

# INSTRUMENTS



## **erfi instruments**

The most comprehensive programme of 19" plug-in device system

## **erfi goes ethernet**

Tele-controllable laboratory equipment

## **erfi cable management system**





# erfi instruments





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erfi are specialists for complete working place systems, equipment for laboratories, workshops and assembly tables, measuring and testing devices, didactic training systems as well as testers for electric safety and function.

Our expertise is documented by comprehensive know-how and unequalled experience in 55 years company history.

As initiators and market leaders for electronic laboratory equipment we stand for topmost innovations.

On a total production area of more than 8600 m<sup>2</sup> all products are developed and made in-house, using the most modern machines and storage systems.

erfi dispose of a high vertical range of manufacture and thus ensures high flexibility.

We set great importance to value creation in all parts of our company. All electronic devices and all laboratory furniture systems are manufactured by ourselves. Only this guarantees the unequalled product quality.

The newly built production hall in Freudenstadt sets standards and due to the newly introduced erfi production system (eps) for all product groups, a consistently high quality is ensured.

Your demands are for us the ultimate benchmark. With this comprehensive catalogue we show you at first the new buildings of our company, the modern architecture of which reflects erfi's claim for leadership in design.

We gladly invite you to our new customer service centre. On a tour through the erfi company you witness the formation of all electronic devices and components of laboratory furniture, followed by a professional product presentation.

**Register with the erfi customer service centre,  
phone No. 07441 / 9144-400  
- Tour through the company  
- Product presentation in the new erfi customer service centre**

*Managing directors and owners  
Ernst and Andreas Fischer*









Also with the architecture of our buildings we put into practice our claim for leadership in design: Form follows function!













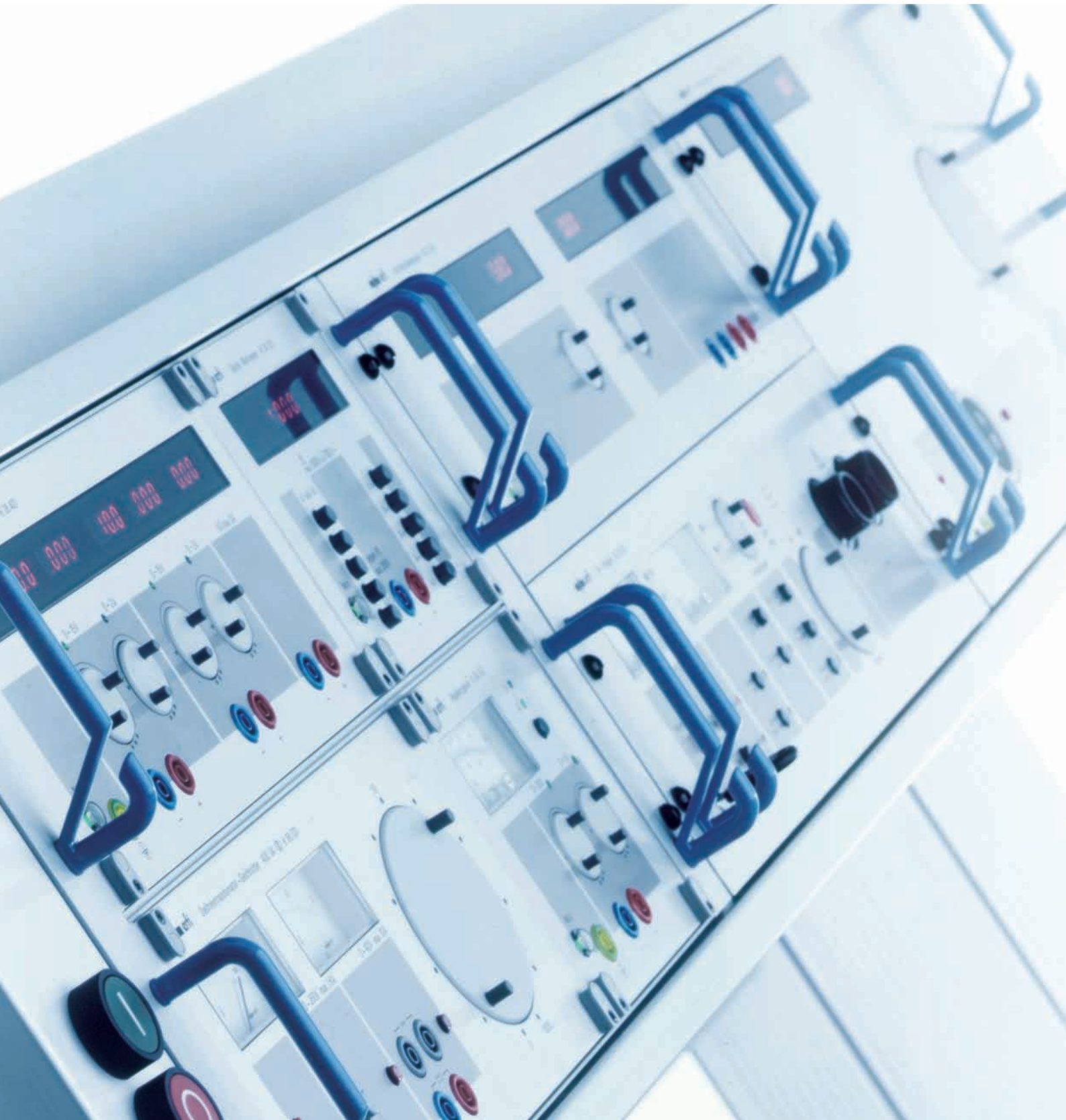
Welcome to erfi!







## erfi instruments – The new benchmark





## erfi instruments – The most comprehensive programme of 19" plug-in device systems

erfi instruments are the result of more than 50 years of research work, development and production.

erfi instruments are representative for the range of electronic products made by erfi and the 3 device systems linked with it:



- **acto®**  
The modern laboratory insert plate system for compact applications
- **highlab®**  
The professional 19" laboratory device system of excellent design and high functionality
- **basic**  
The professional 19" laboratory device system with an alternative design of the front and the control elements.

As first manufacturers and founders of the market for technical working place systems in the field of electrical engineering and electronics, erfi developed in the early 60s 19" plug-in devices such as regulating power supplies, AC power supplies, multi-meters, function generators, oscilloscopes and many more. erfi instruments offer the largest product variance in the field of plug-in device technology.

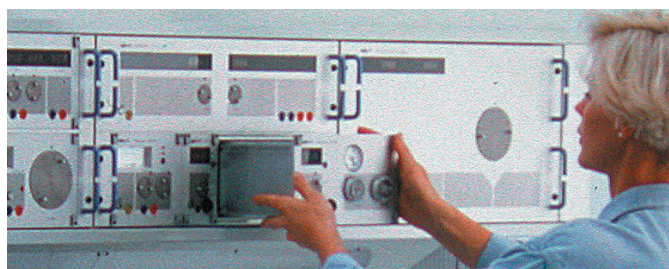
Due to the consistent further development it is now possible to present 3 device systems with the most modern electronics and software for almost all metrological tasks.

The insert plate system acto is the basis of the product range erfi instruments. acto is a very efficient small instrumentation system which meets the requirements of many lower and average performance categories.

For more exacting performances, the Profi-19" device systems highlab and basic are available. With more than 500 different instruments the benchmark is set on the market for 19" plug-in devices. The family-run company erfi develop and produce all instrumentation themselves. An ultramodern test facility ensures to meet highest quality demands. The soldering processes are carried out in the factory by means of high-grade soldering machines, using Wörthmann nozzles and lead-free technology.

Many erfi instruments such as power packs, function generators and safety testers are now equipped with a modern processing technology. Besides the hardware development department, the necessary software development is an inherent part of the erfi development team.

The thus acquired expertise ensures our independence and guarantees highest flexibility. With the present compendium erfi newly set the benchmark on the market of electronic 19" plug-in devices.



The 3 device systems from erfi at a glance:



Due to 3 comprehensive device systems erfi-instruments offer today modern and powerful devices in the field of electronic laboratory equipment and testing systems for electric safety and function. With this comprehensive range of products, the appropriate solution for your particular application is readily available.

## acto® - The new powerful insert plate system

A special feature of this tightly arranged basic system is the low installation height (113 mm) and the low installation depth. The system is suitable in equal measure for laboratory, assembly and training equipment.

The width of the devices depends on the 19" partial plug-in technology. (7 module widths, 1 module width = 5,08 mm). For high packing densities the system is combinable with the 19" device systems.

## highlab® - 19" device system of excellent design and extraordinary good functionality

The professional 19" device system highlab is characterised in particular by its high-grade design and its extraordinarily good operating concept. Several design prizes were awarded to this system.

### **Sandwich design:**

The front of the device is of sandwich design. On a solid mounting plate all operating and display elements are installed. The attached graphic front panel ensures the flush installation. Due to the sandwich design the modern operating elements can be so designed that no caps or other components can be removed or damaged. This is of special advantage in the field of training. **(Safety feature against vandalism!)**

### **Graphic operating interfaces:**

The graphic panel is made according to the Seo-photo-process which means the inscription is absolutely abrasion-proof and embedded underneath the anodised layer.

Additional grid patterns allow an unequalled, high-grade and well structured front panel.



## basic - 19" device system – The alternative in design

basic follows also the principle of the 19" insert technique. Each highlab device is also available in the basic design line.

basic differs from highlab by its front panel, design and operating elements. The circuit technology is identical.

The system is characterised in particular by its mechanically high-grade, smooth surface.

The smooth surface is dirt-repellent.

Due to a special two-layer paint finish and the multi-component print, the surfaces of the front panel are highly resistant against shocks, scratches and chemical stress.

The thus obtained surface quality is clearly superior to any screen printing method.

## Device system highlab® with furniture system varantec®







## Device system basic with furniture system varantec®

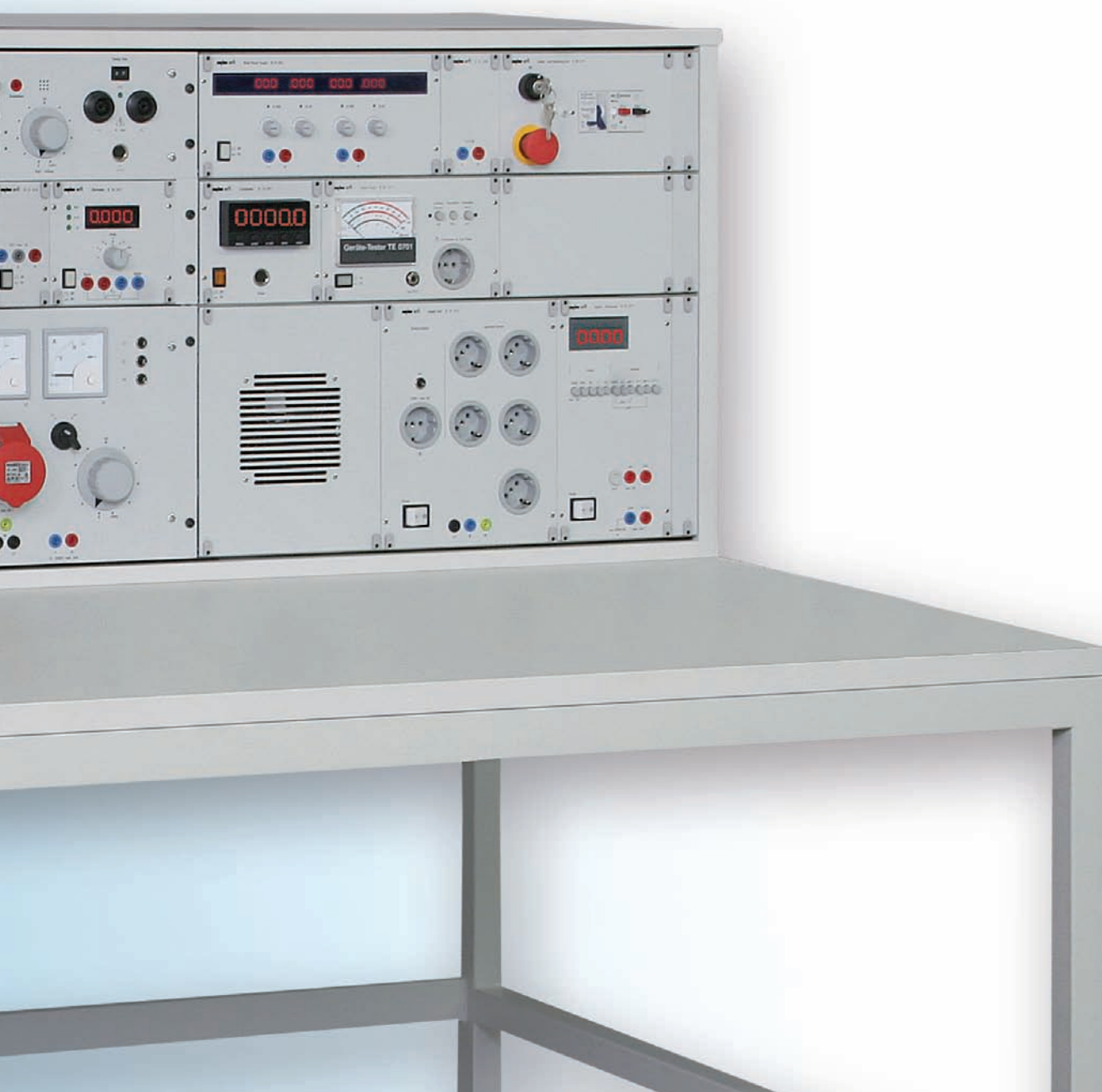




Device system basic integrated in the furniture system ABZ®  
(Example of a motor test station)







## Device system acto<sup>®</sup> with furniture system ABZ<sup>®</sup>



## Electronic laboratory for the industry



*Height adjustable corner combination:  
By a hand crank (alternatively motorised height adjustment) the complete  
table combination can be adapted in height.*



*Ergonomically designed working places*



## Didactic trolley



*Didactic Mobil (trolley for training) equipped with erfi didactic teaching materials:  
Test of automation technology with PLC S7 board inclusive model "traction module",  
frequency inverter board, VDE 0701 and 0702-test  
Electric machines: AC asynchronous error simulator.*



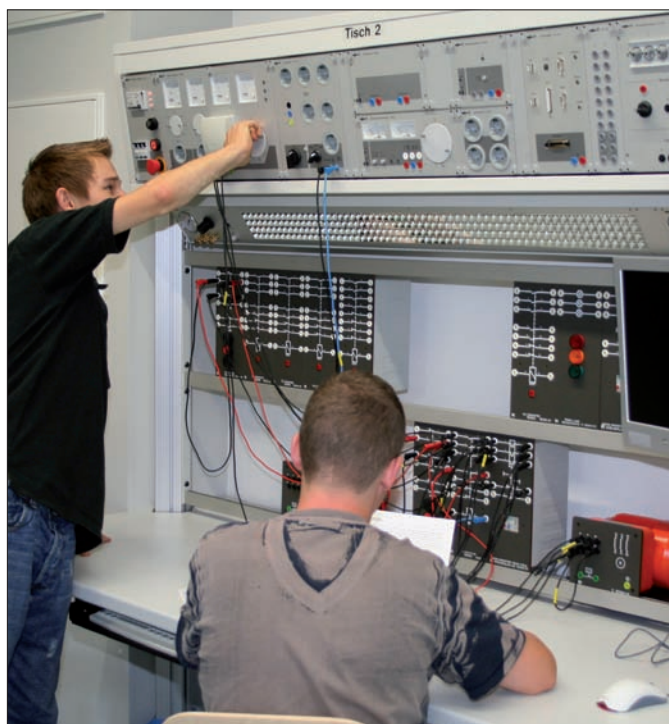
## Complete laboratory equipment



*Furniture system varantec C with aluminium cabinet system varantec select.*



*Device cockpits equipped with device system highlab.*



*Integrated lighting systems and DIN A4 experimenting frames.*

## Complete laboratory equipment



*erfi laboratory working place with 19" device system basic and erfi didactic teaching materials*



*erfi didactic trolley*





## Complete laboratory equipment



*Furniture series varantec with 19" device system highlab  
Equipment with 19" swivel attachments (foldaway by electric motor)*





## Complete laboratory equipment



*Experimenting frames equipped with erfi didactic teaching materials*





*Theory and practice in one room!*

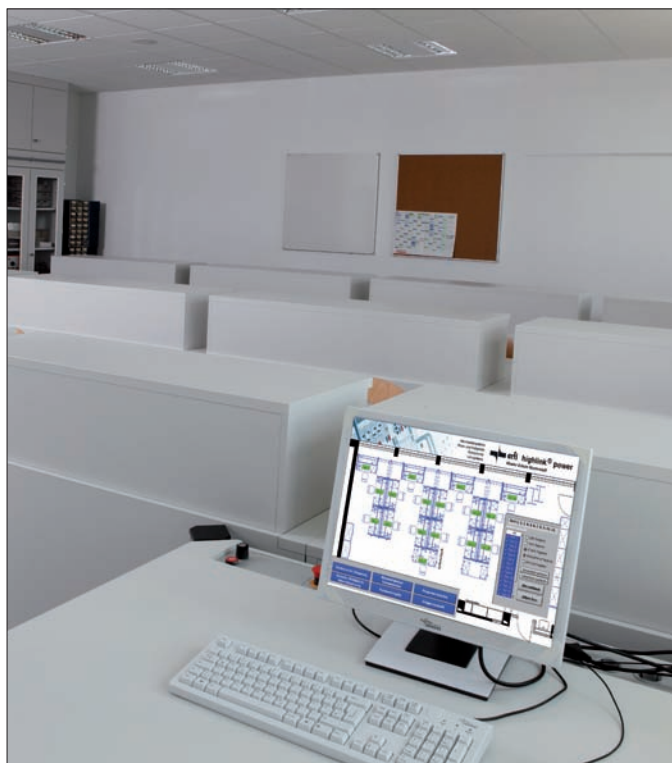
*In the middle of the room, the table series varantec with round feet are used for theoretical instructions.*

## Complete laboratory equipment inclusive tele-control software highlink® power





## Complete laboratory equipment, multifunctional with erfi foldaway tables



*With the modern tele-control software highlink Power from erfi, all foldaway attachments are retractable / extendable at the push of a button.*



*Foldaway attachments being extended.*



*Foldaway attachments being retracted by half.*



*Foldaway attachments being completely retracted.*

## Furniture system varantec® with 3 HE/19" table attachments and 19" device system basic



Laboratory system equipment varantec with 19" device system basic and erfi didactic teaching materials (VDE tests, motor defect simulator, PLC S7 board and frequency inverter board for the automation technology).



Perforated plate system for experimenting, integrated in the working place.  
The wall units are uncluttered and transparent due to their glass fronts.



## Complete laboratory equipment with integrated training rooms



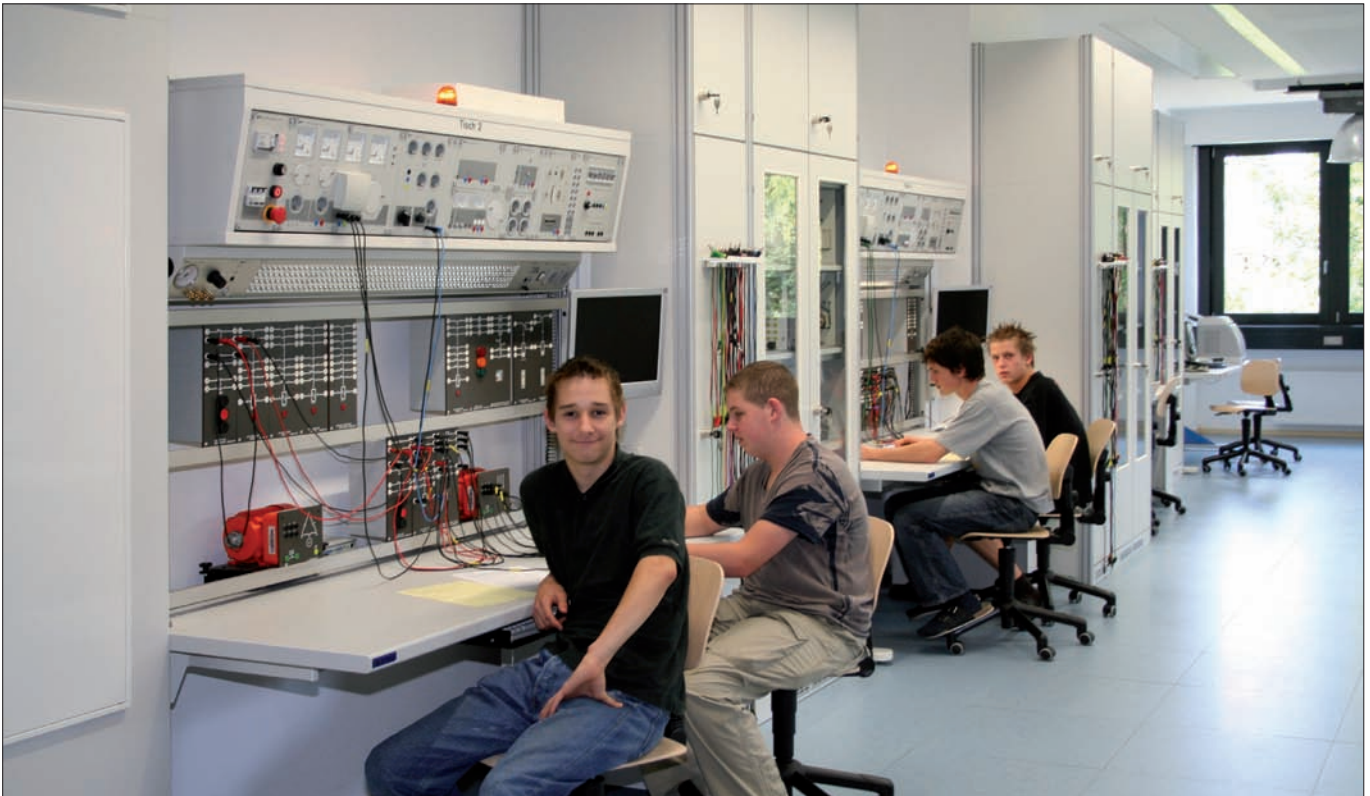
*Theory and practice being united.*



*Laboratory with suspended wall cabinets. Smooth-running sliding doors allow the quick and easy access to didactic materials.*



## Laboratory equipment – networked and tele-controlled by the software highlink® Power



Equipment for training in the vocational training school 5 in Linz:  
Aluminium furniture system varantec C with integrated 19" device system highlab and aluminium cabinet system varantec select.



PC tables for theory of the series varantec 4.

Multifunctional due to 19" swivel attachments. Completely tele-controlled and networked.



*19" highlab device system with 3 HE/19" swivel attachment, movable experimenting frame with perforated plate.*



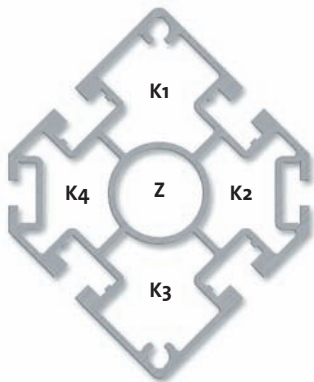
*Laboratory table equipped with power pack, variable isolating transformer, function generator and many more. In the background: wall unit system and conference room with trapezoidal tables*



## The erfi cable management system

Vertical cable channel system  
varantec MAX, interior cladding  
with high-quality brushes

The varantec  
system with aluminium profiles



- 4 spacious cable chambers (K1 – K4)
- 1 central pipe (Z)





LED lighting technique from erfi !  
The well known highlight lighting technique is now also available in LED design!



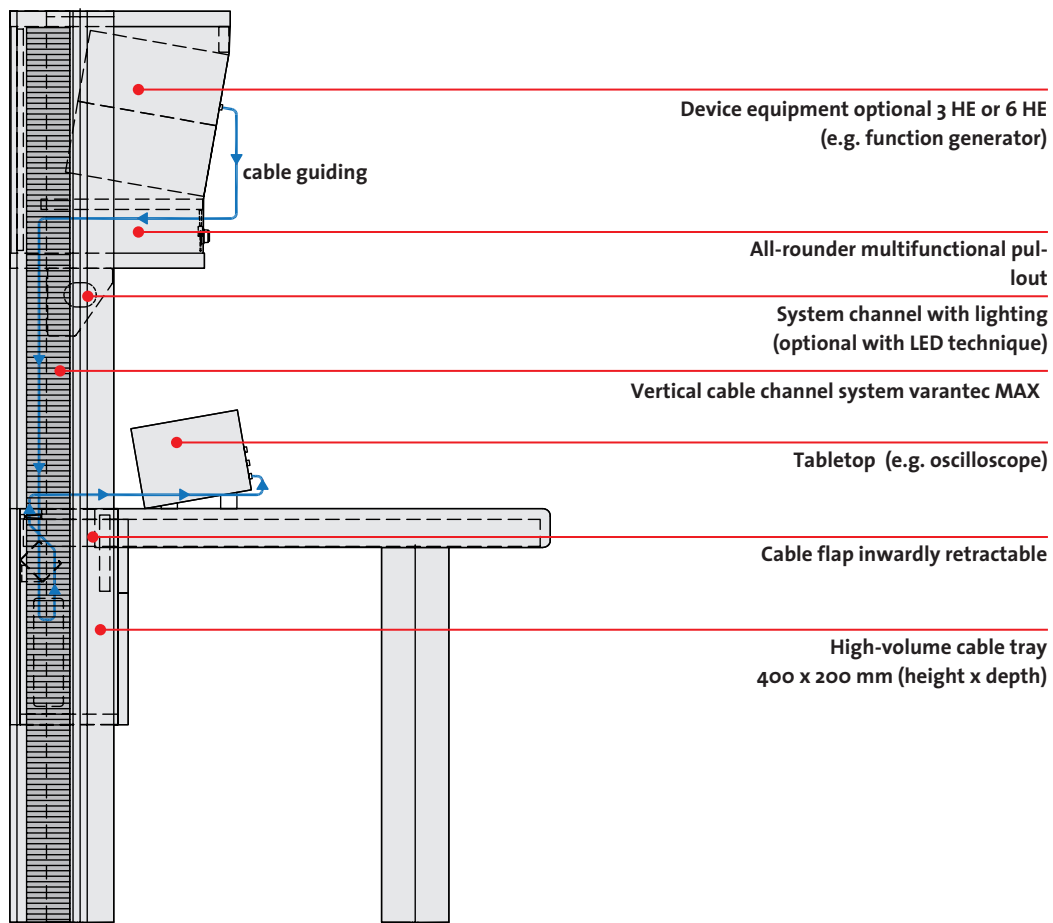
All-rounder multifunctional pull-out (optional: tiltable)

Vertical cable channel system  
varantec MAX, interior cladding  
with high-quality brushes

Cable flap  
inwardly retractable

High-volume  
cable tray 400 x 200 mm ) (height x depth)

## Example of cable guiding



All-rounder multifunctional pullout for the professional storing of tools, media adaptor, media guiding and more



The all-rounder is integrated in the device cockpit and thus forms one unit.  
For tidiness at your working place!



The all-rounder can easily be opened and is well accessible. Optionally, it can be tiltable downward.



Useful detail:  
Tiltable key head!

#### Selection chart

Reference No. integrated in the device cockpit	Reference No. integrated underneath the shelf	suitable for table width
V 24.9.112	V 24.9.212	1200 mm
V 24.9.116	V 24.9.216	1600 mm
V 24.9.118	V 24.9.218	1800 mm
V 24.9.120	V 24.9.220	2000 mm

#### Dimensions of the multifunctional pullout

Height mm	Depth mm
75	320

#### Option:

Additional price for the tiltable  
multifunctional pullout  
Reference No. V 24.9.001

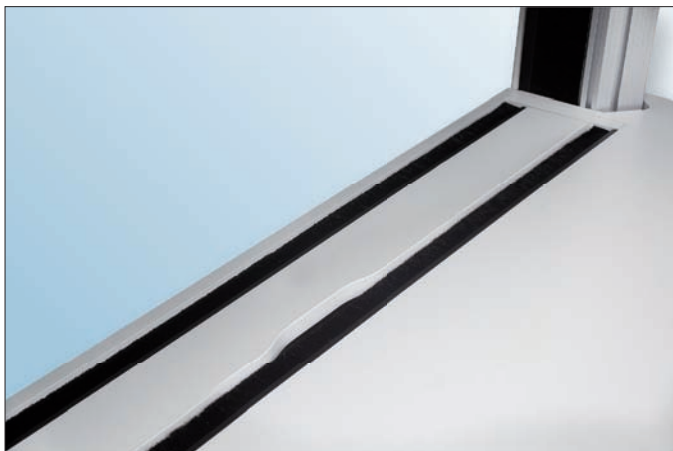
The all-rounder is lockable and thus protects your valuable tools or other articles of value. Due to the complete integration in the cockpit, the media supply to the built-in units and in the rear vertical varantec Max-channel is very easy.



## The innovative cable flap from erfi. Retractable, with 2 cable feedthroughs and central opening position.

German patent application 10 2011 011 644.3 and 10 2011 011 645.1

### Overview opening procedure



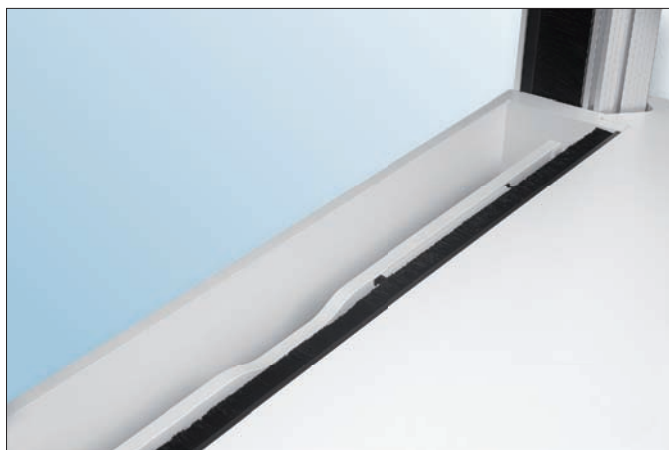
*Two elegant brush rails lengthwise to the table top!*



*One finger touch with quick access!*



*Touch and be amazed!*



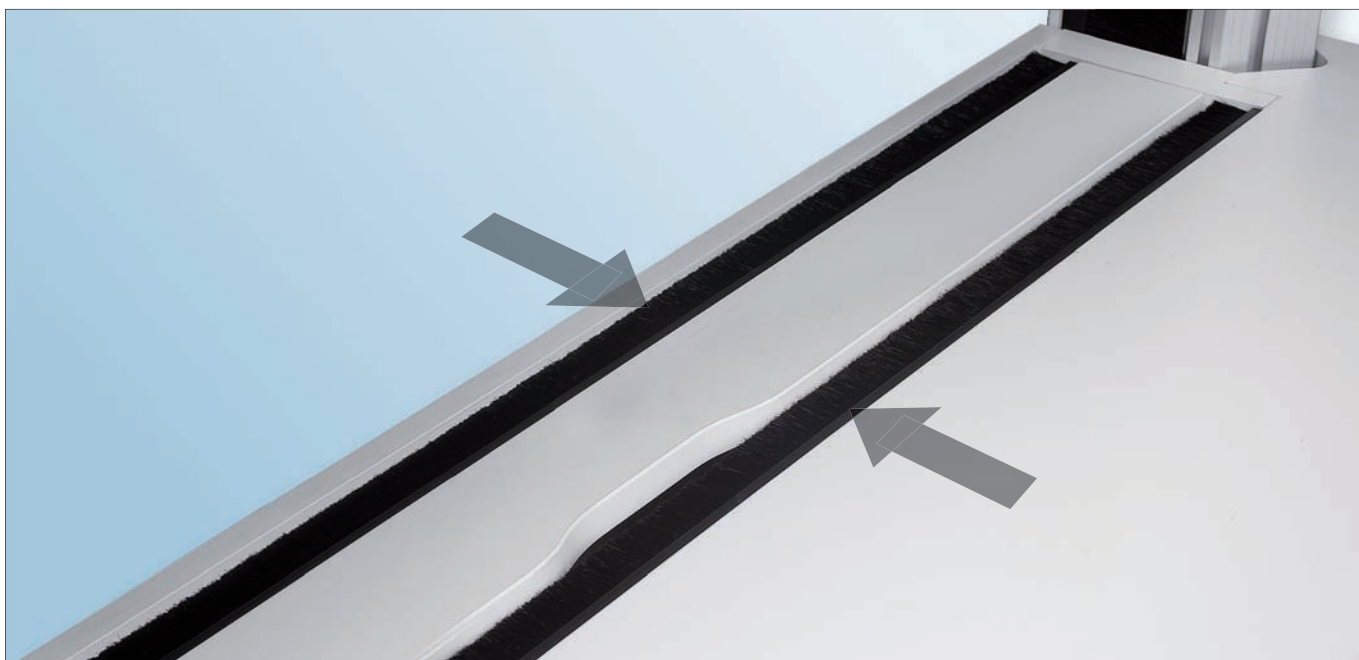
*the cable flap slides in its central position without any effort ...*



*... and is parallel movable to the rear ....*



*into its complete opening position!*



*Cable flap retractable with 2 cable feedthroughs.*

erfi present a completely newly designed cable flap which offers considerable advantages to the user.

#### **One Finger Touch with Quick Access: An invention of erfi.**

Considerable functional advantages compared with all other available solutions:

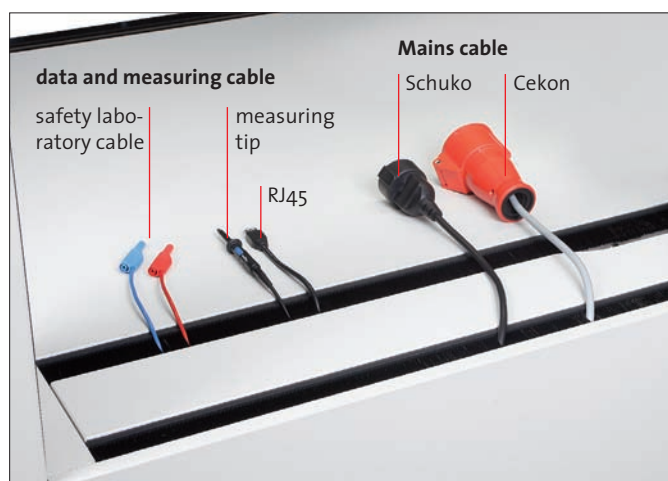
(German patent application 10 2011 011 644.3 and 10 2011 011 645.1)

- Cable flap retractable with 2 cable feedthroughs and central opening position  
The system is equipped with 2 elegant brushes which run lengthwise to the table top.

#### **Advantages due to 2 cable feedthroughs:**

**(German patent application 10 2011 011 644.3)**

1. By providing two cable feedthroughs at the opposite longitudinal edges of the cable channel cover it is possible that, as required, the cables can be fed through into the cable channel from the front or from the back.
2. This allows to meet the high space requirement on the one hand and, on the other hand, a good and easy accessibility.
3. Due to two cable feedthroughs separate cable types such as measuring cable and mains cable can be fed through separately and clearly.
4. It is possible to recognize the cables outside the channel at on-sight.
5. Inside the cable channel this separation can be maintained.
6. Due to the fact that only the rear brush rail is fitted to the cable flap, it is guaranteed that the cable flap does not project beyond the table top at any moment during the opening/closing movement.



*Optimal separation of cable types, recognition of cables at one sight*



*Also during opening and closing, there is no overhang.*

The innovative cable flap from erfi.  
Retractable, with 2 cable feedthroughs and central opening position.



*Quick access – One Finger Touch: With one movement of the finger opening and closing is possible. Touch and be amazed.*

**Advantages due to the central opening position:**  
(German patent application 10 2011 011 644.3)

**1. Quick access – quickly accessible with One Finger Touch**

The cable flap slides in a central position during opening almost without any effort.

The cable flap can be opened and closed easily and quickly with one finger (One Finger Touch). The fitting method developed by erfi allows the advantageous function “Quick Access and One Finger Touch” without having to reposition ones hand.

Within a short moment of time the cables are accessible. With the slogan “Touch and be amazed” you are going to enjoy sorting your cables.

**2. Excellent accessibility due to the symmetrical central position**

Due to the symmetrical central position of the cable flap, the opening of the cable channel, accessible from the top, is divided in two equally sized areas so that both areas are well accessible in the same way.

The quick access function allows that the cable flap slides quickly and easily in its central position and thus gives quick access to the already pre-sorted cables.

**3. Sorting of cables**

The cables are permanently sorted during opening and closing.

In contrast to other systems on the market which swivel the cable flap at the front and rear edge, erfi break new grounds.

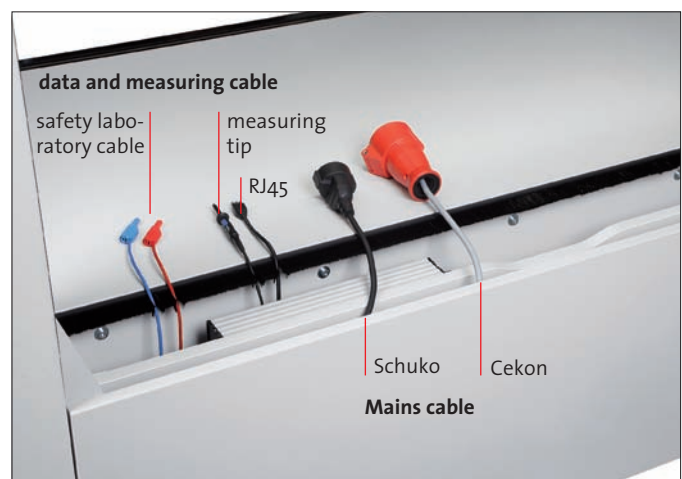
For the first time the cable flap is intentionally positioned in the central area of the cable channel. This allows the quick access with cable sorting function, feeding through the cables separately in a front and rear area.

**4. The complete opening position**

The cable flap is movable parallel from the opening position in the central area of the cable channel into the complete opening position in a border area of the cable channel.



*Quick access: With one movement of the hand the cable flap is pushed from the central position into complete opening position and thus allows the optimal access for extensive cabling.*



*Good accessibility due to the central position. The cables are permanently sorted during opening and closing.*





*Quick access: With one movement of the hand the cable flap is pushed from the central position into complete opening position and thus allows the optimal access for extensive cabling.*

For extensive installations the big opening area can optimally be used. The sliding procedure is easy and does not require any physical effort thanks to the special guiding.

#### 5. The generously designed cable channel

Underneath the cable flap there is a large cable channels for a high volume of cables.

##### **Dimensions of the cable channel:**

Overall height 400 mm, depth 200 mm, width: as per the table width.

#### 6. Perfect cable sorting in the cable channel by the optional separating wall (measuring cable and current-carrying cables)

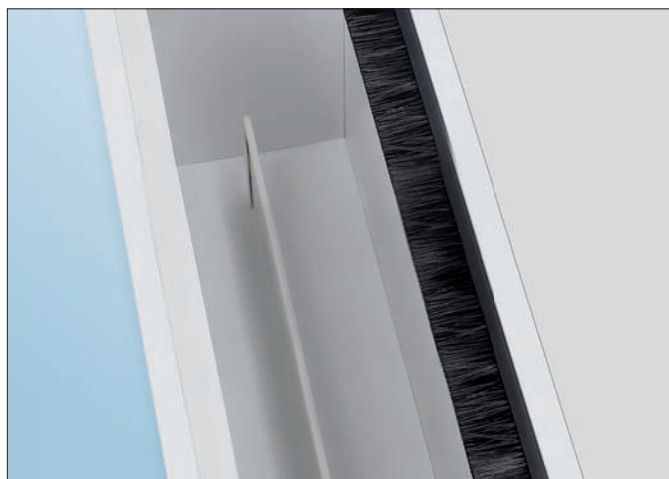
On request the cable channel can be equipped with an additional integrable separating wall for the professional cable sorting. Thus, the cable sorting which is already feasible due to the 2 openings in the cable flap, can consistently be carried on in the cable channel. To avoid the cross-talk between measuring and current-carrying cables, the intermediate wall is made of metal (shielding).

#### 7. Easier accessibility / enlarged working area

Besides the advantage of the cable sorting, the access for feeding through the cables in the front brush rail has been clearly improved. Especially with deep tables of 1 m depth the access to the cables fed through at the table end, is difficult from the front. When using the rear brush, however, the working area is optimised.

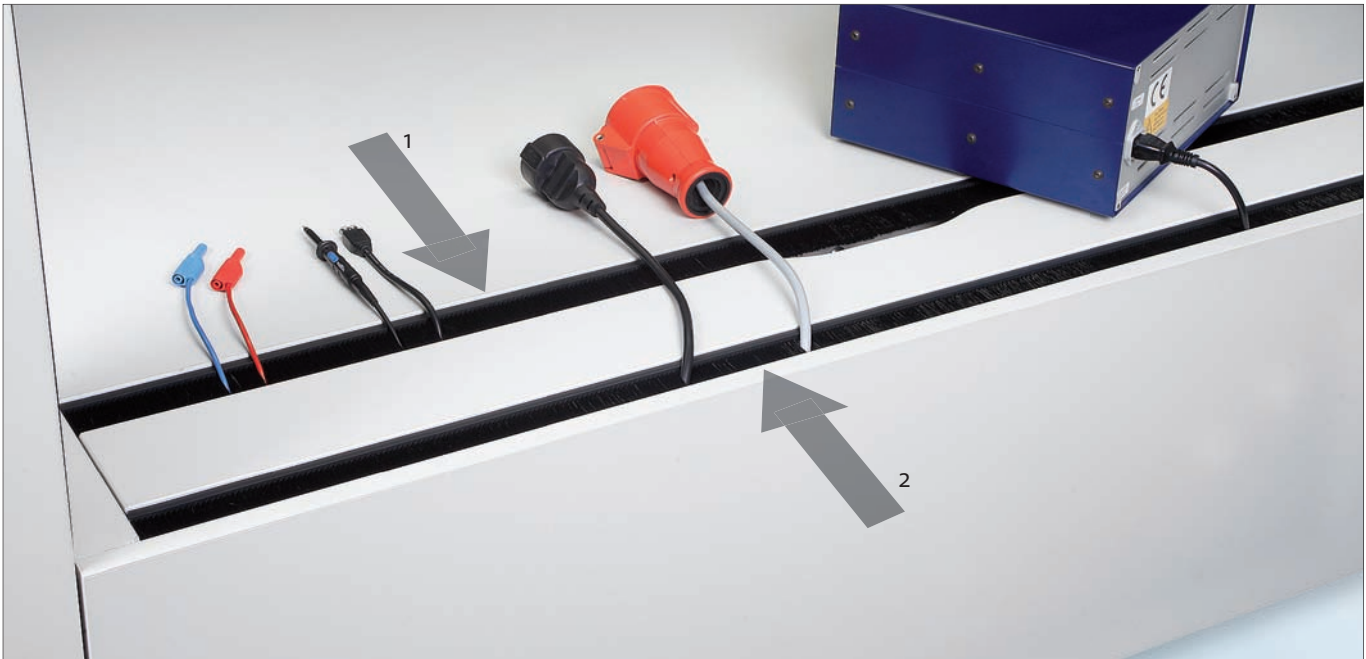


*Large cable channel for a high volume of cables*



*Optional separating wall for the perfect cable sorting*

## The innovative cable flap from erfi. Retractable, with 2 cable feedthroughs and central opening position



Good accessibility of the cables due to the front brush rail, optimal ergonomics. (1) Optimization of the working area by using the rear brush (2).

Thus, the system offers considerable advantages with respect to:

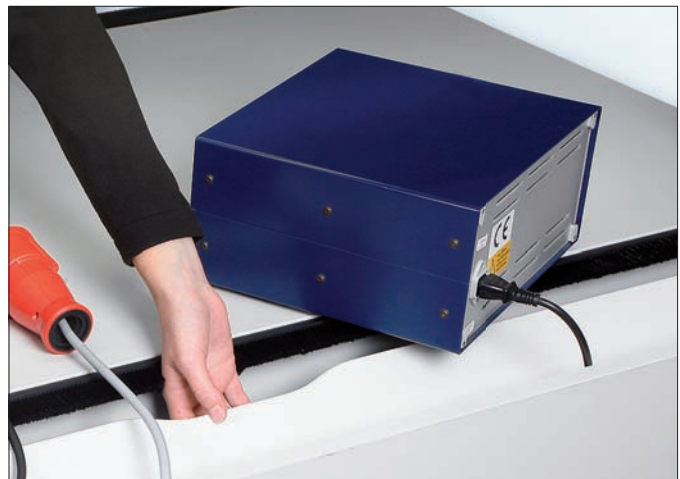
- Cable sorting
- Accessibility and
- Ergonomics

### 8. Ergonomics

During development special attention has been paid to the fact that the cable flap does not project beyond the table top at any time. In the central and complete opening position the vertical cable flap is lowered. Thus, the cables are fed through so that they do not have to be fed through a projecting cable flap.

### 9. Electrification

The system allows the elegant integration of multiple socket strips. The same can be mounted on the underside of the cable flap. In the complete opening position the consumers can be quickly electrified. In the closing and swivelling movement the cable is carried along and does not have to be lifted at any time.



At no time does the cable flap project beyond the table top thanks to a well-thought-out flap system.

### 10. Cable channel lighting with LED light



Integration of multiple socket strips optionally possible on the underside of the cable flap.

The modern erfi concept offers optionally the channel lighting with a modern LED light.

To avoid that the LED lighting interferes with the cable sorting, it is embedded on the underside of the cable flap. After opening of the same, the LED light shows downwards and ensures the optimal lighting of the cable channel.

#### 11. Integrated adjustable brake function

The almost effortless operation of the cable flap ensures a high degree of safety. An integrated brake takes care that the cable flap slides smoothly and easily inside the cable channel during opening. An abrupt opening is thus precluded. The brake is so designed that it does not hinder the closing of the cable flap.

#### Retractable cable flap with a spacious cable trough

	suitable for table width	Ordering numbers
<b>400 x 200 mm (H x T)</b>	1200 mm	V 24.9.312
	1600 mm	V 24.9.316
	1800 mm	V 24.9.318
	2000 mm	V 24.9.320

(For integration in a varantec table type 1)

#### Additional articles

	suitable for table width	Ordering numbers
<b>Option: Separating wall made of metal H= 120 mm</b>	1200 mm	V 24.9.412.1
	1600 mm	V 24.9.416.1
	1800 mm	V 24.9.418.1
	2000 mm	V 24.9.320.1

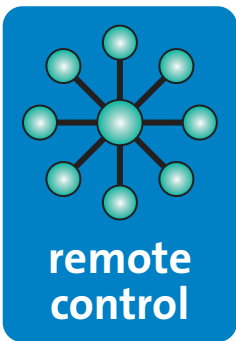
	suitable for table width	Ordering numbers
<b>Option: LED lighting (for 1 cable channel)</b>	1200 mm	V 24.9.412.2
	1600 mm	V 24.9.416.2
	1800 mm	V 24.9.418.2
	2000 mm	V 24.9.320.2

On request, the retractable cable flap is also available with 1 brush only.





## erfi goes ethernet – tele-controllable equipment technology from erfi



All tele-controllable devices and instruments in this catalogue are marked with this logo and are, therefore, easily findable. All tele-controllable devices can be integrated in the modern tele-control software highlink Power. The networking with integrated ethernet interfaces is a matter of course. As an alternative to the ethernet interface technology, almost all devices are deliverable with a serial interface RS232 or with interface USB 2.0.

erfi are the pioneers on the market of electronic laboratory equipment and as a first company, presented in 2002 tele-controllable and networked laboratory devices which revolutionized the total market due to the innovative software highlink.

erfi is presenting the present tele-controllable device generation with innovative microprocessor technology. The new devices contain a high level of self-contained intelligence with many innovative functions for training and work.

**The following product groups belong to the tele-controllable devices, such as:**

- Variable direct current sources (regulating power supplies)
- Variable alternating voltage sources (regulating transformers)
- Variable three-phase supplies (three-phase regulating transformers)
- Function generators
- Digital multi-meters
- Power measuring devices
- Oscilloscopes
- Insulation and earth conductor testing equipment



Example: tele-controllable three-phase supply



## erfi goes ethernet – The highlights of the leading erfi equipment technology



RJ 45



**Option:**  
Ethernet interface  
(rear)  
Reference No.:  
NWT 1.106

USB 2.0



**Option:**  
USB 2.0 interface  
(rear)  
Reference No.:  
NWT 1.107

COM 1



**Option:**  
RS232-C serial inter-  
face (rear)  
Reference No.:  
NWT 1.108

### Highlights of the modern equipment world:

The new generation of  $\mu$ -processor controlled regulating power supplies  
The modern regulating power supplies from erfi possess an unequalled level of functionality due to the latest processors. This functionality is protected by a utility model.

German utility model No. 20 2004 004 623

### Technical highlights:

- Ethernet, USB 2.0 and RS 232 interfaces (option)
- Interface at the rear or front is optionally available
- Plug-and-play function
- Control deviation of only 0,2 mV / A
- Minimum residual ripple: 0,2 mVeff
- Fastest control setting time: 15  $\mu$ s
- Integrated ramp generator for long-term tests
- Chart function by means of ramp generator
- Many programmable parameters for flexible triggering
- Easy handling due to simple ASCII block commands
- Self-contained measuring chart for voltage and current values
- Continuous quick measurements with fast processors
- Thus, superior metered value transfers

### The modern programmable function generator family

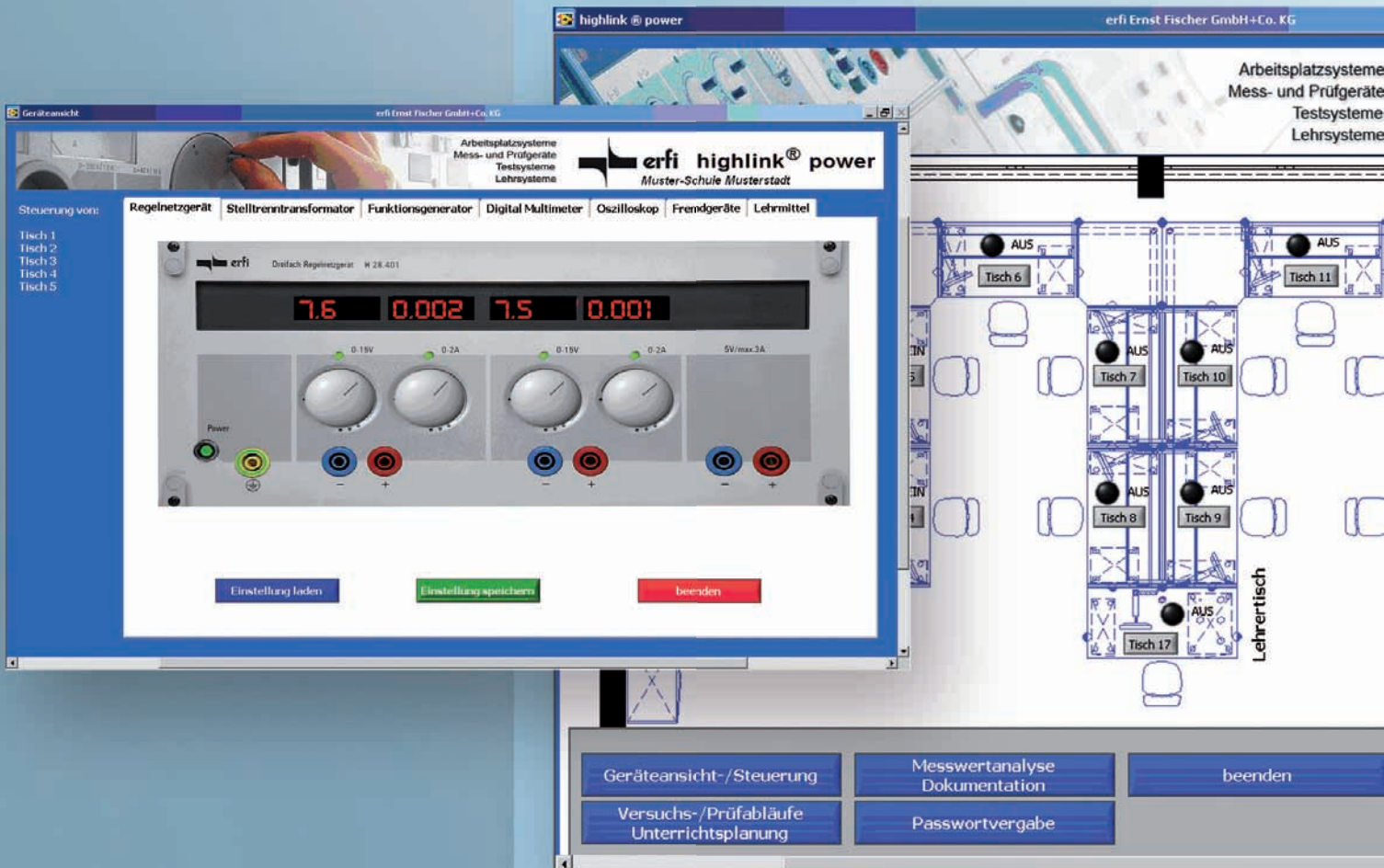
Amplitudes of up to 30 Vss, frequencies of up to 20 MHz, occurrence counter etc. are only some of the features which redefine the benchmark in this product group.

### Technical highlights:

- Ethernet, USB 2.0 and RS 232 interfaces (option)
- Interface at the rear or front is optionally available
- Plug-and-play function
- **All functions are tele-controllable and back-readable**
- **Complete measuring device for frequency and voltage**
- Amplitudes up to 30 Vss
- Frequencies of up to 20 MHz
- Ramp generator
- Occurrence counter for non-periodical occurrences
- Attenuators 0-20 dB, 20 dB and 40 dB in addition
- **Freely programmable single current pulse**
- Internal Sweep (start and stop frequency, wobble frequency)
- Frequency counter up to 100 MHz
- Many functions: Sinus, triangle, rectangle, saw tooth
- PWM from 10 % to 90 % programmable
- VCO input, PWM input
- DC offset -10 up to +10 V



## highlink®Power – The software for the easily operated telecontrol of complete laboratories



erfi are the first company worldwide offering completely networked electronic laboratories and, being the leader on the market, have set new standards.

The further development of the erfi software which has been on the market since 2002, is the corollary to secure erfi's position on this market segment.

The result of the consistent software development for the networking of laboratories has a new name:

**highlink®Power**

The innovative software structure of highlink Power is the consolidated combination of all functions which no other instrument has.

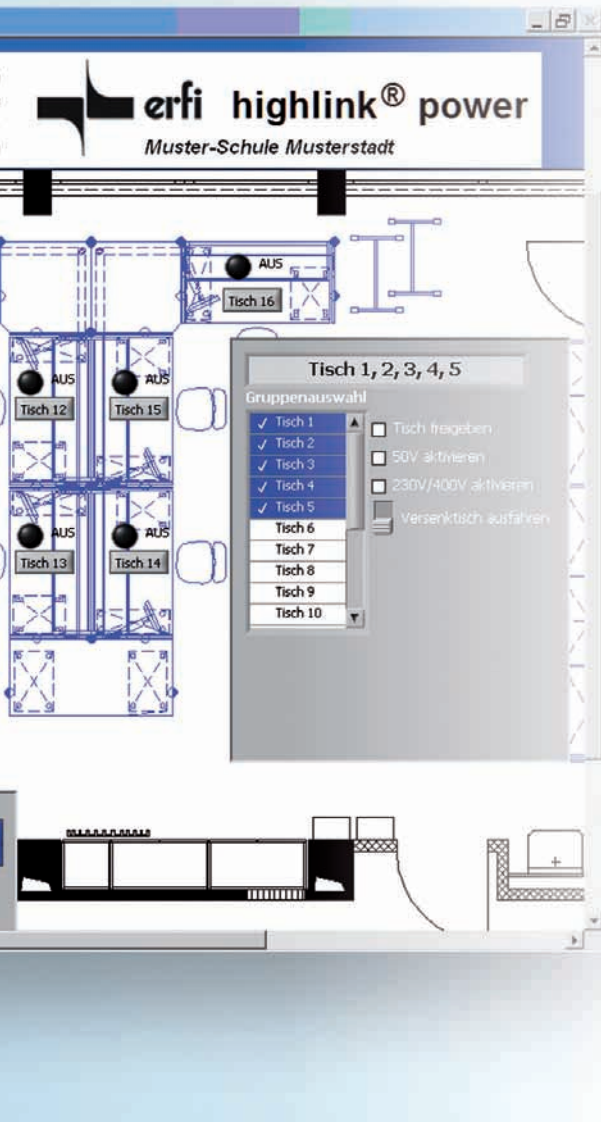
At a glance all functions are elegantly and easily controllable in one laboratory. In addition to all erfi device functions also the conditions of the electronic laboratories can be controlled and inquired.

**Switch over to the future and link your laboratories with highlink Power!**

**highlink Power: The benchmark in the field of networked laboratory systems!**



## highlink®Power



### The structure:

The software package highlink Power is a modern instrument which is suitable for professional as well as industrial applications.

### Highlights:

- Representation of the actual room layout
- Thus immediate survey of the conditions of all laboratory tables
- Individual control of individual working places from the table of the instructor
- Most modern network engineering (LAN, WLAN, ...)
- Control / release of individual function groups
- General release
- 50 V
  - 230 V / 400 V
- Retractable / swivel tables
- Visualisation of all conditions
- Emergency stop function
- Position of the retractable / swivel tables
- Release given / not given
- 50 V / 230 V / 400 V release
- Forming of groups of tables
- Remote control of all groups of devices and functions
- Photo-realistic representation of the device
- Recognition of failures and prevention of operating errors (failure manager)
- Optimal lesson plan due to time-controlled parameterisation of all functions (immediate beginning of the lesson and thus, optimal exploitation of the teaching times)
- Increased teaching quality
- Any number of tests and parameterisations per student's place storable and recallable at any time (configuration of the laboratory place)
- Professional logging of the measurement data with integrated reporting generator
- Student-related assessment possible for individual tests
- Representation of measurement data also in HTML format
- Recording and play-back functions of the gradients
- Simulation of the gradients to be expected (nominal / actual condition)
- Password management for individual access rights
- Limitation of the range of adjustment for individual working places
- Vis- Visualisation and transmittance of individual screen contents to any number of working places
- Excellent didactic teaching methods
- erfi laboratory manager
- In case of comprehensive equipment individual floor plans can be selected and tele-controlled by the networking. From the instructor's room all necessary functions of the specific room can be adjusted.
- Integral concept due to the good integration of the erfi teaching system contained in the programme erfi didactic:
  - Automation technology with logo! and S7
  - Building automation
  - and more

## highlink®Power – The software for the easily operated telecontrol of complete laboratories

### Visualisation of the laboratories

Due to the efficient and powerful software package the laboratories can be visualised within a very short time. All conditions are detected at a glance.

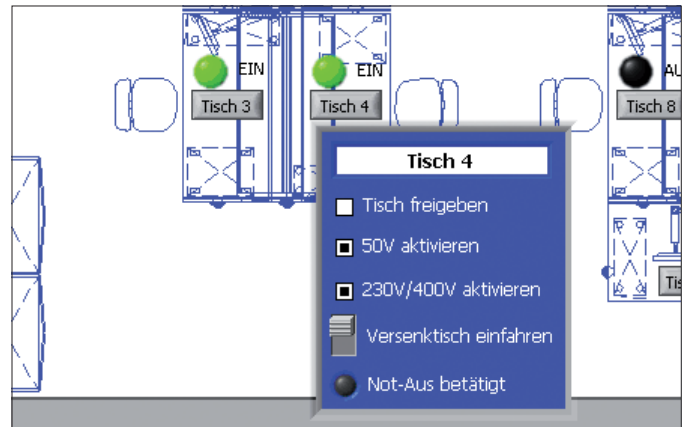
In bigger buildings the erfi floor plan manager allows the free selection of the room. If required, this package permits even access to rooms in other buildings.



### Activation / control of individual function and device groups

Besides the current 230 V and 400 V voltage supply, modern laboratory tables are equipped with modern DC power supplies (low voltages) and measuring devices with intelligent functions. The individual devices and function groups can easily be controlled.

Also the up/down movement of the foldaway and swivel tables can be easily controlled from the instructor's place on the push of a button. At the same time the conditions of the various laboratory tables can be visualised (see table4).



### Photo-realistic visualisation of the device

Due to the modern software structure highlink Power ensures the homogenous integration of all erfi devices and devices of other current makes inclusive erfi didactic. Of course, all established makes of teaching material can be implemented in this concept without involving increased expenses.

The package shows the user all devices with a front panel true to the original inclusive all operating elements.

The advantages are evident. For the user it does not matter whether he operates the device directly or through the software. No tedious training

times are required. On starting the software, operation can be started at once.

In addition, highlink Power ensures a very quick communication with the device concerned so as to avoid any delays. Benefit from the many years experience in the field of software development.



Example: Visualisation of an erfi double regulating power pack



Example: Visualisation of an erfi function generator.

### High protection of the hardware by programmable limits

highlink Power guarantees the protection of your hardware at any time. Due to the possible limitation of individual device parameters such as current limiting (output OFF function) it is ensured that the connected

measuring hardware or electronics resp. does not get affected. Longsome repairs caused by operating errors are precluded.



#### Example DC source:

Power pack with tension and current limiting ( $U_{max}$  and  $I_{max}$ )  
Limitation of the output power by the output OFF function



#### Example of a sensitive measuring technique:

Digital multi-meter with respective measurement ranges

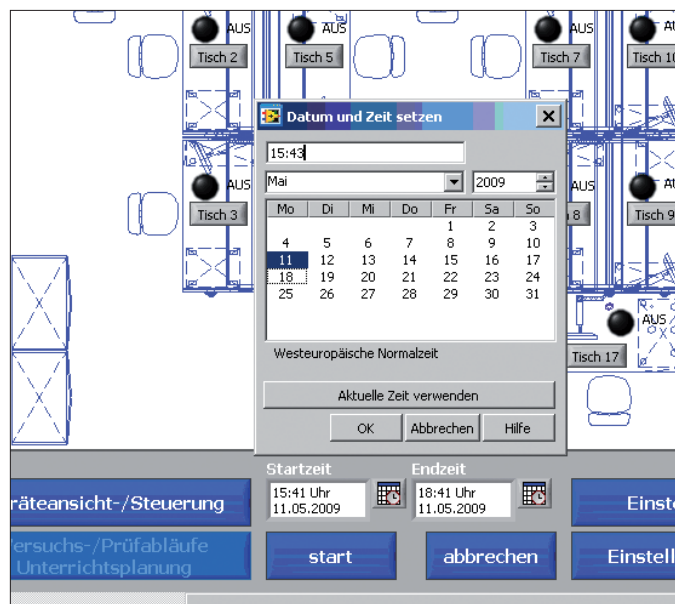
### The planning manager for training and examination (optimal time management)

Start your lessons immediately without losing time! The complete package allows the perfect time control of your lessons. Within the planning of the lessons the individual device parameters can be pre-adjusted per student's working place and student and can be linked with a clearly laid out yearly time planning. When reaching the point in time, all working places contained in the planning are automatically adjusted to the desired configuration. For example, retractable tables move automatically to the desired position and the power supplies are configured to the respective maximum currents for the applicable test.

highlink Power allows the easy individual programming of the student's working places and thus ensures a productivity of the training which has never been achieved before.

Adjustment times required by the students prior to starting the test are no longer needed!

Already in 2002 erfi launched on the market the telecontrol software highlink and, therefore, possesses the longest experience in the field of tele-controllable laboratories. This fact is clearly documented by our trade mark rights for tele-controllable devices (see page 47, utility model protection).





## highlink®Power – The software for the easily operated telecontrol of complete laboratories

### Complete integration of erfi teaching materials (E-learning) – erfi didactic

erfi didactic is an own brand name of the company and comprises a modern teaching material programme for the automation technology, drive engineering, building automation, error simulation, motor simulators, installation technique and more.

Many erfi training devices are equipped with an interface and thus allow to integrate the devices in an intelligent way in the training structure by means of highlink Power.

Besides the well-known E-learning a modern tool is handed over to the student.

The different tests are stored in the software and can be processed by devices with standard interfaces. The instructions for the tests are visualised and the student is guided didactically.

### Up to date documentation by reporting generator:

highlink Power permits different simulations prior to starting the test. Gradients to be expected can be displayed graphically and can be compared later with the actual process.

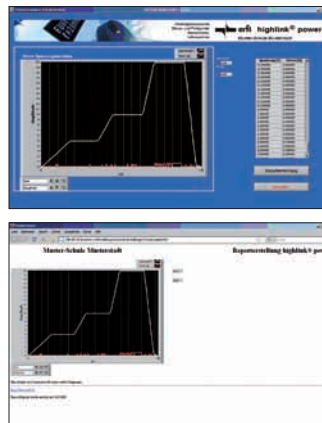
The measurement data and the documentation are automated and the data are available in HTML, Excel or other formats. At the push of a button, the data streams can be relayed to other programmes (Excel, Internet explorer, etc.).

The integral concept provides a professional and up to date data management.

### Example of integration of the test: automation engineering, learning area 7 to 13



Detailed test instructions giving assistance to the instructor and the student are normal for erfi and are included in the scope of supply.



The measurement data are visualised in a chart in real time in a chart during measuring and simultaneously in a graphic chart.

At the push of a button a HTML-reporting for Internet explorer or other browsers is made.

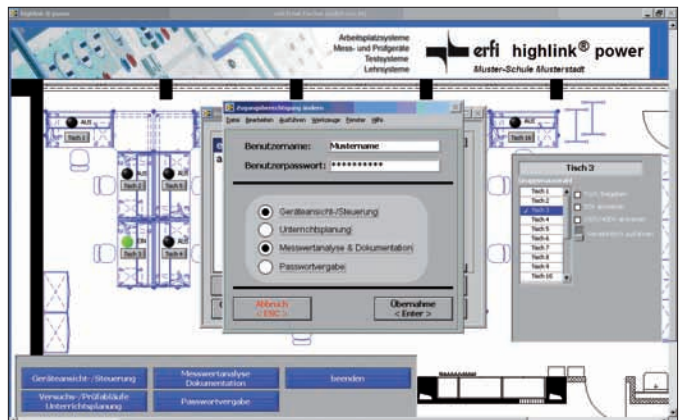
### Visualisation of devices of different makes

highlink Power supports the integration of devices of a different make. Depending on the design of the device and the customer's request, the respective functions are integrated.

### High safety due to the password management

Due to a defined administration level, the user rights can be determined individually for each instructor and student. In addition to the individual access control to the tests, also the programme modules device control, training plan, measurement analysis and documentation as well as password management are controlled individually. This ensures that pre-adjustments cannot be altered unknowingly.

The long lasting experience of the erfi software development team pays off and guarantees the safe and trouble-free training.



## erfi - Network engineering

The erfi network engineering uses consistently the most modern Ethernet technology.

Each laboratory place is equipped with intelligent Ethernet compatible devices which optionally can be integrated in a self-contained experimenting network or in an existing in-house network. Depending on customers requirements, the network is designed accordingly.

Due to the co-operation with renowned solution providers in the field of communication and data networks, erfi has great experience with respect to network engineering.

The references in the field of “tele-controllable laboratories” documents this expertise.

There are two different solutions:

### 1.) Self-contained experimenting network, physically separated from the remaining network

With this solution each PC is equipped with a second Ethernet connection (second network interface card).

This ensures that no failures happen within the in-house network.

The instructor and the students have access to the network through the second network interface card. With this solution a switch is sufficient for networking the room.

Depending on the customers requirements the switch can already be considered by erfi in the planning phase or can be provided by the customer.

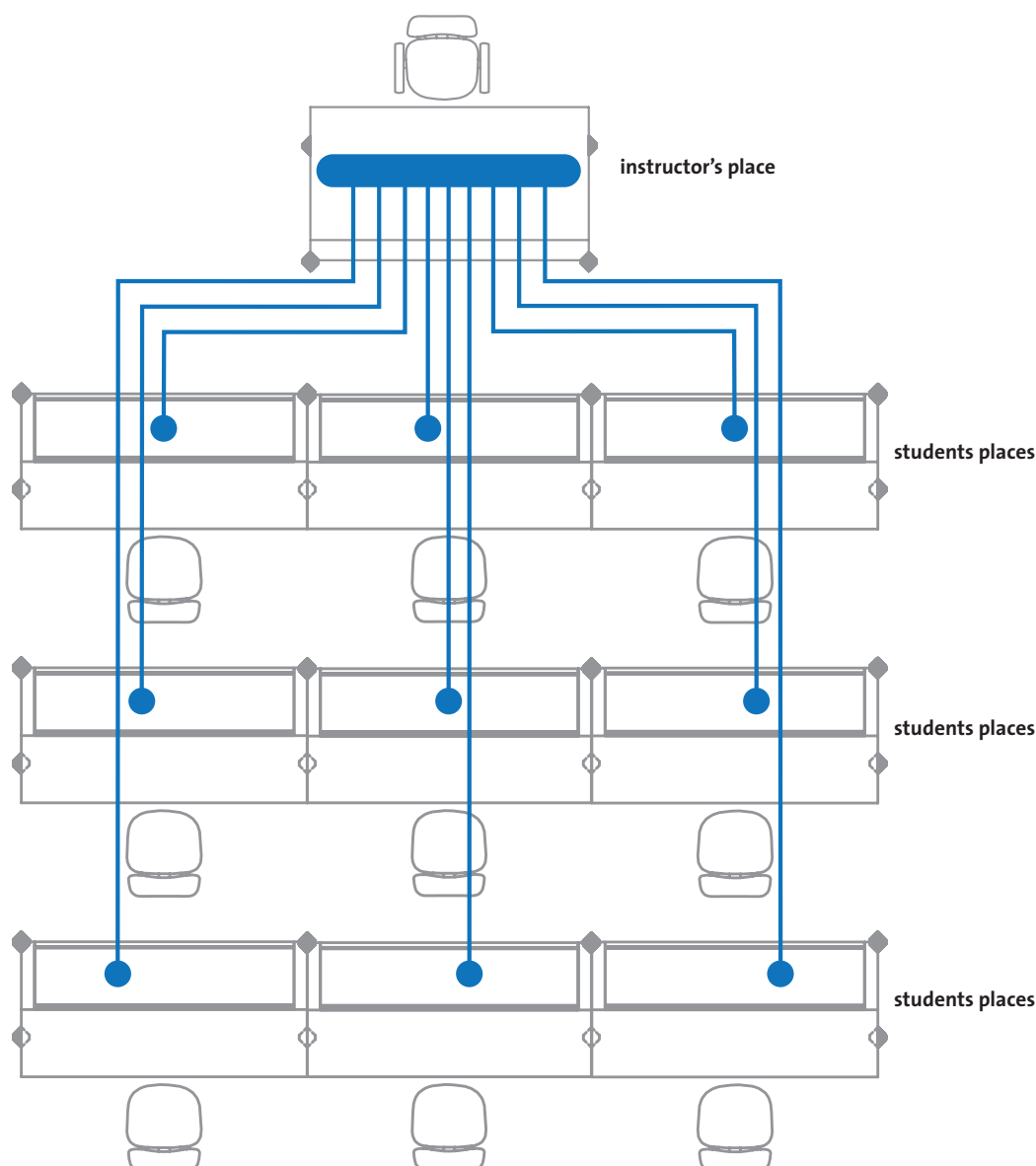
### 2.) Integration of the experimenting network in the existing network

This solution is applied when the PC's cannot be equipped with a second network connection. Then a virtual network is build up.



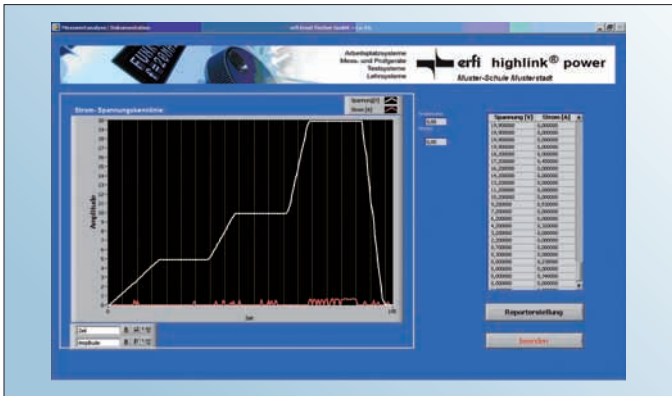

With this solution a VLAN switch is required.

Depending on the customers requirements the VLAN switch can already be considered by erfi in the planning phase or can be provided by the customer.

Example: Self-contained experimenting network



## Software packages:

Reference No.	Product description	
HP 1.100	<p>Software package <b>highlink Power student's package twelve licence for 12 student working places</b> Complete package inclusive all described functionalities</p> <p><b>Note:</b> The release of different device groups such as low voltage, alternating voltage und three-phase current as well as the control for the swivel/retractable tables and EMERGENCY STOP surveillance will be designed for you. The necessary hardware (contactors and relays) for activation of the individual device groups is quoted for in the separate position "system integration".</p>	
HP 1.101	<p>Software package <b>highlink Power instructor package single licence for 1 instructor working place</b> Complete package inclusive all described functionalities and inclusive laboratory room manager</p> <p><b>Note:</b> The release of different device groups such as low voltage, alternating voltage und three-phase current as well as the control for the swivel/retractable tables and EMERGENCY STOP surveillance will be designed for you. The necessary hardware (contactors and relays) for activation of the individual device groups is quoted for in the separate position "system integration". The erfi laboratory room manager which allows to change between the different rooms is contained in our scope of supply from the second room.</p>	
HP 1.102	<p>Software package <b>highlink Power industrial package single licence for 1 industrial electronic working place (single user licence)</b> Complete package for triggering the respective integrated tele-controllable erfi device with Ethernet interface inclusive automatic measured value acquisition and analysis for 1 single working place.</p> <p><b>Note:</b> The difference of this package is that among other things, the graphic floor plan visualisation for several places is not included. For more extensive laboratory equipment the floor plan (plan for positioning all laboratory tables) can be implemented on request.</p>	
 <p><b>LabVIEW device driver</b> <b>free download</b> <a href="http://www.erfi.de/software">www.erfi.de/software</a></p>		<p>The erfi device drivers are ideally suited for all developers who use the development tool LabVIEW. The different functions of the erfi devices are summarised in VI's (virtual instruments) and can easily be integrated in the project concerned.</p>
HP 1.200	for erfi regulating power packs	
HP 1.201	for erfi function generators	
HP 1.202	for erfi digital multi-meters	
HP 1.203	for erfi regulating transformers (AC (single-phase and three-phase)	
HP 1.204	for erfi oscilloscopes	
HP 1.205	for erfi power measuring devices	
HP 1.206	for erfi insulation testers	
HP 1.207	for erfi earth conductor testers	



## erfi –Network engineering

Reference No.	Product description
NWT 1.100	<b>Switch 24-fold</b> For integration in 19" attachments or 19" containers resp. of the instructor's place
NWT 1.101	<b>Switch 8-fold</b> For integration in 19" attachments or 19" containers resp. of the instructor's place
NWT 1.102	<b>VLAN switch 24-fold</b> For integration in 19" attachments or 19" containers resp. of the instructor's place
NWT 1.103	<b>VLAN-switch 8-fold</b> For integration in 19" attachments or 19" containers resp. of the instructor's place
NWT 1.104	<b>erfi network module</b> ZFor the control and surveillance of individual table functions <ul style="list-style-type: none"> <li>- Release of the mains module</li> <li>- Release 50 V / 230 V / 400 V</li> <li>- EMERGENCY STOP function</li> <li>- Up / down movement swivel table</li> <li>- many more</li> <li>- 8 digital I/O's to be activated by Ethernet interface</li> </ul>
NWT 1.110	<b>System integration</b> consisting of all contactors and relays pertaining to the complete functionality, for the release of all groups and devices
NWT 1.105	<b>W-LAN-Router</b> For the wireless control of the laboratory rooms.eightfold access point

## erfi – device interfaces

The latest erfi device generation (erfi instruments) is nowadays equipped with an innovative microprocessor technology. No matter whether this concerns DC power supplies (regulating power supplies), AC sources, function generators, digital multi-meters or other measuring devices, erfi offers always the right link to the outside world. All interfaces are

serially lead through on the rear and are thus networked invisibly with the 19" attachment or 19" cockpit. On request, the interfaces can be lead through to the front to a separate insert board (7 TE).

### Rear device interfaces: (erfi instruments)

NWT 1.106	Ethernet interface
NWT 1.107	USB 2.0 interface
NWT 1.108	RS232 C-interface



### Front device interfaces: (erfi instruments)

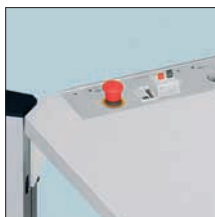
Interfaces	Reference No. for the respective front panel (device system)				
7 TE wide front panel equipped with:	acto 113 mm	highlab 3 HE	highlab 6 HE	basic 3 HE	basic 6 HE
Single Ethernet interface	A 10.031	H 11.201	H 11.501	E 11.201	E 11.501
Double Ethernet interface	A 10.032	H 11.202	H 11.502	E 11.202	E 11.502
Single USB 2.0 interface	A 10.033	H 11.203	H 11.503	E 11.203	E 11.503
Double USB 2.0 interface	A 10.034	H 11.204	H 11.504	E 11.204	E 11.504
Single RS232 C-interface	A 10.035	H 11.205	H 11.505	E 11.205	E 11.505
Double RS232 C-interface	A 10.036	H 11.206	H 11.506	E 11.206	E 11.506

## Insert plate system acto®



*The insert plate system is multifunctional and can be integrated in the following system components:*

- 1 Supply terminal in the table top
- 2 System channel
- 3 Energy attachment
- 4 Energy cockpit
- 5 19" combined attachment
- 6 19" combined cockpit
- 7 Swivel attachment



1



2



3

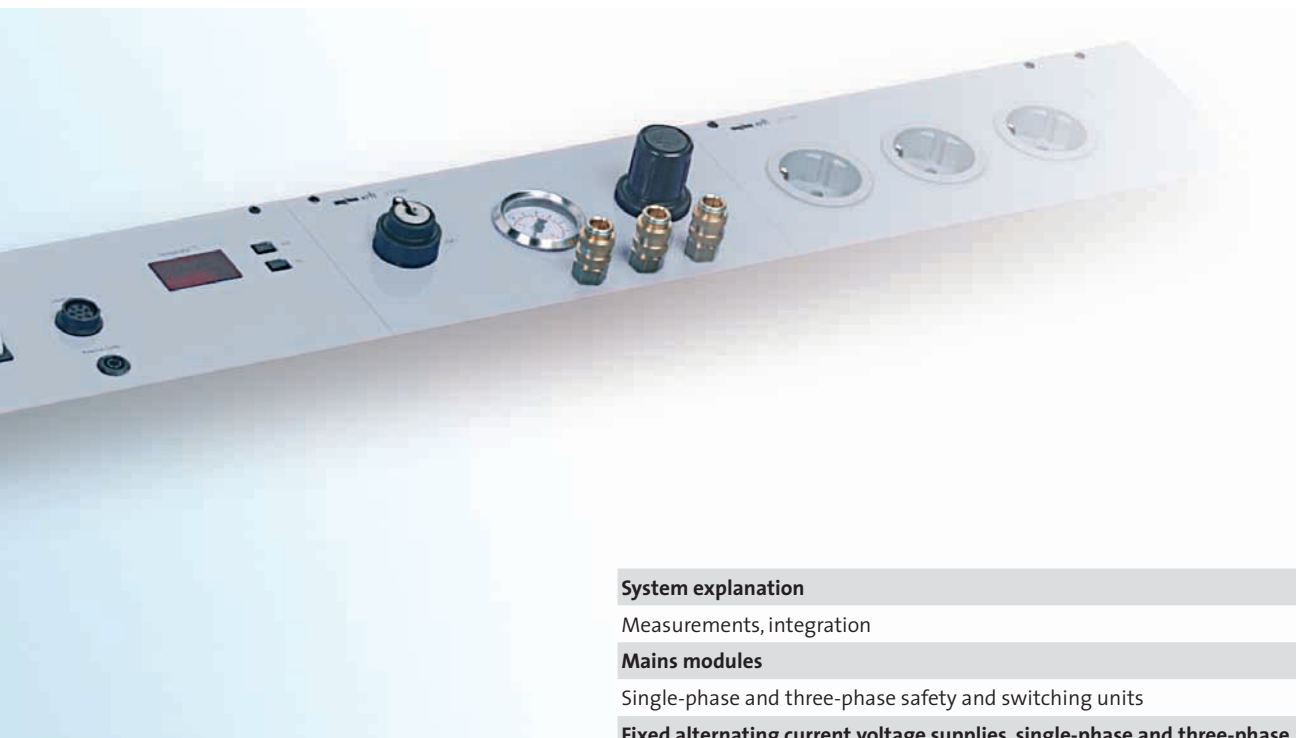


4



5

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6



7



## Insert plate system acto®

### System explanation

The insert board system is a registered trademark of the erfi company and besides the low installation height of 113 mm it is particularly characterised by its innovations. Due to the new developments in the past two years, this system has turned into a professional programme of compact devices. By the great variety of functions, this system contributes considerably to a sensible equipment of modern laboratory working places. acto is ideally suited for classrooms, production facilities, assembly and development departments. The low installation height allows constant eye contact in the room.

#### Innovations of the system acto®

- Tele-controllable regulating power packs (Ethernet, USB 2.0 and RS232-C optional)
- Tele-controllable function generators up to 20 MHz with integrated counters up to 100 MHz (Ethernet, USB 2.0 and RS232-C optional)
- Outstanding power and control data of power packs and function generators (control accuracy <2m V/Am control speeds <15µs)
- Most modern software for the networking of classrooms and research laboratories
- Module grid width in 19" partial plug-in technique as per DIN 41494 part 5

#### Technical dimensions:

Installation height: 113 mm

Installation width: 7 TE grid width

#### Definition TE = module width














1 TE = 2/10 inch = 5,08 mm

7 TE correspond to 35,56 mm

Due to the 19" partial plug-in technique as per DIN 41494 part 5, acto allows a high module flexibility. Each insert plate is designed in a grid of 7 TE and, therefore, the available space can optimally be used for integration. Due to the tight grid of 7 TE, a high packing density can be achieved.

In the same way the insert plates can easily be installed in combined attachments and combined cockpits with the big 19" device series high-lab and basic.

Measurement table (19")  
Module width in mm

7 TE	= 35,56 mm	
14 TE	= 71,12 mm	
21 TE	= 106,68 mm	
28 TE	= 142,24 mm	
35 TE	= 177,80 mm	
42 TE	= 213,36 mm	
49 TE	= 248,92 mm	
56 TE	= 284,48 mm	
63 TE	= 320,04 mm	
70 TE	= 355,60 mm	
77 TE	= 391,16 mm	
84 TE	= 426,72 mm	
98 TE	= 497,84 mm	

### Possible integrations

The insert plate system acto can be installed in the highly productive furniture system components varantec and ABZ from erfi. All components of the insert plate system are functional, wired and tested when being integrated in the respective holding fixtures.

### Design of the front panel

The aluminium front panels are of high quality, anodised and refined. The surface paint finish is deliverable as per customers request. The front panels are particularly resistant against shock, scratches and other wear and tear.



1 Integration in the system channel

### Advantages of the anodised front panel:

In the case of system channels with integrated lighting, the table surface is additionally brightened up by the anodised front panel and contributes significantly to a positive working atmosphere. Technique in details!

2 Integration in the supply terminal



3 Integration in the swivel attachment



4 Integration in the energy attachment, depth 150 mm



5 Integration in the energy cockpit, depth 150 mm



6 Integration in the energy attachment, depth 320 mm



7 Integration in the energy cockpit, depth 320 mm



8 Integration in the 19" combined attachment, depth 360 mm



9 Integration in the 19" combined cockpit, depth 360 mm



Product information:  
AC/DC sensitive leakage current protective switch (type B)

As an alternative, the erfi safety and switching units can be equipped with AC/DC sensitive leakage current protective switches (type B). In series all models are equipped with pulsed current sensitive earth leakage circuit breakers (type A).

Possible smooth faulty direct currents caused by frequency inverters, alternating-current inverters, photo-voltaic installations and battery chargers, cannot be reliably detected by pulsed current sensitive earth leakage circuit breakers of the type A for sinusoidal faulty alternating-currents and pulsed direct currents. Faulty direct currents can cause, by pre-magnetization of the converter, that pulsed current sensitive earth leakage circuit breakers do not ensure any more the protective function also in the case of faulty alternating currents.

The AC/DC sensitive leakage current protective switches (type B) detect reliably smooth faulty direct currents and faulty alternating current up

to a frequency of 1 MHz.

For the fuse protection of classrooms (in case of supply by TN or TT-systems) with experimenting equipment, the regulation DIN VDE 0100-723:2005-06 is binding.

If for the supply of experimenting equipment a TN- or TT-system is used, one or several faulty current protective devices (RCDs) with a differential current  $I_{AN} < 30 \text{ mA}$  must be provided for.

**These faulty current protective devices must be of the type B.**

**Additional price for AC/DC sensitive leakage current protective switch type B, suitable also for smooth direct currents:**

**Reference No.: Z 01.100**



Safety and switch units

**Note:** Installation height = 113 mm

single-phase



Reference No.	Design	42 TE
A53.001	single-phase	

three-phase



Reference No.	Design	42 TE
A53.010	three-phase	

Technical Data:		
Emergency stop push-button:	with potential-free contact for connection with an available room emergency stop	
NFI-switch:	faulty current 30 mA, nominal current 25 A	
Motor protection switch:	10-16 A with undervoltage circuit breaker	
Phase pilot lamp:	L1 or L1, L2, L3	



## Safety and switch units with key-operated switch

Note: Installation height: 113 mm

### Single-phase



Reference No.	Design	42 TE
A53.014	single-phase	

### Three-phase



Reference No.	Design	42 TE
A53.012	three-phase	

#### Technical Data:

Key-operated on-off switch:	The key can be removed in both positions.
Emergency stop push-button:	with potential-free contact for connection with an available room emergency stop
NFI-switch:	faulty current 30 mA, nominal current 25 A
Motor protection switch:	10-16 A with undervoltage circuit breaker
Phase pilot lamp:	L1 or L1, L2, L3

## Safety and switch units without emergency stop

### Single-phase



Reference No.	Design	28 TE
A52.003	single-phase	

### Three-phase



Reference No.	Design	42 TE
A53.011	three-phase	

#### Technical Data:

NFI-switch:	faulty current 30 mA, nominal current 25 A
Motor protection switch:	10-16 A with undervoltage circuit breaker
Phase pilot lamp:	L1 or L1, L2, L3

Safety and switch units with key-operated switch, without emergency stop

Note: Installation height: 113 mm

Single-phase



Reference No.	Design	35 TE
A52.008	single-phase	

Three-phase



Reference No.	Design	42 TE
A53.013	three-phase	

Technical Data:

Key-operated on-off switch:	The key can be removed in both positions.
NFI-switch:	faulty current 30 mA, nominal current 25 A
Motor protection switch:	10-16 A with undervoltage circuit breaker
Phase pilot lamp:	L1 or L1, L2, L3

Emergency stop push-button



Reference No.	Design	14 TE
A51.001	<b>Emergency stop push-button:</b> With potential-free contact for connection to an available room emergency stop.	



Reference No.	Design	14 TE
A51.002	<b>Emergency stop push-button:</b> Outwit-proof due to an integrated key-operated switch. The emergency stop push-button can be released by means of the key.	



Reference No.	Design	14 TE
A51.003	<b>Emergency stop push-button:</b> With a separate on-off switch. On operating the emergency stop push-button the voltage can be released only by means of the key-operated switch.	

## Alternating current voltage supplies, single-phase

**Note: Installation height: 113 mm**

- Schuko socket 230 V, 50 Hz, 16 A
- Colour of the sockets: serially pebble grey, RAL 7032 (other colours and models against additional price)

### Socket modules without mains switch



Fig.: A14.001

Reference No.	Sockets without mains switch	Width
A11.016	1	14 TE
A12.002	2	28 TE
A13.001	3	42 TE
A14.001	4	56 TE
A15.001	5	70 TE
A16.001	6	84 TE

### Socket modules with mains switch



Fig.: A15.002

Reference No.	Sockets with mains-switch	Width
A12.016	1	28 TE
A13.005	2	42 TE
A14.002	3	56 TE
A15.002	4	70 TE
A16.002	5	84 TE
A17.001	6	98 TE

### Additional prices for sockets

Note: Replaces the serial Schuko socket  
(in each case per piece)

#### Sockets:

Reference No.	Design
A1.102	<b>Schuko socket</b> 230 V, 50 Hz, 16 A, <b>orange</b>
A1.103	<b>Schuko socket with hinged cover</b> 230 V, 50 Hz, 16 A, pebble grey, RAL 7032
A1.105	<b>Schuko socket with hinged cover</b> 230 V, 50 Hz, 16 A, <b>orange</b>
A1.106	<b>Schuko socket Switzerland</b> 230 V, 50 Hz, 10 A, (SEV 13), pebble grey, RAL 7032
A1.107	<b>Schuko socket France</b> 230 V, 50 Hz, 16 A, pebble grey, RAL 7032
A1.108	<b>Schuko socket Italy</b> 230 V, 50 Hz, 16 A, pebble grey, RAL 7032
A1.109	<b>Schuko socket Great Britain</b> 230 V, 50 Hz, 13 A, pebble grey, RAL 7032
A1.110	<b>Schuko socket United States</b> 115 V, 50 Hz, 15 A, pebble grey, RAL 7032





## Supply modules

Note: Installation height: 113 mm

Safety laboratory sockets

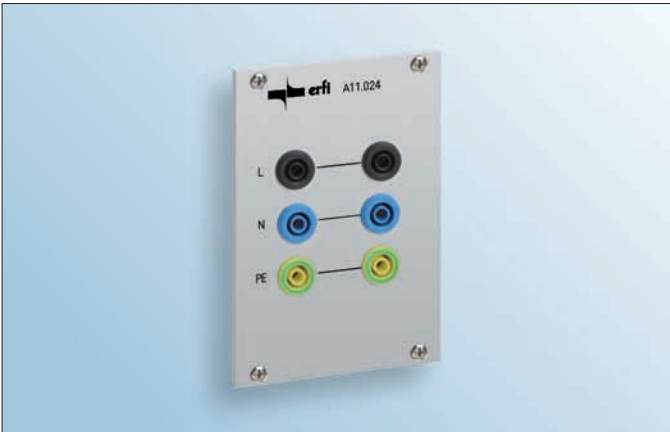


Reference No.	Design	14 TE
A11.015	PE (protective earth connector, wired) 1 safety laboratory socket 4 mm	



Reference No.	Design	14 TE
A11.021	L1, N, PE (wired) 3 safety laboratory sockets 4 mm 230 V, 50 Hz, 16 A	

Safety laboratory sockets



Reference No.	Design	14 TE
A11.024	2 x L1, N, PE (wired) 3 safety laboratory sockets 4 mm 230 V, 50 Hz, 16 A	

CEE sockets



Reference No.	Design	14 TE
A11.022	CEE socket (wired) 2-pole + PE, 6 h 230 V, 50 Hz, 16 A with blue hinged cover	

## Alternating current supplies, single-phase

Note: Installation height: 113 mm

Small alternating current voltage module, unearthed



Reference No.	Design	35 TE
A92.010	<b>Small alternating current voltage module, unearthed</b> 12 V, 24 V/ 1 A - 1 illuminated mains switch - 3 safety laboratory sockets for current drain unearthed small alternating current voltage - 1 thermal protective switch (primary fuse protection) - 2 thermal magnetic protective switches (secondary fuse protection)	

Small alternating current voltage module, unearthed



Reference No.	Design	35 TE
A92.011	<b>Small alternating current voltage module, unearthed</b> 6 V, 8 V/1 A - 1 illuminated mains switch - 4 safety laboratory sockets for current drain unearthed small alternating current voltage - 1 thermal protective switch (primary fuse protection) - 3 thermal magnetic protective switches (secondary fuse protection)	

Alternating current voltage module, unearthed



Reference No.	Design	35 TE
A92.020	<b>Alternating current voltage module, unearthed</b> 230 V/ max. 0,5 A 115 VA - 1 illuminated mains switch - 1 socket without protective contact for drain of unearthed alternating current voltage - 1 safety fuse	

Alternating current voltage module, unearthed

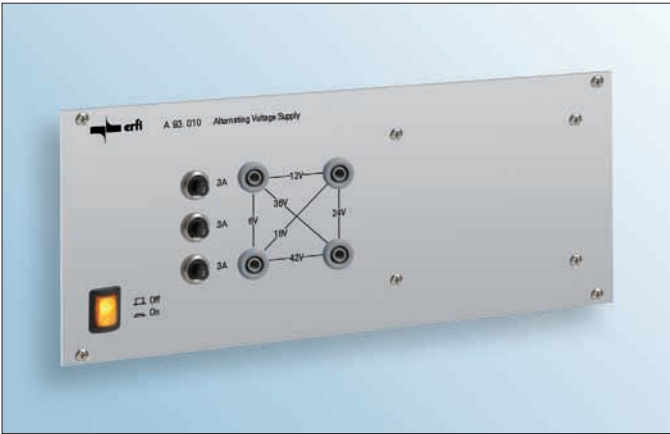


Reference No.	Design	28 TE
A92.021	<b>Alternating current voltage module, unearthed</b> 230 V/ max. 0,5 A 115 VA - 1 illuminated mains switch - 2 safety laboratory sockets for drain of unearthed alternating current voltage - 1 safety fuse	

Alternating current voltage supplies, single-phase and three-phase

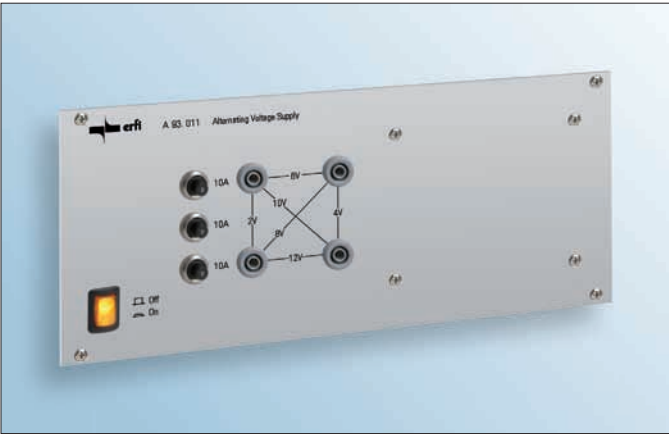
Note: Installation height: 113 mm

Small alternating current voltage module, unearthed



Reference No.	Design	49 TE
A93.010	<b>Small alternating current voltage module, unearthed</b> 6 V, 12 V, 18 V, 24 V, 36 V, 42 V/ 3 A - 1 illuminated mains switch - 4 safety laboratory sockets for current drain unearthed small alternating current voltage - 1 thermal protective switch (primary fuse protection) - 3 thermal magnetic protective switches (secondary fuse protection)	

Small alternating current voltage module, unearthed



Reference No.	Design	49 TE
A93.011	<b>Small alternating current voltage module, unearthed</b> 2 V, 4 V, 6 V, 8 V, 10 V, 12 V/ 10 A - 1 illuminated mains switch - 4 safety laboratory sockets for current drain unearthed small alternating current voltage - 1 thermal protective switch (primary fuse protection) - 3 thermal magnetic protective switches (secondary fuse protection)	

Supply module



Reference No.	Design	14 TE
A11.030	<b>Supply module</b> 2 x 5 safety laboratory sockets 400/ 230 V, 50 Hz, 16 A	

Three-phase current module



Reference No.	Design	28 TE
A12.001	<b>Three-phase current module</b> 1 CEE-socket 3 pole + N + PE, 6 h 400/ 230 V, 50 Hz, 16 A	



## Alternating current voltage supplies, single-phase and three-phase

Note: Installation height: 113 mm

### Small alternating current voltage module, unearthed



Reference No.	Design	56 TE
A94.010	<b>Small alternating current voltage module, unearthed</b> triangle 3 x 17,3 V/ 150 VA star 3 x 10 V/ 5 A - 1 mains switch - 4 safety laboratory sockets L1, L2, L3 N for current drain unearthed small alternating current voltage - 1 thermal protective switch (primary fuse protection) - 3 thermal magnetic protective switches (secondary fuse protection)	

### Three-phase current module



Reference No.	Design	35 TE
A12.021	<b>Three-phase current module</b> - 1 mains switch - 3 thermal magnetic protective switches - 5 safety laboratory sockets L1, L2, L3, N, PE 400/ 230 V, 50 Hz, 16 A	

### Three-phase current module



Reference No.	Design	28 TE
A12.020	<b>Three-phase current module</b> - 1 CEE socket, 3 pole + N + PE, 6 h 400/ 230 V, 50 Hz, 16 A - 5 safety laboratory sockets L1, L2, L3, N, PE 400/ 230 V, 50 Hz, 16 A	

Variable transformers, single-phase

Note: Installation height: 113 mm

0-30 V AC, 2 A, unearthed



Reference No.	Design	77 TE
A95.010	<b>Variable transformer (unearthed)</b> 0 – 30 V AC max. 2 A unearthed, infinitely variable, astable	

Technical Data:	
Output AC:	2 safety laboratory sockets 4 mm
Display:	Moving iron instrument class 2,5 voltage: 0-30 V Moving iron instrument class 2,5, current: 0-2 A

0-30 V AC/DC, 2 A, unearthed



Reference No.	Design	77 TE
A95.011	<b>Variable transformer (unearthed)</b> 0 – 30 V AC max. 2 A unearthed, infinitely variable, astable, switchable to: 0-24 V DC, residual ripple approx 50 % by integrated bridge rectifier	

Technical Data:	
Output AC/DC:	2 safety laboratory sockets 4 mm
Display:	Moving iron instrument class 2,5 voltage: 0-30 V Moving iron instrument class 2,5, current: 0-2 A

0-260 V AC, 1 A, unearthed, Schuko



Reference No.	Design	63 TE
A94.030	<b>Variable transformer (unearthed)</b> 0 – 260 V AC max. 1 A unearthed, infinitely variable, astable	

Technical Data:	
Output AC:	Schuko socket
Display:	Moving iron instrument class 2,5 voltage: 0-260 V Moving iron instrument class 2,5, current: 0-1 A
Note:	<b>not insertable in system channels</b>

0-24 V AC/DC, 4 A, unearthed



Reference No.	Design	77 TE
A95.012	<b>Variable transformer (unearthed)</b> 0 – 24 V AC max. 4 A unearthed, infinitely variable, astable, switchable to: 0-19 V DC, residual ripple approx 50 % by integrated bridge rectifier	

Technical Data:	
Output AC/DC:	2 safety laboratory sockets 4 mm
Display:	Moving iron instrument class 2,5 voltage: 0-30 V Moving iron instrument class 2,5, current: 0-4 A

## Variable transformers, single-phase

Note: Installation height: 113 mm

0-260 V AC, 1 A, unearthed, without display



Reference No.	Design	35 TE
A92.030	<b>Variable transformer (not unearthed)</b> 0 – 260 V AC max. 1 A not unearthed, infinitely variable, astable	

### Technical Data:

Output AC:	3 safety laboratory sockets 4 mm (L1, N and PE)
Note:	<b>not insertable in system channels</b>

0-260 V AC/DC, 1 A, not unearthed, without display



Reference No.	Design	42 TE
A93.030	<b>Variable transformer (not unearthed)</b> AC: 0 – 260 V AC max. 1 A not unearthed, infinitely variable, astable DC: 0 – 20 V DC, unsifted, residual ripple approx 50 % by integrated bridge rectifier	

### Technical Data:

Output AC:	3 safety laboratory sockets 4 mm (L1, N and PE)
Output DC:	2 safety laboratory sockets 4 mm
Note:	<b>not insertable in system channels</b>

0-260 V AC, 1 A, not unearthed, laboratory sockets



Reference No.	Design	63 TE
A94.031	<b>Variable transformer (not unearthed)</b> 0 – 260 V AC max. 1 A not unearthed, infinitely variable, astable	

### Technical Data:

Output AC:	3 safety laboratory sockets 4 mm (L1, N and PE)
Anzeige:	Moving iron instrument class 2,5, voltage: 0-260 V Moving iron instrument class 2,5, current: 0-1 A
Note:	<b>not insertable in system channels</b>

0-12/24/260 V AC/DC, unearthed and not unearthed resp.



Reference No.	Design	56 TE
A94.033	<b>Variable transformer (unearthed/not unearthed)</b> infinitely variable voltages, astable AC 1: 0 – 12 V AC max. 12 A unearthed AC 2: 0 – 24 V AC max. 6 A not unearthed AC 3: 0 – 260 V AC max. 2 A not unearthed	

### Technical Data:

Output AC 1+2:	2 safety laboratory sockets 4 mm each
Output AC 3:	3 safety laboratory sockets 4 mm (L1, N and PE)
Bridge rectifier:	built-in for external protective circuit
Note:	<b>not insertable in system channels and energy attachments / energy cockpits 150 mm deep</b>



Variable transformers, single-phase

Note: Installation height: 113 mm

0-260 V AC/DC, 2 A, unearthed



Reference No.	Design	63 TE
A94.032	<b>Variable transformer (unearthed)</b> 0 – 260 V AC max. 2 A unearthed, infinitely variable, astable switchable to: 0 – 200 V DC through integrated bridge rectifier	

Technical Data:	
Output AC:	socket without protective contact
Output DC:	2 safety laboratory sockets 4 mm
Display:	Moving iron instrument class 2,5, voltage: 0-260 V Moving iron instrument class 2,5, current: 0-2 A
Note:	<b>not insertable in system channels and energy attachments / energy cockpits, 150 mm deep</b>

Note: All variable transformers are equipped with 1 thermal (primary) and thermal magnetic (secondary) automatic fuse and 1 illuminated mains switch.

0-6/18/42/260 V, AC/DC, unearthed and not unearthed resp.



Reference No.	Design	56 TE
A94.034	<b>Variable transformer (unearthed/not unearthed)</b> infinitely variable voltages, astable: AC 1 : 0 - 6 V AC max. 15 A unearthed, AC 2 : 0 - 18 V AC max. 6 A unearthed, AC 3 : 0 - 42 V AC max. 3 A unearthed, AC 4 : 0 - 260 V AC max. 2 A not unearthed.	

Technical Data:	
Output AC 1-3:	2 safety laboratory sockets 4 mm each
Output AC 4:	3 safety laboratory sockets 4 mm (L1, N and PE)
Bridge rectifier:	built-in for external protective circuit
Note:	<b>not insertable in system channels and energy attachments / energy cockpits 150 mm deep</b>

## Direct voltage supplies / fixed voltage supply sources

**Note:** Installation height: 113 mm

Technical data lengthwise controlled fixed voltage supply sources:							
Output data	voltage	5 V	5 V	12 V	12 V	15 V	15 V
	current	1 A	3 A	1 A	2 A	1 A	2 A
Control deviation	change of voltage load 0 – 100 %	20 mV	20 mV	50 mV	80 mV	50 mV	80 mV
Residual ripple	voltage with nominal load	0,5 mVeff					
Transient time	step change in load from 0 % to 100 %	15 µs					

### Tracking power pack



Reference No.	Design	49 TE
A23.050	<b>Tracking power pack</b> ±3 to ±15 V/ 1 A and 5 V/ 1 A, fixed lengthwise controlled	

Technical Data:	
Output data:	continuous short-circuit protected, lengthwise controlled, switchable in series and in parallel
Outputs:	4 mm safety laboratory sockets

### Fixed voltage supply source



Reference No.	Design	35 TE
A22.050	<b>Fixed voltage supply source</b> 5 V/ 3 A lengthwise controlled	

Technical Data:	
Output data:	continuous short-circuit protected, lengthwise controlled, switchable in series and in parallel
Outputs:	4 mm safety laboratory sockets

### Fixed voltage supply source



Reference No.	Design	56 TE
A24.050	<b>Fixed voltage supply source</b> ±5 V/ 3 A lengthwise controlled	

Technical Data:	
Output data:	continuous short-circuit protected, lengthwise controlled, switchable in series and in parallel
Outputs:	4 mm safety laboratory sockets

Direct voltage supplies / fixed voltage supply sources

Note: Installation height: 113 mm

Fixed voltage supply source



Reference No.	Design	42 TE
A23.051	<b>Fixed voltage supply source</b> 24 V/ 1,5 A cyclical power pack	

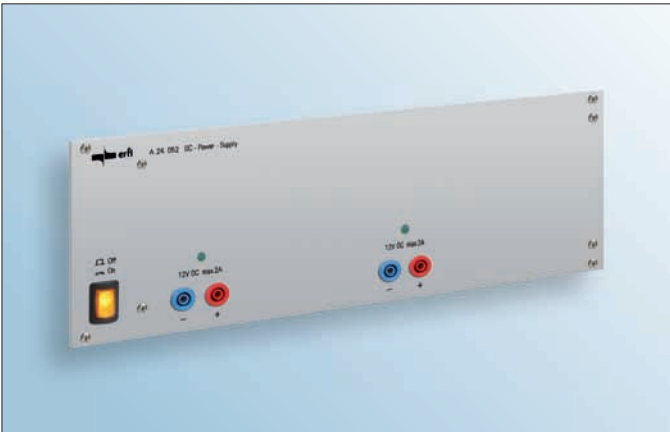
Technical Data cyclical power pack:	
Output specifications:	control deviation - change of input voltage: $\pm 0,2$ % max. - change of load: $\pm 0,8$ % max.
General specifications:	temperature coefficient: $\pm 0,01$ %/ $^{\circ}\text{C}$
Output data:	continuous short-circuit protected, switchable in series and in parallel
Outputs:	4 mm safety laboratory sockets



Reference No.	Design	56 TE
A24.051	<b>Fixed voltage supply source</b> 24 V/ 5 A (10 A-peak) cyclical power pack	

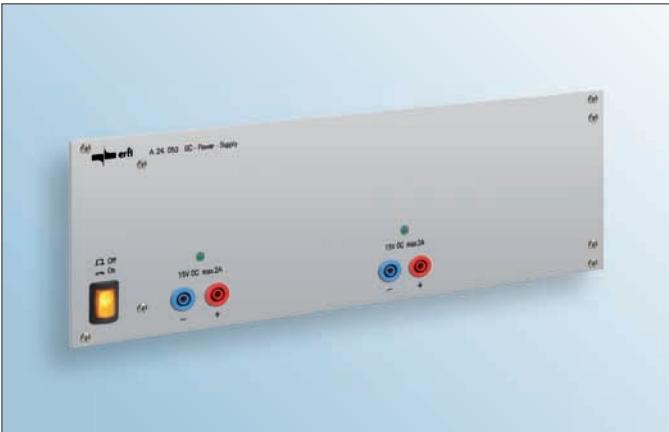
Technical Data cyclical power pack:	
- Double nominal peak capacity when switching-on - Power factor and improvement of harmonics as per EN61000-3-2	
Load stabilisation: 192 mV max.	
Residual ripple and random noise:	360 mV max.
Output data:	continuous short-circuit protected, switchable in series and in parallel
Outputs:	4 mm safety laboratory sockets

Fixed voltage supply source



Reference No.	Design	63 TE
A24.052	<b>Fixed voltage supply source</b> 2 x 12 V/ 2 A switchable in parallel and in series resp. lengthwise controlled	

Technical Data:	
Output data:	continuous short-circuit protected, lengthwise controlled, switchable in series and in parallel
Outputs:	4 mm safety laboratory sockets



Reference No.	Design	63 TE
A24.053	<b>Fixed voltage supply source</b> 2 x 15 V/ 2 A switchable in parallel and in series resp. lengthwise controlled	

Technical Data:	
Output data:	continuous short-circuit protected, lengthwise controlled, switchable in series and in parallel
Outputs:	4 mm safety laboratory sockets



## Direct voltage supplies / fixed voltage supply sources

Note: Installation height: 113 mm

### Fixed voltage supply source



Reference No.	Design	70 TE
A25.050	<b>Fixed voltage supply source</b> $\pm 12$ V / 1 A and 5 V / 3 A lengthwise controlled	

#### Technical Data:

Output data:	continuous short-circuit protected, lengthwise controlled, switchable in series and in parallel
Outputs:	4 mm safety laboratory sockets 1 Schuko socket 230 V / 16 A in addition
Note:	<b>not insertable in system channels</b>



Reference No.	Design	70 TE
A25.051	<b>Fixed voltage supply source</b> $\pm 15$ V / 1 A and 5 V / 3 A lengthwise controlled	

#### Technical Data:

Output data:	continuous short-circuit protected, lengthwise controlled, switchable in series and in parallel
Outputs:	4 mm safety laboratory sockets 1 Schuko socket 230 V / 16 A in addition
Note:	<b>not insertable in system channels</b>

## Telecontrollable regulating power packs (DC)



**Note:** Installation height: 113 mm

### Technical Data:

Interface:	optional Ethernet, USB 2.0, RS232-C
Ramp generator:	for any current voltage curve
Ramp parameters:	initial voltage and terminal voltage, speed, length of time per ramp step, number of cycles
Operation:	manual or tele-controlled
Bidirectional function:	output voltage and current limitation programmable, actual measurement transmittance of current and voltage by interface
Plug-and-play:	automatic recognition of device type by highlink Power software or LabVIEW device driver (option)
Output data:	continuous short-circuit protected, lengthwise controlled, switchable in series and in parallel
Control deviation in case of change of load from 0 to 100 %	
voltage:	<b>2 mV/A</b>
current:	0,02 mA/V
Temperature coefficient:	
voltage:	<b>0,005 %/K</b>
current:	0,013 %/K
Residual ripple:	
voltage:	<b>0,2 mV<sub>eff</sub></b>
current:	0,5 mA <sub>eff</sub>
Transient time with a step change in load of	
0 % to 100 %:	<b>15 µs</b>
100 % to 0 %:	500 µs
Outputs:	4 mm safety laboratory sockets



### Rear interfaces (option)

Reference No.	Interface
NWT 1.106	Ethernet
NWT 1.107	USB 2.0
NWT 1.108	RS 232 C

The interfaces allow the control of the regulating power packs.  
In addition to the complete device control, erfi software highlink Power takes also over the room control by means of Ethernet interface.

### Note:

Front interfaces see page 55

highlink Power see page 48 ff.



**LabVIEW device driver**  
**free download**  
**[www.erfi.de/software](http://www.erfi.de/software)**

# Telecontrollable single regulating power packs (DC)

Note: Installation height: 113 mm

## Analog display



Fig.: A23.010

49 TE

## Digital display



Fig.: A23.011

49 TE

### Single regulating power pack

- 1 common analog or digital display resp. for voltage and current
- analog display with double scale, reversible between current and voltage
- OUTPUT-OFF function:  
Allows deactivation of the output with simultaneous limitation of the maximum output current (visualised on the display)

**Note:**

Technical detail data see page 74  
Front interfaces see page 55

Reference No.	Display V/A reversible	Voltage	Current
A23.010	analog	0-15 V	0-2 A
A23.011	digital		
A23.012	analog	0-30 V	0-1 A
A23.013	digital		
A23.014	analog	0-30 V	0-2 A
A23.015	digital		

## Analog display



Fig.: A23.020

49 TE

## Digital display



Fig.: A23.021

49 TE

### Single regulating power pack

- 1 analog or digital display resp. each for voltage and current
- OUTPUT-OFF function:  
Allows deactivation of the output with simultaneous limitation of the maximum output current (visualised on the display)

**Note:**

Technical detail data see page 74  
Front interfaces see page 55

Reference No.	Display V/A	Voltage	Current
A23.020	analog	0-15 V	0-2 A
A23.021	digital		
A23.022	analog	0-30 V	0-1 A
A23.023	digital		
A23.024	analog	0-30 V	0-2 A
A23.025	digital		



Telecontrollable double regulating power packs (DC)



Note: Installation height: 113 mm

Analog display



Fig.: A27.010

98 TE

Digital display



Fig.: A27.011

98 TE

Double regulating power pack

- per channel 1 common analog or digital display resp. for voltage and current
- analog display with double scale, reversible between current and voltage
- OUTPUT-OFF function:  
Allows deactivation of the output with simultaneous limitation of the maximum output current (visualised on the display)

Note:  
Technical detail data see page 74  
Front interfaces see page 55

Reference No.	Display V/A reversible	Voltage	Current
A27.010	analog	2 x 0-15 V	2 x 0-2 A
A27.011	digital		
A27.012	analog	2 x 0-30 V	2 x 0-1 A
A27.013	digital		
A27.014	analog	2 x 0-30 V	2 x 0-2 A
A27.015	digital		

Analog display



Fig.: A27.020

98 TE

Digital display



Fig.: A27.021

98 TE

Double regulating power pack

- per channel 1 analog or digital display each for voltage and current
- OUTPUT-OFF function:  
Allows deactivation of the output with simultaneous limitation of the maximum output current (visualised on the display)

Note:  
Technical detail data see page 74  
Front interfaces see page 55

Reference No.	Display V/A	Voltage	Current
A27.020	analog	2 x 0-15 V	2 x 0-2 A
A27.021	digital		
A27.022	analog	2 x 0-30 V	2 x 0-1 A
A27.023	digital		
A27.024	analog	2 x 0-30 V	2 x 0-2 A
A27.025	digital		



## Telecontrollable function generators inclusive counter

**Note: Installation height: 113 mm**

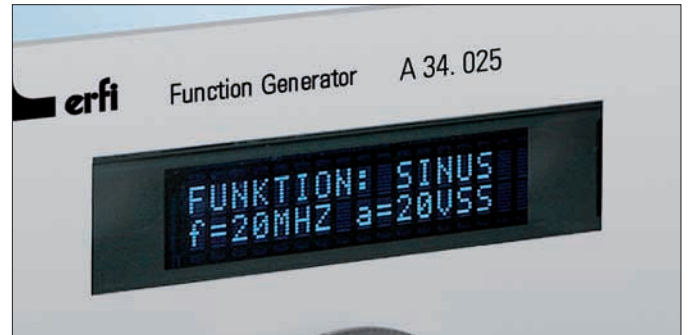
erfi are the first manufacturers of laboratory furniture systems for electrical engineering and electronics who introduced the telecontrollable<sup>19</sup> function generators and 19" regulating power packs in connection with a modern network-compatible software (highlink) in professional working place systems. This is another proof of erfi's innovation leadership. The completely newly developed function generator family offers outstanding functionalities and parameters such as tele-control by means

of the most modern software, large frequency ranges of up to 20 MHz, amplitudes up to 30 V<sub>ss</sub> and frequency counters of up to 100 MHz. This new generation of devices meets all imaginable requirements. The multi-lingual menu navigation combined with the elegant shaft encoder and the new Comand function keys emphasise the superiority of this equipment.



Fig.: A 34.025

56 TE



The new graphic display of the vacuum fluorescent technology allows an excellent reading precision even from a distance of 3 m, independently of the reading angle! The display is in blue and has a very high image sharpness and brilliance.

Reference No.	Size	Design
A34.025	56TE	0,1Hz – 20MHz, 20V <sub>ss</sub> , counter up to 30MHz
A34.026	56TE	0,1Hz – 10MHz, 30V <sub>ss</sub> , counter up to 30MHz
A34.027	56TE	0,1Hz – 20MHz, 20V <sub>ss</sub> , counter up to 100MHz
A34.028	56TE	0,1Hz – 10MHz, 30V <sub>ss</sub> , counter up to 100MHz

- telecontrollable through Ethernet, USB 2.0 or RS232 interface (options)
- comprehensive control software highlink Power (option) or LabVIEW device driver (option)
- innovative menu navigation with modern graphic display in blue
- Comand function keys for the fast access to the main functions
- elegant shaft encoder for the easy-to-operate menu control
- outstanding frequency range up to 20 MHz
- 8-digit frequency counter up to 100 MHz

Technical Data:	
Display:	graphic display in vacuum fluorescent technology, blue, well readable from 3 m distance!
Menu language:	reversible German / English
Operating concept:	elegant shaft encoder with pressure function as well as Comand function keys for the optimal handling
Functions:	Sinus, triangle, rectangle, saw tooth, ramp operation, amplifier, DC, single current pulse, variable pulse duty factor, Sweep, frequency counter, occurrence counter, additional attenuation 20 and 40 dB
Operating modes:	free-wheeling, externally wobblable, (Sweep operation), PWM operation
Frequency range:	0,1Hz -20MHz for models A34.025 and A34.027 0,1Hz -10MHz for models A34.026 and A34.028
Amplitudes:	0-20V <sub>ss</sub> for models A34.025 and A34.027 0-30V <sub>ss</sub> for models A34.026 and A34.028
Amplifier:	approx. 20 dB amplification, DC
Single current pulse:	variable, positive current pulse released by a key, adjustable current pulse length up to 1000 ms
Outputs:	20V <sub>ss</sub> idling for models A34.025 and A34.027 30V <sub>ss</sub> idling for models A34.026 and A34.028 5V TTL-compatible, 50Ω-output impedance
Inputs:	external, internal PWM In, VCO IN, attenuator: 0-30 dB continuously, additionally 20 dB and 40 dB to be activated through the same bushing
DC offset:	-10V bis +10V, 0V V with push-button
<b>Wobble operation, external:</b>	
VCo input:	0-5 V control voltage input for frequency change of max. 1:100
<b>Wobble operation, internal:</b>	Sweep operation, start and stop frequency, wobble frequency: max. 100 Hz in steps of 1Hz
<b>PWM operation:</b>	-2,5V to +2,5V control voltage input for pulse-pause operation
<b>Frequency counter:</b>	
Measuring range:	0,1Hz to 30MHz for models A34.025 and A34.026 0,1Hz to 100MHz for models A34.027 and A34.028
Input:	external, BNC bushing
Input voltage:	0,5V <sub>eff</sub> to 100V <sub>eff</sub>
Display:	2 x 16 characters
Occurrence counter:	for non-periodic occurrences

## Tele-control for function generators and counters (option)



Due to the available interfaces the new function generators are real all-rounders. The tele-control allows to programme the function generators and the integrated counters. This functionality permits the integration of the new function generators for automated measuring and regulating operations.

The telecontrollable function generators have been developed for the industrial use as well as for didactic training. They are an ideal and up-to-date tool to utilise fully the many valuable functions

The optionally available software highlink Power and the optionally available LabVIEW device driver allow the easy access to the device..

The following parameters are programmable by means of the optional interfaces (Ethernet, USB2.0 or RS232 within the respective limits:

Selection of operating mode:	free-wheeling, externally wobbable, internally wobbable (Sweep operation, PWM-operation)
Functions/wave form:	Sinus, triangle, rectangle, saw tooth, ramp operation, rectifier, DC, single current pulse, variable pulse duty factor
Frequency:	0-20MHz and 0-10MHz resp.
Amplitude:	0-20V <sub>ss</sub> or 0-30V <sub>ss</sub>
DC offset:	-10V to +10V
Attenuator:	0-30dB, 20dB and 40dB
Sweep parameter:	start and stop frequency, wobble frequency
Counter frequency:	can be read out
Occurrence counter:	can be read out

 **LabVIEW device driver**  
free download  
[www.erfi.de/software](http://www.erfi.de/software)



Rear interfaces (option)	
Reference No.	Interface
NWT 1.106	Ethernet
NWT 1.107	USB 2.0
NWT 1.108	RS 232 C

The interfaces allow the control of the function generators. In addition to the complete device control, erfi software highlink Power takes also over the room control by means of Ethernet interface.

**Note:**  
Front interfaces see page 55  
highlink Power see page 48 ff.



# Pneumatic units

**Note:** Installation height: 113 mm

## Pneumatic Units



Reference No.	Design	35 TE
A72.010	<b>Manometer</b> <ul style="list-style-type: none"> <li>- output pressure for coupling 1 and 2: 0 to 3 bar, continuously adjustable, pressure reducer with a locking mechanism and relief pressure valve</li> <li>- output pressure for coupling 3: direct extraction of the input pressure</li> <li>- outputs: all 3 coupling sockets DN 5 self-stopping</li> </ul> Input: on the rear side for a hose of 6 mm inside diameter	



Reference No.	Design	35 TE
A72.011	<b>Manometer</b> <ul style="list-style-type: none"> <li>- output pressure for coupling 1 and 2: 0 to 10 bar, continuously adjustable, pressure reducer with a locking mechanism and relief pressure valve</li> <li>- output pressure for coupling 3: direct extraction of the input pressure</li> <li>- outputs: all 3 coupling sockets DN 5 self-stopping</li> </ul> Input: on the rear side for a hose of 6 mm inside diameter	

## Pneumatic units



Reference No.	Design	14 TE
A71.001	<b>Compresses air output</b> <ul style="list-style-type: none"> <li>- compressed air output: self-stopping compressed air coupling DN 5</li> <li>operating pressure: max. 10 bar</li> <li>- compressed air input: on the rear side for a hose of 6 mm inside diameter</li> </ul>	

Energy and auxiliary devices

Note: Installation height: 113 mm

RC Logade



Reference No.	Design	28 TE
A12.050	<b>RC Logade</b> For the experimental identification of resistance and capacity. The resistance as well as the capacity can be adjusted by means of a turn-switch.	

Technical Data:	
Resistance range:	100 Ohm to 680 kOhm line E 6
Tolerance:	± 2 %
Load capacity:	max. 0,5 W
Voltage:	max. 400 V DC
Capacity range:	100 pF to 680 nF series E 6
Tolerance:	± 10 %
Voltage:	max. 250 V DC

L Logade



Reference No.	Design	14 TE
A11.050	<b>L Logade</b> For the experimental identification of inductance in testing and experimenting circuits. The inductance can be adjusted by means of a turn-switch.	

Technical Data:	
Range of values:	1 µH to 4700 µH, graded as per line E 6 (23 values)
Precision:	1 µH to 33 µH +- 10 % 47 µH to 4700 µH +- 5 %
Operating voltage:	max. 100 V DC
Operating current:	max. 63 mA, protected by a microfuse

RC Decade



Reference No.	Design	42 TE
A13.050	<b>RC Decade</b> Combined device with integrated R and C Decade for the experimental identification of resistance and capacity values. Discharge circuit: push-button with changeover switch and discharge resistance 10 kOhm.	

Technical Data:	
Range of resistance:	1 Ohm to 999,999 kOhm in steps of 1 Ohm
Precision:	= ± 1% above 40 Ohm = ± 4% from 40 Ohm to 13 Ohm = ± 6 % from 12 Ohm to 3 Ohm = ± 10 % with 2 Ohm and 1 Ohm
Load capacity:	max. 1W
Voltage:	max. 250 V (50 Hz)
Capacity range:	100 pF to 9.9999 µF in steps of 100 pF
Precision:	= ± 2 % aber 1 nF = ± 10 % from 1 nF to 100 pF

## Energy and auxiliary devices / miscellaneous

Note: Installation height: 113 mm

### Continuity tester, visible and audible



Reference No.	Design	28 TE
A12.060	<b>Continuity tester, visible and audible</b> visible by a green luminous field for low ohmic resistances, audible through a loudspeaker for high ohmic resistances	

#### Technical Data:

Connection:	2 pcs. 4 mm safety laboratory sockets for the visible test 2 pcs. 4 mm safety laboratory sockets for the audible test
Electric strength:	up to approx. 400 V AC with an audible continuity test
Test voltage:	approx. 24 V with a visible continuity test

### Soldering station 80 Watt with digital display



Reference No.	Design	42 TE
A13.060	<b>Soldering station 80 Watt with digital display</b> Scope of supply inclusive soldering pencil WSP 80 and holder WPH for WSP 80	

#### Technical Data:

- electronic control electronics
- temperature ranges 50°C to 450° C, adjustable by means of keys
- 3-digit digital display for actual value and set point
- tolerance  $\pm 2\%$  of the final value
- automatic tool recognition
- external input device (WCB 1/WCB 2, optional) can be connected for time and locking position
- potential equalisation (initial state hard-earthed)

### Loop wiring fields



Reference No.	Design	14 TE
A11.011	<b>Loop wiring fields</b> - 6 pcs. 4 mm safety laboratory sockets with 6,3 mm flat socket for connection to loop wirings, non-wired	



Reference No.	Design	21 TE
A11.060	<b>Loop wiring fields</b> - 6 pcs. 4 mm safety laboratory sockets with 6,3 mm flat socket for connection to loop wirings, non-wired - 3 pcs. BNC sockets, non-wired	



## Interface fields

**Note:** Installation height: 113 mm

### Interface fields



### Selection chart interface fields

Reference No.	Width	Interfaces
A10.001	7 TE	2 pcs. PS2-sockets for keyboard and mouse, inclusive connection cable length 1,8 m and mating plug
A10.002	7 TE	2 pcs. USB sockets, inclusive connection cable length 1,8 m and mating plug
A10.003	7 TE	2 pcs. SubD-plug, 9 pole, inclusive connection cable length 1,8 m and mating plug
A10.004	7 TE	1 pc. SubD-socket 25 pole, inclusive connection cable length 1,8 m and mating plug
A10.005	7 TE	2 pcs. stereo jack plugs 3,5 mm, inclusive connection cable length 1,8 m and mating plug
A10.021	7 TE	1 pcs. VGA SubD-socket 15 pole, inclusive connection cable length 1,8 m and mating plug
A10.022	7 TE	1 pc. DVI-I-socket, inclusive connection cable length 1,8 m and mating plug
A10.023	7 TE	2 pcs. audio sockets, Chinch, red and white, inclusive connection cable length 1,8 m and mating plug
A10.024	7 TE	1 pc. S-VHS-socket 4pole, mini-DIN, inclusive connection cable length 1,8 m and mating plug
A10.013	7 TE	2 pcs. RJ45-sockets CAT 6, 8 pole, rear plug connection, inclusive patch cable length 3 m and mating plug

### Further interfaces

Reference No.	Width	Interfaces
A10.025	7 TE	1 pc. FireWire-IEEE 1394 inclusive connection cable length 1,8 m and matching part
A10.026	7 TE	1 pc. IEEE 488 socket, GPIB, 24 pole, inclusive connection cable length 1,8 m and matching part
A10.007	7 TE	2 pcs. BNC through sockets, 50 Ohm
A10.027	7 TE	ASI interface field with 4 pcs. safety laboratory sockets 4 mm
A10.028	7 TE	PROFI NET-interface field with 1 pc. RJ45 socket CAT 6, 8 pole, rear plug connection, inclusive Patch cable length 3 m and mating plug
A10.029	7 TE	PROFI BUS interface field with 1 pc. SubD-plug 9 pole, inclusive connection cable length 1,8 m and female socket
A10.030	7 TE	1 pc. HDMI-pin-and-socket-connector type A, inclusive connection cable length 1,8 m and matching part
A12.032	28 TE	Multiple interface field with <ul style="list-style-type: none"> <li>- 2 pcs. USB sockets, inclusive connection cable length 1,8 m and matching part</li> <li>- 2 pcs. PS2-sockets for keyboard and mouse, inclusive connection cable length 1,8 m and mating plug</li> <li>- 1 pc. SubD-plug, 9 pole, inclusive connection cable length 1,8 m and female socket</li> <li>- 1 pc. SubD-socket, 15 pole, inclusive connection cable length 1,8 m and mating plug</li> <li>- 2 pcs. stereo-jack plugs 3,5 mm, inclusive connection cable length 1,8 m and mating plug</li> <li>- 2 pcs. RJ45-sockets CAT 6, 8 pole, rear pin-and-socket-connector</li> </ul>

## Empty plates

Note. Installation height: 113 mm

### Insert plates for hollow wall socket



Reference No.	Width
A12.017	28 TE Empty plate with breakthrough 68 mm for hollow wall socket

### Empty plates



Reference No.	Width
A01.010	14 TE
A02.010	28 TE
A03.010	42 TE
A04.010	56 TE
A05.010	70 TE
A06.010	84 TE

## The 19" device systems highlab® and basic

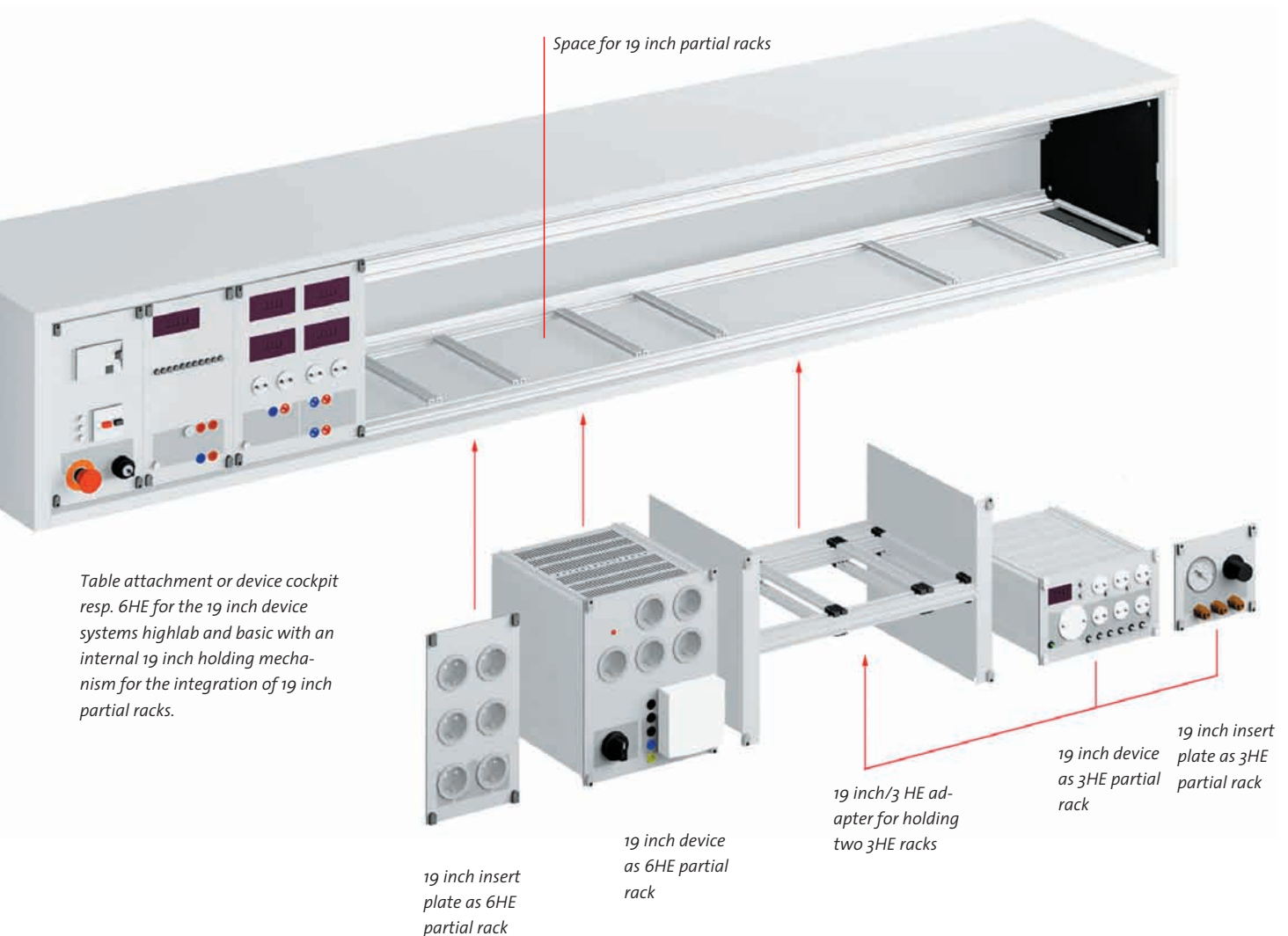


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## 19" Rack technique: equipment variants



### The 19 inch device systems highlab and basic

#### Modular design of the complete system

Devices of the most different functions and for the most different fields of application of the standardized 19 inch system allow the individual configuration of the devices.

The complexity, volume, performance data and type of the device are specified by the user. A great variety of various modules are available. The fields of application are varied just the same: Research, development, manufacturing, test shop, maintenance, service and training.

#### 19 inch module dimensions

The classification of the rack technique is based on 19 inch full racks, partial racks, sub-racks and adapters of 6HE and 3HE partial racks. Depending on the space required for the function of the device concerned, full racks and partial racks are offered as 3HE or 6HE rack. However, different modules of the same function are also deliverable as 6HE as well as 3HE rack (see device concerned). Full racks conform to DIN 41494 page 1 and are designed as either 3HE or 6HE devices. Partial racks conform to DIN 41494 volume 5. The standardized width of 14 partial racks allows an optimal combination within the sub-rack.

**Widths of the devices:** 14, 28, 42, 56, 70, 84TE as well as 19 inch

**Height of the device:** 3HE and 6HE

**Definition 19 inch, HE and TE**

19 inch: This is the width of a full rack of the theoretical dimensions of 482,6 mm.

HE: A height unit is defined with 44,45 mm. Thus, the theoretical dimension of 3HE = 133,35 mm and of 6HE = 266,5 mm.

TE: A sub-unit = 2/10 inch = 5,08 mm. 14 TE thus conform to theoretical 71,12 mm.

#### Information regarding the representation of the devices in this catalogue:

The 19" partial and full racks are always represented in this catalogue with a lateral or top device shielding. These shieldings are not included in the standard scope of supply. On request, they are deliverable as an option.

## 19" Rack technique: equipment variants

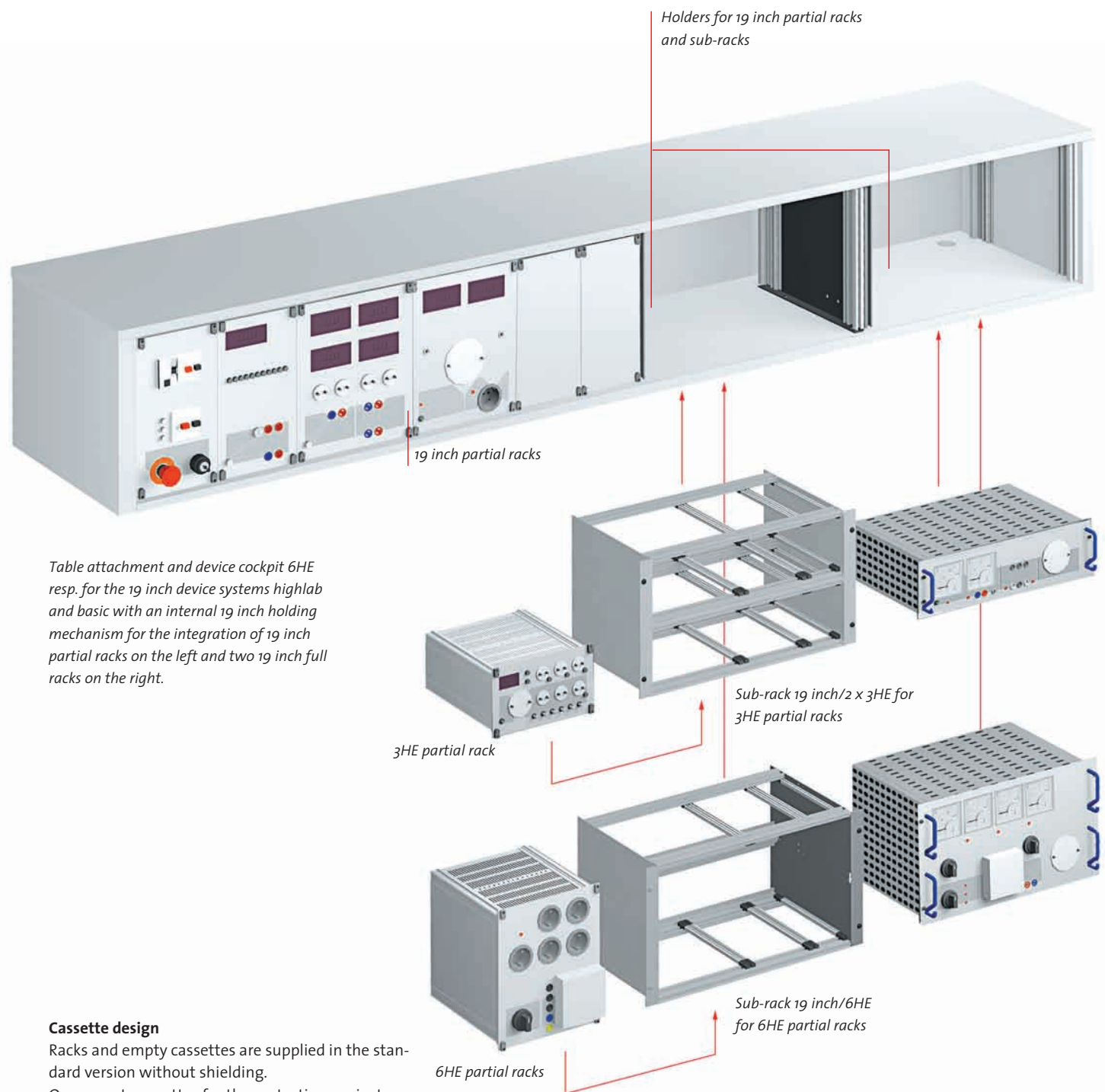


Table attachment and device cockpit 6HE resp. for the 19 inch device systems highlab and basic with an internal 19 inch holding mechanism for the integration of 19 inch partial racks on the left and two 19 inch full racks on the right.

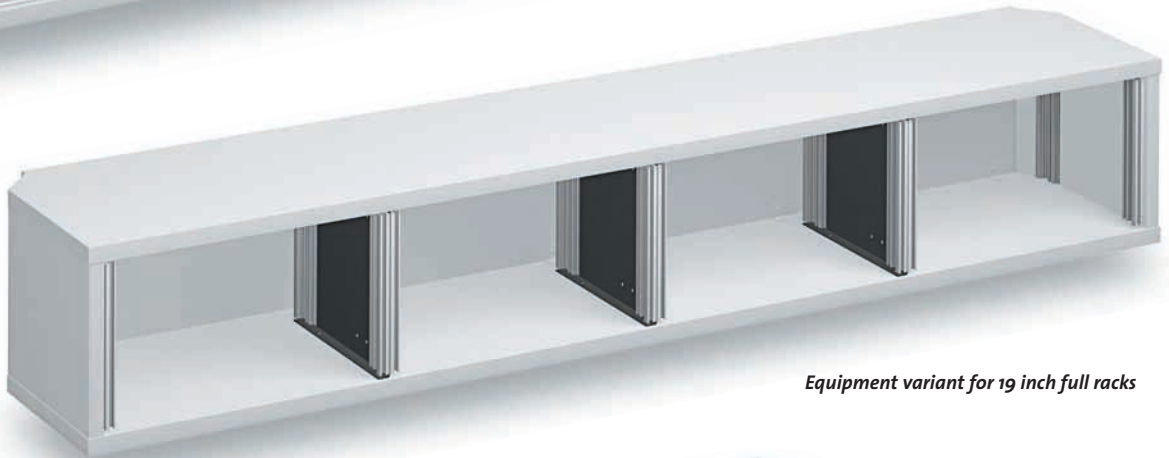
### Cassette design

Racks and empty cassettes are supplied in the standard version without shielding. On request, cassettes for the protection against accidental contact can be provided with an all-round metal shielding. The upper and lower shieldings are equipped with airing perforations.

## 19" Rack technique: equipment variants



*Equipment variant for 19 inch partial racks*



*Equipment variant for 19 inch full racks*



*Equipment variant: on the left for 19 inch partial racks and on the right for 2 x 19 inch full racks*

### Equipment variants

Depending on the work required, different designs are available: The equipment is divided in three groups which in turn can be combined:

1. Holders for 19 inch partial racks
2. Holders for 19 inch full racks
3. Open shelves

Combinations of full racks with partial racks as well as with open shelves can be realised.

The completion of the device system by the insert plate programme act is possible at any time.

### Module flexibility

For the combination of full and partial racks as well as of partial racks with different height units, the 19 inch system offers ideal conditions:

- 19 inch sub-racks for integrating partial racks in 19 inch holders of attachments and cockpits et.
- 3 HE adapter for integrating 3HE partial racks in holder for 6HE partial racks.

### System wiring

The necessary distributor is provided for a standard equipment and can be extended, if required. Partial racks are powered by standardized rack connectors conforming to DIN 41612 design H15. For full racks and insert plates there is a flexible connection system available which allows also the easy integration of special devices.

## Safety and switch units

Device system highlab



Fig.: H 56.011

3HE / 42TE

Device system basic



Fig.: E 54.021

3HE / 42TE

Reference No.	Design size	1~	3~	Key-operated switch
H 56.021	3HE/42TE	•		
H 52.021	6HE/14TE	•		
H 56.023	3HE/42TE		•	
H 54.716	6HE/28TE		•	
H 56.011	3HE/42TE	•		•
H 54.711	6HE/28TE	•		•
H 56.013	3HE/42TE		•	•
H 54.713	6HE/28TE		•	•

Reference No.	Design size	1~	3~	Key-operated switch
E 54.021	3HE/42TE	•		
E 52.531	6HE/14TE	•		
E 54.023	3HE/42TE		•	
E 53.516	6HE/28TE		•	
E 54.011	3HE/42TE	•		•
E 53.511	6HE/28TE	•		•
E 54.013	3HE/42TE		•	•
E 53.513	6HE/28TE		•	•

### Technical Data:

(applicable to all models)

Design size: Optionally 3 HE / 42 TE, 6 HE / 28 TE or 6 HE / 14 TE

Operating elements: Motor protection switch: 10-16 with built-in undervoltage release  
 NFI switch: leakage current 30 mA, nominal current 25 A type A pulsed current sensitive  
 Emergency stop push-button: with additional potential-free contact for the room emergency stop.  
 Key-operated on-off switch: Option (see selection chart above)

Phase display: Phase pilot lamp



### Options: AC/DC sensitive NFI switch type B

Reference No.	Design
Z 01.100	Additional price for NFI switch type B ( <b>AC/DC sensitive</b> ) Suitable for smooth direct-currents, obligatory for the fuse protection of classrooms as per DIN VDE 0100-723:2005-06



Safety and switch units

By means of a key-operated switch these mains modules allow the separate release of low voltages and alternating current voltages and three-

phase supplies respectively.  
Durch eine integrierte Fangschaltung kann die Person ermittelt werden, die den Not-Aus-Taster betätigt hat.

Device system highlab



Reference No.	Design
H 56.015	3 HE / 49 TE

Device system basic



Reference No.	Design
E 54.015	3 HE / 49 TE

Device system highlab



Reference No.	Design
H 54.718	6 HE / 28 TE

Device system basic



Reference No.	Design
E 53.518	6 HE / 28 TE

Technical Data:

(applicable to all models)

Operating elements:	Motor protection switch:	10-16 with built-in undervoltage release
	NFI switch:	leakage current 30 mA, nominal current 25 A type A pulsed current sensitive
	Emergency stop push-button:	with integrated key-operated switch (by-pass proof) with additional potential-free contact for the room emergency stop
	Key-operated changeover switch:	with 3 key positions for changeover between - low voltage - zero voltage - low, AC and three-phase current supply
	LED display:	white = for low voltage green = for low, AC and three-phase current supply yellow = for emergency stop interception circuit
Due to the interception circuit the student can be found out who has operated the emergency stop push-button.		
<b>Note:</b> A separate control line has to be provided for!		
Display of phases: Phase pilot lamps		

## Emergency stop modules

### Device system highlab



Reference No.	Design
H 52.041	<b>Emergency stop palm push-button</b> 3 HE / 14 TE With potential-free contact for connection to an available room emergency stop.



Reference No.	Design
H 52.042	<b>Emergency stop palm push-button</b> 3 HE / 14 TE By-pass proof due to an integrated key-operated switch. The emergency stop push-button can be released by means of the key.

### Device system basic



Reference No.	Design
E 52.041	<b>Emergency stop palm push-button</b> 3 HE / 14 TE With potential-free contact for connection to an available room emergency stop.



Reference No.	Design
E 52.042	<b>Emergency stop palm push-button</b> 3 HE / 14 TE By-pass proof due to an integrated key-operated switch. The emergency stop push-button can be released by means of the key.

## Emergency stop modules with Schuko sockets

### Device system highlab



Reference No.	Design
H 12.539	<b>1 Emergency stop palm push-button</b> <b>2 Schuko sockets</b> , one of them switchable 6 HE / 14 TE



Reference No.	Design
H 12.540	<b>1 Emergency stop palm push-button</b> By-pass proof due to an integrated key-operated switch, <b>2 Schuko sockets</b> one of them switchable 6 HE / 14 TE

### Device system basic



Reference No.	Design
E 12.539	<b>1 Emergency stop palm push-button</b> <b>2 Schuko sockets</b> , one of them switchable 6 HE / 14 TE



Reference No.	Design
E 12.540	<b>1 Emergency stop palm push-button</b> By-pass proof due to an integrated key-operated switch, <b>2 Schuko sockets</b> , one of them switchable 6 HE / 14 TE

## Room sub-distribution and table controls for training centres

For the professional equipment of classrooms and laboratories, nowadays the instructor places are, as a rule, equipped with room sub-distributions and table controls. This allows to professionally make safe complete rooms and to control individual student working places.

The standardized 19" modules for room sub-division and table control are integrated in a space-saving way in a 19" floor unit at the instructor working place.

Example of an instructor working place with room sub-distribution in a 19" floor unit



19" floor unit equipped with the following components:

Example:

- 1.) **Control module with up/down push-button**  
to control the retractable table of the student (up/down control)
- 2.) **Main power supply module**  
for the central release of the room  
(network supply)
- 3.) **Individual release module**  
for the separate release of individual student tables

## Main power supply modules Basic equipment

### Device system highlab

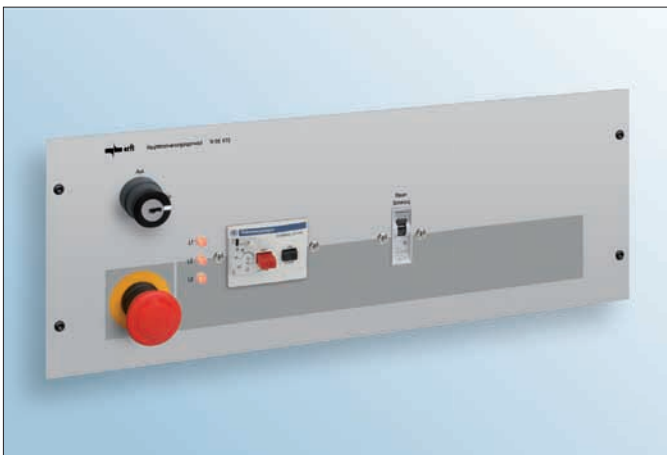


Fig.: N 58.410

Reference No.	Design
N 58.410 highlab	Main power supply module
C 58.410 basic	for the central release

Technical Data:	
(applicable to all models)	
Design size:	19" / 4 HE
Use:	The main power supply module serves for the central release of the power supply of the classroom.
Equipment:	1 key-operated on-off switch 1 emergency stop palm pushbutton with locking 3 phase pilot lamps 1 motor protection switch 4 pole, 40 A with zero voltage release 1 automatic fuse 16 A B for the control circuit

## Main power supply module - Extended by NFI protective switch 5000 mA

### Device system highlab

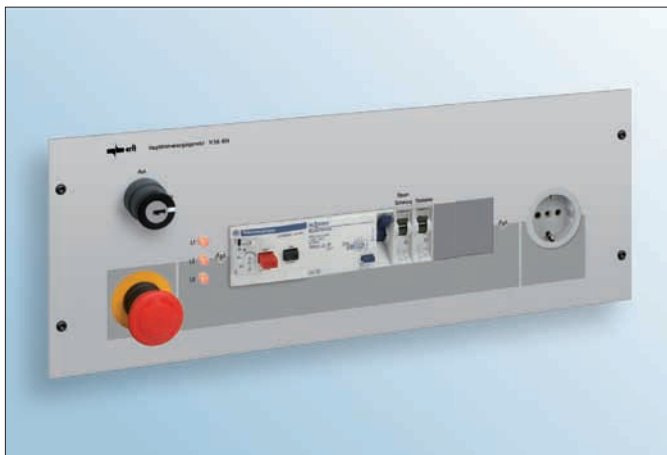


Fig.: N 58.454

Reference No.	Design
N 58.454 highlab	Main power supply module
C 58.454 basic	for the central release

Technical Data:	
(applicable to all models)	
Design size:	19" / 4HE
Use:	The main power supply module serves for the central release of the power supply of the classroom.
Equipment:	1 key-operated on-off switch 1 emergency stop palm pushbutton with locking 3 phase pilot lamps 1 motor protection switch 4 pole, 40 A with zero voltage release 1 NFI protective switch 4 pole, leakage current 50 mA nominal current 40 A type A ( <b>pulsed current sensitive</b> ) 1 automatic fuse 16 A B for the control circuit 1 Schuko socket 230 V / 16 A 1 automatic fuse 16 A C for the socket

Space for subsequent equipment is available

### Optionally available equipment:

FI protective switch 4 pole / 40 A / 500 mA (**AC/DC sensitive**)

Reference No.	Design
Z 01.200	1 NFI switch type B (AC/DC sensitive) 4 pole, leakage current 500 mA, nominal current 40 A Suitable for smooth direct-currents, obligatory for the fuse protection of classrooms as per DIN VDE 0100-723:2005-06



Individual release module with motor protection switch (MS)

Device system highlab

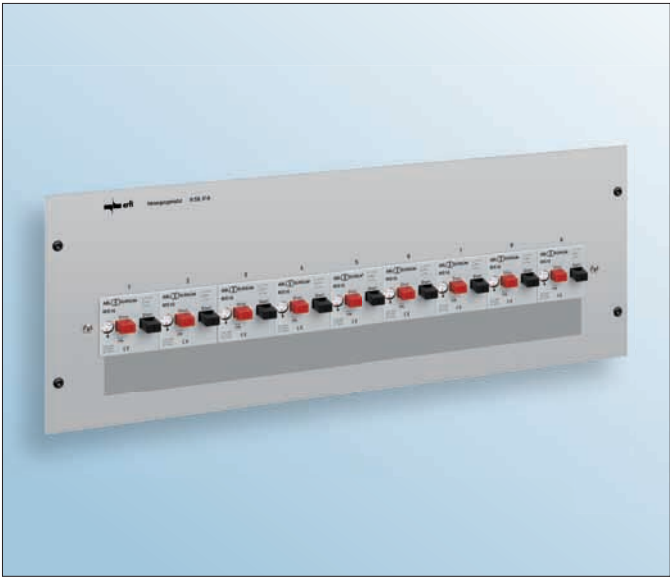


Fig.: N 58.414

Reference No.	Design
N 58.414 highlab	Individual release module for max. 9 MS
C 58.455 basic	
Z 01.101	Motor protection switch 10-16 A with undervoltage release

Technical Data:	
(applicable to all models)	
Design size:	19" / 4 HE
Use:	The individual release module serves for the individual release of the student and instructor tables.
Equipment:	up to 9 motor protection switches 10-16 A with undervoltage release

**Note:**  
The module has openings for max. 9 motor protection switches and is labelled with numerals 1-9.  
The number of motor protection switches has to be ordered separately. (see reference No. Z01.101)  
The modules are supplied completely wired.

Motor protection switch (MS)

Reference No.	Design
Z 01.101	Motor protection switch 10-16 A with undervoltage release

Device system highlab

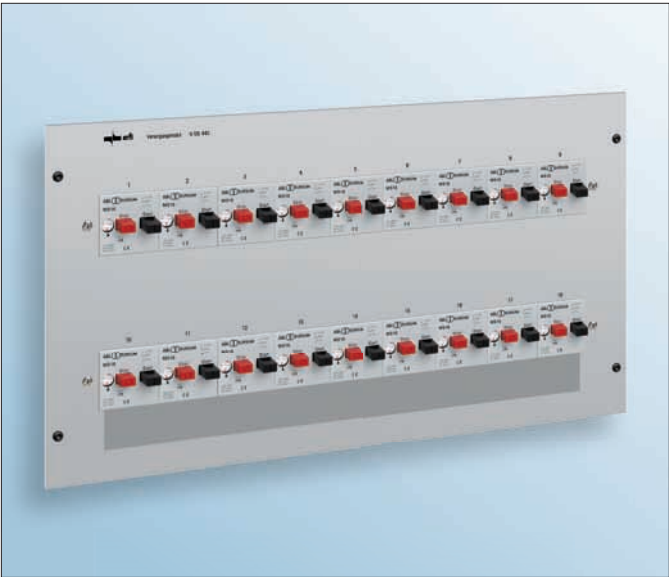


Fig.: N 58.440

Reference No.	Design
N 58.440 highlab	Individual release module for max. 18 MS
C 58.440 basic	
Z 01.101	Motor protection switch 10-16 A with undervoltage release

Technical Data:	
(applicable to all models)	
Design size:	19" / 6 HE
Use:	The individual release module serves for the individual release of the student and instructor tables.
Equipment:	up to 18 motor protection switches 10-16 A with undervoltage release

**Note:**  
The module has openings for max. 18 motor protection switches and is labelled with numerals 1-18.  
The number of motor protection switches has to be ordered separately. (see reference No. Z01.101)  
The modules are supplied completely wired.

## Individual release modules with automatic fuses (LS) (single-phase power supply to the student tables)

### Device system highlab

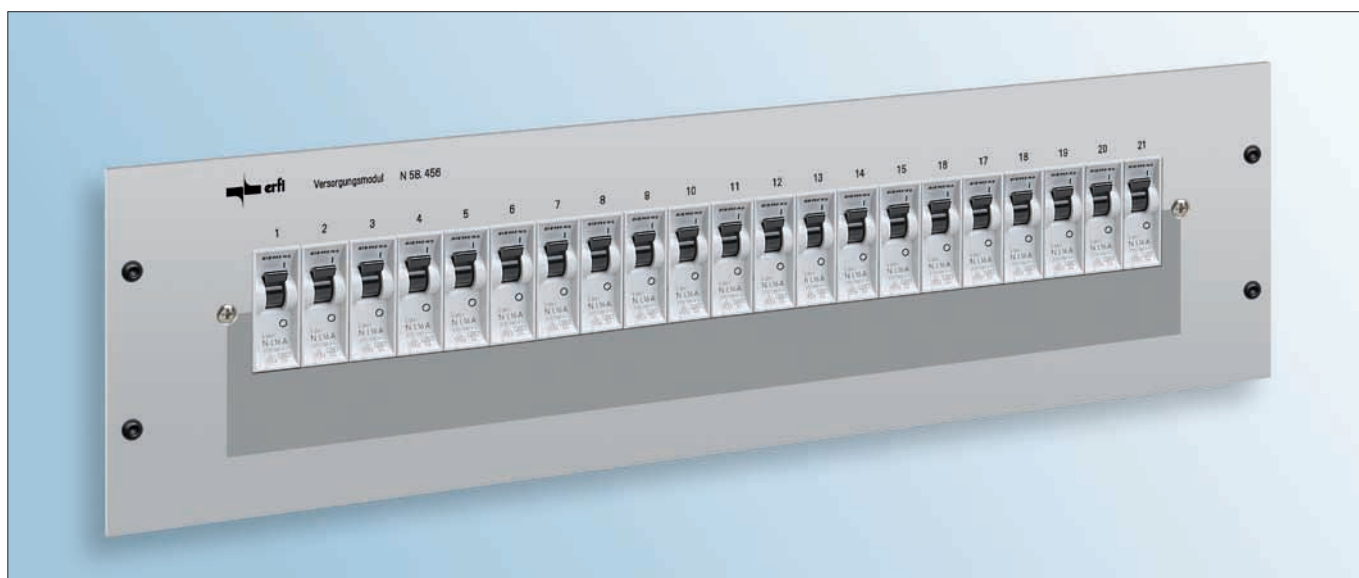


Fig.: N 58.456

Reference No.	Design
N 58.456 highlab	Individual release module
C 58.456 basic	for max. 21 automatic fuses <b>(1 pole)</b>
Z 01.102	Automatic fuse 16 A B <b>1 pole</b>

### Technical Data:

(applicable to all models)

Design size:	19" / 3 HE
Use:	The individual release module serves for the individual release of the student and instructor tables.
Equipment:	up to 21 automatic fuses <b>(1 pole)</b> 16 A tripping characteristic B

### Note:

The module has openings for max. 21 single-phase automatic fuses and is labelled with numerals 1-21.

The number of automatic fuses has to be ordered separately.

(see reference No. Z01.102)

The modules are supplied completely wired.

### Automatic fuse (1 pole)

Reference No.	Design
Z 01.102	Automatic fuse 16 A 1 pole B

Individual release modules with automatic fuses (LS)  
(three-phase power supply to the student tables)

Device system highlab

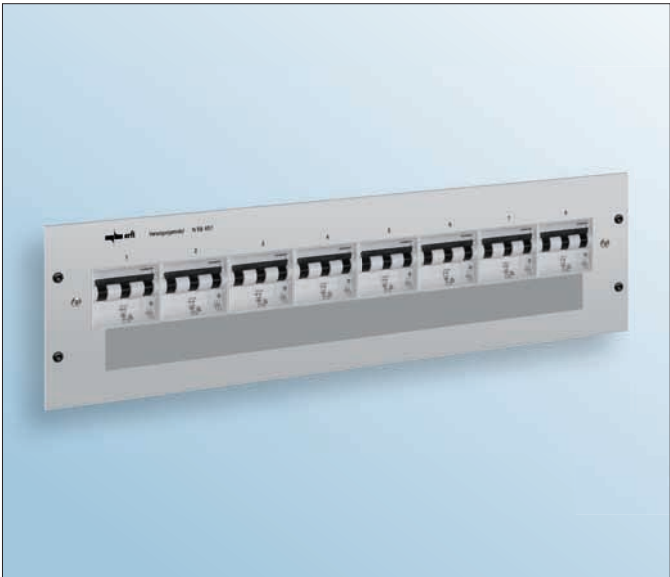


Fig.: N 58.457

Reference No.	Design
N 58.457 highlab	Individual release module for max. 8 automatic fuses (3 pole)
C 58.457 basic	
Z 01.103	Automatic fuse 16 A B 3 pole

Technical Data:	
(applicable to all models)	
Design size:	19" / 3HE
Use:	The individual release module serves for the individual release of the student and instructor tables.
Equipment:	up to 8 automatic fuses <b>(3 pole)</b> 16 A tripping characteristic B

**Note:**  
The module has openings for max. 8 three-phase automatic fuses and is labelled with numerals 1-8.  
The number of automatic fuses has to be ordered separately. (see reference No. Z 01.103)  
The modules are supplied completely wired.

Automatic fuse (3 pole)

Reference No.	Design
Z 01.103	Automatic fuse 16 A 3 pole B

Device system highlab



Fig.: N 58.450

Reference No.	Design
N 58.450 highlab	Individual release module for max. 21 automatic fuses (3 pole)
C 58.450 basic	
Z 01.103	Automatic fuse 16 A B 3 pole

Technical Data:	
(applicable to all models)	
Design size:	19" / 7 HE
Use:	The individual release module serves for the individual release of the student and instructor tables.
Equipment:	up to 21 automatic fuses <b>(3 pole)</b> 16 A tripping characteristic B

**Note:**  
The module has openings for max. 21 three-phase automatic fuses and is labelled with numerals 1-21.  
The number of automatic fuses has to be ordered separately. (see reference No. Z 01.103)  
The modules are supplied completely wired.

## Control module for retractable and swivel tables

### Device system highlab

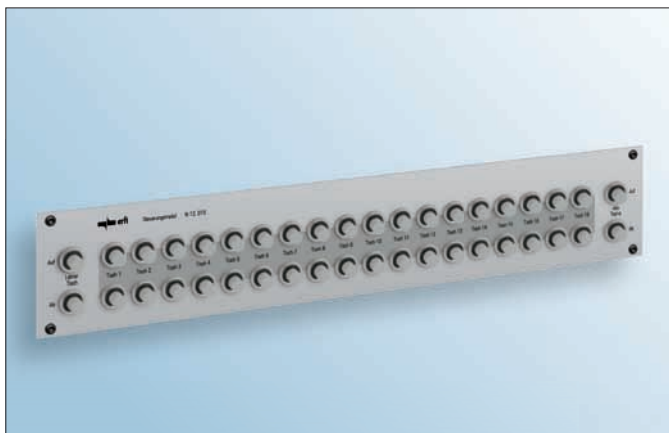


Fig.: N 12.015

Reference No.	Design
N 12.015 highlab	Control module for max.
C 12.015 basic	18 retractable or swivel tables resp. (student tables), 1 instructor table and 1 collective lifting
Z 01.104	1 pair of push-buttons (up/down push-button)

### Technical Data:

Design size:	19" / 2HE
Use:	The control module serves for the up/down control of the student and instructor tables. A collective lifting is also possible.
Equipment:	up to 20 pairs of push-buttons
Labelling:	UP / DOWN for all pairs of push-buttons

#### Note:

The module has openings for max. 20 pairs of push-buttons  
18 student tables  
1 instructor table  
1 collective lifting

The number of pairs of keys has to be ordered separately.  
(see reference No. Z01.104)  
The modules are supplied completely wired.

### Pair of push-buttons up / down

Reference No.	Design
Z 01.104	1 Pair up / down push-buttons

## Telecontrol with radio actuator for retractable and swivel tables with additional functions

### Telecontrol



Reference No.	Design
Z 01.105	Telecontrol for max. 24 retractable or swivel tables resp., other functions
Z 01.106	Receiver (radio actuator) built- into the table attachments

### Technical Data:

Use:	The telecontrol contributes considerably to the functionality of the room. 3 groups of 8 tables each can be controlled. For example, 1 push-button can be programmed for several actuators (receivers). Thus, groups can be controlled quickly and efficiently.
Advantages:	No cabling necessary High flexibility due to a simple programming of the allocation of the push-buttons. Additional functions such as separate release of low voltage and three-phase voltage, light, sun-blinds etc. easily realisable

### Receiver (actuators)

Reference No.	Design
Z 01.106	1 radio actuator (receiver)

The radio actuators allow the control of the following functions:  
1.) Up / down movement of the retractable / swivel tables  
2.) Switching of different device groups in the student tables  
e.g. (low voltage, mains voltage, measuring devices etc.)



Socket modules – not unearthed

Device system highlab



Fig.: H 14.851

Reference No.	Design	Reference No.	Design
H 12.201	3 HE / 14 TE 2 Schuko sockets	H 12.545	6 HE / 14 TE 4 Schuko sockets
H 14.851	3 HE / 28 TE 4 Schuko sockets	H 14.611	6 HE / 28 TE 6 Schuko sockets

Device system basic



Fig.: E 13.011

Reference No.	Design	Reference No.	Design
E 12.101	3 HE / 14 TE 2 Schuko sockets	E 12.545	6 HE / 14 TE 4 Schuko sockets
E 13.011	3 HE / 28 TE 4 Schuko sockets	E 14.611	6 HE / 28 TE 6 Schuko sockets

Socket module – not unearthed, with analog power and voltage meter

Device system highlab



Reference No.	Design
H 14.514	6 HE / 28 TE 1 Schuko socket 1 analog voltage meter 0-260 V AC (moving iron instrument class 1,5) 1 analog ammeter 0-16 A AC (moving iron instrument class 1,5) 1 mains switch

Note: Sockets of foreign make see page 63

Device system basic



Reference No.	Design
B 13.513	6 HE / 28 TE 1 Schuko socket 1 analog voltage meter 0-260 V AC (moving iron instrument class 1,5) 1 analog ammeter 0-16 A AC (moving iron instrument class 1,5) 1 mains switch

## Socket modules – not unearthed, with safety laboratory sockets L1, N and PE

Device system highlab



Fig.: H 16.011

Reference No.	Design	Reference No.	Design
H 16.011	3 HE / 42 TE 4 Schuko sockets 2 x 3 laboratory sockets	H 12.543	6 HE / 14 TE 3 Schuko sockets 3 laboratory sockets

Device system basic



Fig.: E 14.011

Reference No.	Design	Reference No.	Design
E 14.011	3 HE / 42 TE 4 Schuko sockets 2 x 3 laboratory sockets	E 12.543	6 HE / 14 TE 3 Schuko sockets 3 laboratory sockets

## Socket modules – not unearthed, with safety laboratory sockets L1, N and PE and mains switch

Device system highlab



Fig.: H 16.020

Reference No.	Design	Reference No.	Design
H 16.020	3 HE / 42 TE 4 Schuko sockets 2 x 3 laboratory sockets mains switch	H 12.556	6 HE / 14 TE 3 Schuko sockets 3 laboratory sockets mains switch

Device system basic



Fig.: E 14.020

Reference No.	Design	Reference No.	Design
E 14.020	3 HE / 42 TE 4 Schuko sockets 2 x 3 laboratory sockets mains switch	E 12.547	6 HE / 14 TE 3 Schuko sockets 3 laboratory sockets mains switch

Note: Sockets of foreign make see page 63

## Socket modules – not unearthed, antenna socket

Device system highlab



Fig.: H 16.042

Reference No.	Design	Reference No.	Design
H 16.042	3 HE / 42 TE 2 Schuko sockets 1 antenna socket TV, SAT, radio	H 12.102	6 HE / 14 TE 3 Schuko sockets 1 antenna socket TV, SAT, radio

Device system basic



Fig.: E 14.040

Reference No.	Design	Reference No.	Design
E 14.040	3 HE / 42 TE 2 Schuko sockets 1 antenna socket TV, SAT, radio	E 12.562	6 HE / 14 TE 3 Schuko sockets 1 antenna socket TV, SAT, radio

## Socket modules – not unearthed – with mains filter

Device system highlab



Fig.: H 16.043

Reference No.	Design	Reference No.	Design
H 16.043	3 HE / 42 TE 4 Schuko sockets 1 Schuko socket with mains line filter 230 V / 4 A 1 thermal-magnetic automatic fuse 1 mains switch	H 12.103	6 HE / 14 TE 1 Schuko socket 1 Schuko socket with mains line filter 230 V / 16 A 1 thermal-magnetic automatic fuse 1 mains switch

Device system basic



Fig.: E 14.041

Reference No.	Design	Reference No.	Design
E 14.041	3 HE / 42 TE 4 Schuko sockets 1 Schuko socket with mains line filter 230 V / 4 A 1 thermal-magnetic automatic fuse 1 mains switch	E 12.563	6 HE / 14 TE 1 Schuko socket 1 Schuko socket with mains line filter 230 V / 16 A 1 thermal-magnetic automatic fuse 1 mains switch

Note: Sockets of foreign make see page 63

## Alternating current voltage modules – unearthed

### Device system highlab



Fig.: H 94.021

Ref. No.	Design	Ref. No.	Design
H 94.114	3 HE / 28 TE isolating transformer 100 VA	H 94.021	3 HE / 28 TE isolating transformer 460 VA

### Device system basic



Fig.: B 93.012

Ref. No.	Design	Ref. No.	Design
B 93.016	3 HE / 28 TE isolating transformer 100 VA	B 93.012	3 HE / 28 TE isolating transformer 460 VA

#### Technical Data:

(applicable to all models)

Design size: 3 HE / 28 TE

Outputs: 1 socket without grounding contact through isolating transformer for supplying unearthed alternating current voltage 230 V / 100 VA, alternatively 460 VA

Fuse protection: isolating transformer through thermal magnetic protective switch  
Mains switch

## Alternating current voltage modules – unearthed, additionally with 2 Schuko sockets

### Device system highlab



Fig.: H 96.045

Ref. No.	Design	Ref. No.	Design
H 96.045	3 HE / 42 TE isolating transformer 100 VA	H 96.046	3 HE / 42 TE isolating transformer 690 VA

### Device system basic



Fig.: B 94.024

Ref. No.	Design	Ref. No.	Design
B 94.024	3 HE / 42 TE isolating transformer 100 VA	B 94.025	3 HE / 42 TE isolating transformer 690 VA

#### Technical Data:

Design size: 3 HE / 42 TE

Outputs: 2 Schuko sockets for extracting mains voltage  
1 socket without grounding contact through isolating transformer for supplying unearthed alternating current voltage 230V / 100VA, alternatively 690 VA

Fuse protection: isolating transformer through thermal magnetic protective switch

Note: Sockets of foreign make see page 63



Alternating current voltage modules – unearthed, additionally with 2 safety laboratory sockets unearthed and 4 Schuko sockets

Device system highlab



Fig.: H 16.841

Ref. No.	Design
H 16.841	3 HE / 42 TE isolating transformer 100 VA

Device system basic



Fig.: B 94.013

Ref. No.	Design
B 94.013	3 HE / 42 TE isolating transformer 100 VA

Technical Data:	
(applicable to all models)	
Design size:	3 HE / 42 TE
Outputs:	4 Schuko sockets for extracting mains voltage 1 socket without grounding contact through isolating transformer for supplying unearthed alternating current voltage. 230V / 100 VA, alternatively 690 VA, reversible to 2 safety laboratory sockets
Changeover switch:	For circuit-entering of the isolating transformer output to the socket or bushings resp.
Fuse protection:	isolating transformer through thermal magnetic protective switch
Mains switch	

Alternating current voltage modules – unearthed, additionally with 1 Schuko socket

Device system highlab



Reference No.	Design
H 92.641	6 HE / 14 TE isolating transformer 100 VA

Device system basic



Reference No.	Design
E 12.544	6 HE / 14 TE isolating transformer 100 VA

Technical Data:	
(applicable to all models)	
Design size:	6 HE / 14 TE
Outputs:	1 Schuko socket for extracting mains voltage 1 socket without grounding contact through isolating transformer for supplying unearthed alternating current voltage 230 V / 100 VA
Fuse protection:	isolating transformer through thermal magnetic protective switch
Mains switch	
Note: Sockets of foreign make see page 63	

## Alternating current voltage modules – unearthed, additionally with 5 Schuko sockets and 3 safety laboratory sockets

Device system highlab



Fig.: H 96.505

Ref. No.	Design	Ref. No.	Design
H 96.505	6 HE / 42 TE isolating transformer 690 VA (3A)	H 96.508	6 HE / 42 TE isolating transformer 1150 VA (5A)

Device system basic



Fig.: B 14.515

Ref. No.	Design	Ref. No.	Design
B 14.515	6 HE / 42 TE isolating transformer 690 VA (3A)	B 14.518	6 HE / 42 TE isolating transformer 1150 VA (5A)

### Technical Data:

(applicable to all models)

Design size: 6 HE / 42 TE

Outputs: 5 Schuko socket for extracting mains voltage  
3 safety laboratory sockets (L1,N,PE) 230 V / 16 A, unearthed  
1 socket without grounding contact through isolating transformer  
for supplying unearthed alternating current voltage 230 V / 690 VA, alternatively 1150 VA

Fuse protection: isolating transformer through thermal magnetic protective switch

Mains switch

Low alternating current voltage modules – unearthed

Device system highlab



Reference No.	Design
H 94.115	3 HE / 28 TE 6, 12, 18, 24, 36, 42 V AC / 3 A integrated rectifier

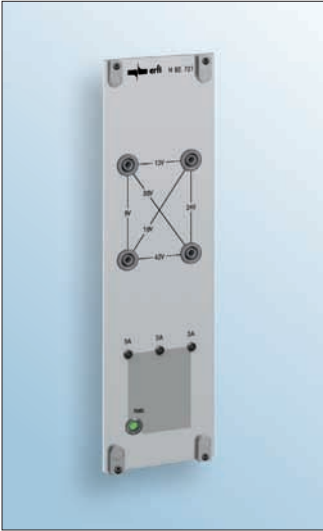
Device system basic



Reference No.	Design
B 93.017	3 HE / 28 TE 6, 12, 18, 24, 36, 42 V AC / 3 A integrated rectifier

Technical Data:	
(applicable to all models)	
Design size:	3 HE / 28 TE
Output voltages:	6, 12, 18, 24, 36, 42 V AC / 3 A (unearthed)
Fuse protection:	primary: safety fuse secondary: 4 x thermal magnetic protective switch
Rectifier:	bridge rectifier for external protective circuit (B2)
Mains switch	

Device system highlab



Reference No.	Design
H 92.721	6 HE / 14 TE 6, 12, 18, 24, 36, 42 V AC / 3 A
H 92.723	6 HE / 14 TE 2, 4, 6, 8, 10, 12 V AC / 10 A

Device system basic



Reference No.	Design
E 12.511	6 HE / 14 TE 6, 12, 18, 24, 36, 42 V AC / 3 A
E 12.513	6 HE / 14 TE 2, 4, 6, 8, 10, 12 V AC / 10 A

Fig.: H 92.721

Fig.: E 12.511

Technical Data:	
(applicable to all models)	
Design size:	6 HE / 14 TE
Output voltages:	for model H 92.721 and E 12.511 resp.: 6, 12, 18, 24, 36, 42 V AC / 3 A (unearthed) for model H 92.723 and E 12.513 resp.: 2, 4, 6, 8, 10, 12 V AC / 10A (unearthed)
Fuse protection:	3 x thermal magnetic protective switch
Mains switch	

Three-phase current modules – not unearthed

Device system highlab



Reference No.	Design
H 14.016	3 HE / 28 TE

Device system basic



Reference No.	Design
E 13.016	3 HE / 28 TE

Technical Data:

(applicable to all models)

Design size: 3 HE / 28 TE

Outputs: 1 CEE socket 400 / 230 V max. 16 A per phase

Three-phase current modules – not unearthed – star-delta connection – with safety laboratory sockets L1, L2, L3, N and PE

Device system highlab



Fig.: H 14.042

Reference No.	Design
H 14.042	3 HE / 28 TE

Device system basic



Fig.: E 13.042

Reference No.	Design
E 13.042	3 HE / 28 TE

Reference No.	Design
E 12.522	6 HE / 14 TE

Technical Data:

(applicable to all models)

Design size: 3 HE / 28 TE optionally 6 HE / 14 TE

Outputs: 5 safety laboratory sockets, 400 / 230 V max. 16 A per phase  
The laboratory sockets are arranged in a star-delta form.

Phase display: 3 phase pilot lamps

Mains switch



## Three-phase current and socket modules – not unearthed, with safety laboratory sockets L1, L2, L3, N and PE

Device system highlab



Fig.: H 14.832

Reference No.	Design	Reference No.	Design
H 14.832	3 HE / 28 TE	H 12.542	6 HE / 14 TE in addition 2 Schuko sockets

Device system basic



Fig.: E 13.012

Reference No.	Design	Reference No.	Design
E 13.012	3 HE / 28 TE	E 12.542	6 HE / 14 TE in addition 2 Schuko sockets

### Technical Data:

(applicable to all models)

Design size: 3 HE / 28 TE optionally 6 HE / 14 TE

Outputs: 1 CEE socket 400 / 230 V max 16 A pro Phase  
5 safety laboratory sockets 400 / 230 V max. 16 A per phase  
**For models H12.542 and E12.542 resp.: in addition with 2 Schuko sockets**

## Three-phase current and socket modules – not unearthed, with safety laboratory sockets, key-operated contactor and off-push-button

Device system highlab



Fig.: H 16.018

Reference No.	Design	Reference No.	Design
H 16.018	3 HE / 42 TE	H 14.525	6 HE / 28 TE in addition 2 Schuko sockets

Device system basic



Fig.: E 14.018

Reference No.	Design	Reference No.	Design
E 14.018	3 HE / 42 TE	E 13.525	6 HE / 28 TE in addition 2 Schuko sockets

### Technical Data:

(applicable to all models)

Design size: 3 HE / 28 TE optionally 6 HE / 28 TE

Outputs: 1 CEE socket 400 / 230 V max 16 A per phase  
5 safety laboratory sockets 400 / 230 V max. 16 A per phase  
1 key-operated on-push-button  
1 off-push-button  
**For models H14.525 and E13.525 resp.: in addition with 2 Schuko sockets**

Phase display: 3 phase pilot lamps

## Three-phase current and socket modules – not unearthed, with voltage and current meter, star-delta connection

Device system highlab



**Reference No.**    **Design**  
H 16.524        6 HE / 42 TE

Device system basic



**Reference No.**    **Design**  
B 14.525        6 HE / 42 TE

### Technical Data:

(applicable to all models)

Design size:	6 HE / 42 TE
Output voltages:	3 x 400 / 230 V, 50Hz, max. 6 A per phase, not unearthed
Outputs:	1 CEE socket 5 safety laboratory sockets (L1, L2, L3, N und PE) 1 Schuko socket
Displays:	voltage: moving iron instrument 0-400 V, class 1,5 current: moving iron instrument 0-6 A, class 1,5
Voltmeter reversible:	for switchover of the voltage display between the phases or between the phases and the neutral conductor
Ammeter reversible:	for switching on the ammeter in each phase
Fuse protection:	3 thermal magnetic automatic fuses
Phase control:	phase pilot lamps
Mains switch	

Note: Sockets of foreign make see page 63

Three-phase current and socket modules – not unearthed, with  
1 voltage meter and 3 current meters , star-delta connection

Device system highlab



Reference No.	Design
H 99.517	6 HE / 84 TE

Device system basic



Reference No.	Design
B 97.517	6 HE / 84 TE

Technical Data:	
(applicable to all models)	
Design size:	6 HE / 84 TE
Output voltages:	3 x 400 / 230 V, 50Hz, max. 16 A per phase, not unearthed
Outputs:	1 CEE socket 8 safety laboratory sockets (L1 or U1, L2 or V1, L3 or W1, U2, V2, W2, N and PE) 2 Schuko sockets 3 safety laboratory sockets L1, N and PE
Displays:	voltage: moving iron instrument 0-400 V, class 1,5 current: 3 moving iron instruments 0-15 A with overload scale, class 1,5
Voltmeter reversible:	for switchover of the voltage display between the phases or between the phases and the neutral conductor
Changeover switch:	for switchover between star and delta connection
Phase control:	phase pilot lamps
Mains switch	

Note: Sockets of foreign make see page 63

Three-phase current and socket modules – unearthed (single-phase), 260 V / 690 VA and 1150 VA resp.

#### Device system highlab



Fig.: H 96.502

Reference No.	Design	Reference No.	Design
H 96.502	6 HE / 42 TE isolating transformer 230 V / 690 VA (3A)	H 16.526	6 HE / 42 TE isolating transformer 230 V / 1150 VA (5A)

#### Device system basic



Fig.: B 14.512

Reference No.	Design	Reference No.	Design
B 14.512	6 HE / 42 TE isolating transformer 230 V / 690 VA (3A)	B 14.526	6 HE / 42 TE isolating transformer 230 V / 1150 VA (5A)

#### Technical Data:

(applicable to all models)

Design size:	6 HE / 42 TE
Output voltages:	3 x 400 / 230 V, 50Hz, max. 16 A per phase, not unearthed 1 x 230 V, 50 Hz, max. 3 A alternatively 5 A, unearthed
Outputs:	1 Schuko socket without grounding contact through transformer for supplying unearthed alternating current voltage 230 V / 690 VA alternatively 1150 VA 4 Schuko sockets, not unearthed 1 CEE socket, not unearthed 5 safety laboratory sockets (L1, L2, L3, N and PE), unearthed
Fuse protection:	isolating transformer through thermal magnetic protective switch
Mains switch	

Note: Sockets of foreign make see page 63



Three-phase current and socket modules – unearthed  
(single-phase 230 V / 500 VA and three-phase 400 V / 1 kVA)

Device system highlab



Reference No.	Design
N 96.612	6 HE / 19"

Device system basic



Reference No.	Design
C 96.612	6 HE / 19"

Technical Data:

(applicable to all models)	
Design size:	6 HE / 19"
Outputs:	1 Schuko socket without grounding contact through isolating transformer for supplying unearthed alternating current voltage max. 500 VA 1 CEE socket through isolating transformer for extracting unearthed three-phase voltage max. 1 kVA
Fuse protection:	primary: isolating transformer through thermal protective switch secondary: 1 automatic fuse 1 pole, 16 A B for Schuko socket 1 automatic fuse 3 pole, 16 A B for CEE socket
Mains switch:	1 mains switch for Schuko socket 1 mains switch for CEE socket

Note: Sockets of foreign make see page 63

## Low three-phase voltage modules – unearthed – star-delta connection

### Device system highlab



Fig.: H 94.116

Reference No.	Design	Reference No.	Design
H 94.116	3 HE / 28 TE 3 x 40 V / 3 x 23 V / 3 A	H 94.117	3 HE / 28 TE 3 x 17,3 V / 3 x 10 V / 5 A

### Device system basic



Fig.: B 93.018

Reference No.	Design	Reference No.	Design
B 93.018	3 HE / 28 TE 3 x 40 V / 3 x 23 V / 3 A	B 93.019	3 HE / 28 TE 3 x 17,3 V / 3 x 10 V / 5 A

### Device system highlab



Fig.: H 93.511

Reference No.	Design
H 93.511	6 HE / 14 TE 3 x 40 V / 3 x 23 V / 3 A
H 93.512	6 HE / 14 TE 3 x 17,3 V / 3 x 10 V / 5 A

### Device system basic



Fig.: E 92.511

Reference No.	Design
E 92.511	6 HE / 14 TE 3 x 40 V / 3 x 23 V / 3 A
E 92.512	6 HE / 14 TE 3 x 17,3 V / 3 x 10 V / 5 A

### Technical Data:

(applicable to all models)

Design size:	3 HE / 28 TE and 6 HE / 14 TE resp.		
Outputs:	4 safety laboratory sockets The laboratory sockets are arranged in star-delta form:		
	For models H 94.116, B 93.018, H 93.511 and E 92.511:	delta	3 x 40 V / 3 A / 50 Hz
		star:	3 x 23 V / 3 A / 50 Hz
	For models H 94.117, B 93.019, H 93.512 and E 92.512:	delta	3 x 17,3 V / 150 VA / 50 Hz
		star:	3 x 10 V / 5 A / 50 Hz
Fuse protection:	3 thermal magnetic automatic fuses		
Phase display:	3 phase pilot lamps		
Mains switch			

## Variable transformers – not unearthed and unearthed, installation height 3 HE

Device system highlab



Fig.: H 98.014

Device system basic



Fig.: B 95.014



Fig.: N 93.011



Fig.: C 93.021

### Technical Data:

(applicable to all models)

Design size:	3 HE / 42 TE, 3 HE / 56 TE, 3 HE / 19"
Outputs:	1 Schuko socket (not unearthed) or 1 Socket without grounding contact (unearthed) or 2 safety laboratory sockets for low voltage, depending on model (see also *)
Output data:	0 - 30 V AC, 0 - 60 V AC, 0 - 260 V AC not unearthed alternatively unearthed, depending on model from 0,8 A bis 4 A, depending on model
Displays:	analog display for U and I, 2 moving iron instruments class 2,5 The models H98.014 and B95.014 have digital displays: digital display for U and I, 2 pcs. LED 3 fh-digit, TRMS precision: +0,5 % +2 digit of the measured value
Fuse protection:	primary: thermal automatic fuse secondary: thermal magnetic automatic fuse
Voltage change:	< 9 % between idle running and full load with $U_E = 230 \text{ V}$
Switch-on current:	limitation by the automatic activator

### Selection chart for device series highlab and basic

Reference No. System highlab	Reference No. System basic	Design size	Output voltage	Output	Display voltage and ammeter
H 96.055	B 94.045	3 HE / 42 TE	0 - 260 V AC / 0,8 A	not unearthed	analog
H 98.024	B 95.024	3 HE / 56 TE	0 - 260 V AC / 3 A	not unearthed	analog
H 96.056*	B 94.046*	3 HE / 42 TE	0 - 30 V AC / 4 A	unearthed	analog
H 96.057*	B 94.047*	3 HE / 42 TE	0 - 60 V AC / 4 A	unearthed	analog
H 96.058	B 94.048	3 HE / 42 TE	0 - 260 V AC / 0,8 A	unearthed	analog
H 98.018	B 95.018	3 HE / 56 TE	0 - 260 V AC / 3 A	unearthed	analog
N 93.011	C 93.021	3 HE / 19"	0 - 260 V AC / 3,8 A	unearthed	analog
H 98.014	B 95.014	3 HE / 56 TE	0 - 260 V AC / 3 A	unearthed	digital

\* : The models marked with \* are equipped with 2 safety laboratory sockets as output.

## Variable transformers – not unearthed and unearthed, installation height 3 HE – analog displays

Device system highlab



Fig.: H 96.511

Device system basic



Fig.: B 94.511

### Technical Data:

(applicable to all models)

Design size: 6 HE / 42 TE, 6 HE / 63 TE resp.

Outputs: **With not unearthed models:**  
1 Schuko socket (not unearthed)  
**With unearthed models:**  
1 socket without grounding contact (unearthed), reversible to  
2 safety laboratory sockets

Output data: 0 - 260 V AC from 3 A to 12 A, depending on model

Changeover switch for unearthed models: between socket and safety laboratory socket

Displays: analog display for U and I and P. resp., depending on model  
2 moving iron instruments class 1,5

Fuse protection: primary: thermal automatic fuse  
secondary: thermal magnetic automatic fuse

Switch-on current: limitation by the automatic activator

### Selection chart for device series highlab and basic

Reference No. System highlab	Reference No. System basic	Design size	Output voltage	Output	Display voltage and ammeter	Display voltage and power meter	Changeover switch socket/ safety labora- tory socket
H 96.511	B 94.511	6 HE / 42 TE	0-260 V AC / 3 A	not unearthed	analog	-	-
H 96.531	B 94.531	6 HE / 42 TE	0-260 V AC / 6 A	not unearthed	analog	-	-
H 96.541	B 94.541	6 HE / 42 TE	0-260 V AC / 12 A	not unearthed	analog	-	-
H 96.544	B 94.544	6 HE / 42 TE	0-260 V AC / 3 A	unearthed	analog	-	•
H 96.545	B 94.545	6 HE / 42 TE	0-260 V AC / 800 W	unearthed	-	analog	•
H 96.546	B 94.546	6 HE / 42 TE	0-260 V AC / 6 A	unearthed	analog	-	•
H 96.547	B 94.547	6 HE / 42 TE	0-260 V AC / 1500 W	unearthed	-	analog	•
H 98.518	B 95.517	6 HE / 63 TE	0-260 V AC / 12 A	unearthed	analog	-	•



## Variable transformers – not unearthed and unearthed, installation height 6 HE – digital displays

Device system highlab



Fig.: H 96.512

Device system basic



Fig.: B 94.512

### Technical Data:

(applicable to all models)

Design size:	6 HE / 42 TE , 6 HE / 56 TE resp.
Outputs:	<b>With not unearthed models:</b> 1 Schuko socket (not unearthed) <b>With unearthed models:</b> 1 socket without grounding contact (unearthed), reversible to 2 safety laboratory sockets
Output data:	0 - 260 V AC from 3 A to 12 A, depending on model
Changeover switch for unearthed models:	between socket and safety laboratory socket
Displays:	digital display for U and I 2 pcs. LED 3 fh-digit, TRMS precision: $\pm 0,5\%$ $\pm 2$ digit of the measured value
Fuse protection:	primary: thermal automatic fuse secondary: thermal magnetic automatic fuse
Voltage change:	$< 9\%$ between idle running and full load with $U_E = 230\text{ V}$
Switch-on current:	limitation by the automatic activator

### Selection chart for device series highlab and basic

Reference No. System highlab	Reference No. System basic	Design size	Output voltage	Output	Display voltage and ammeter	Changeover switch socket/ safety laboratory socket
H 96.512	B 94.512	6 HE / 42 TE	0-260 V AC / 3 A	not unearthed	digital	-
H 96.532	B 94.532	6 HE / 42 TE	0-260 V AC / 6 A	not unearthed	digital	-
H 96.542	B 94.542	6 HE / 42 TE	0-260 V AC / 12 A	not unearthed	digital	-
H 96.548	B 94.548	6 HE / 42 TE	0-260 V AC / 3 A	unearthed	digital	•
H 96.127	B 94.528	6 HE / 42 TE	0-260 V AC / 6 A	unearthed	digital	•
H 98.519	B 95.518	6 HE / 56 TE	0-260 V AC / 12 A	unearthed	digital	•

## Variable transformers– unearthed, inclusive switchable rectifier, installation height 3 HE

Device system highlab



Fig.: H 96.021

Device system basic



Fig.: B 94.221

### Technical Data:

(applicable to all models)

Design size:	3 HE / 42 TE, 3 HE / 56 TE resp.
Outputs:	2 safety laboratory sockets
Output data:	0 - 30, 0 - 60, 0 - 260 V AC unearthed, depending on model 0,8 A to 12 A, depending on model
Changeover switch:	from alternating current voltage to direct current voltage bridge rectifier, residual ripple approx. 48 %
Displays:	analog display for U and I 2 moving iron instruments class 1,5
Fuse protection:	primary: thermal automatic fuse secondary: thermal magnetic automatic fuse
Voltage change:	< 9 % between idle running and full load with $U_e = 230 \text{ V}$
Switch-on current:	limitation by the automatic activator

### Selection chart for device series highlab and basic

Reference No. System highlab	Reference No. System basic	Design size	Output voltage	Output
H 96.049	B 94.049	3 HE / 42 TE	0 - 30 V AC / 4 A	unearthed
H 98.021	B 95.021	3 HE / 56 TE	0 - 30 V AC / 12 A	unearthed
H 96.050	B 94.050	3 HE / 42 TE	0 - 60 V AC / 4 A	unearthed
H 96.021	B 94.221	3 HE / 42 TE	0 - 260 V AC / 0,8 A	unearthed
H 98.026	B 95.026	3 HE / 56 TE	0 - 260 V AC / 3 A	unearthed

Variable transformers– unearthed, inclusive switchable rectifier,  
installation height 6 HE

Device system highlab



Fig.: H 96.564

Device system basic



Fig.: B 94.564

Technical Data:	
(applicable to all models)	
Design size:	6 HE / 42 TE
Outputs	2 safety laboratory sockets
Output data:	Voltage: 0 – 60 V AC reversible to 0 – 48 V DC unearthed alternatively 0 – 260 V AC reversible to 0 – 200 V DC, depending on model Current: from 3 A to 8 A, depending on model
Changeover switch:	from alternating current voltage to direct current voltage bridge rectifier, residual ripple approx. 48 %
Displays:	analog display for U and I 2 moving iron instruments class 1,5
Fuse protection:	primary: thermal automatic fuse secondary: thermal magnetic automatic fuse
Voltage change:	< 9 % between idle running and full load with $U_e = 230\text{ V}$
Switch-on current:	limitation by the automatic activator

Selection chart for device series highlab and basic			
Reference No. System highlab	Reference No. System basic	Design size	Output voltage
H 96.564	B 94.564	6 HE / 42 TE	0- 60 V AC / 8 A
H 96.565	B 94.565	6 HE / 42 TE	0-260 V AC / 3 A
H 96.566	B 94.566	6 HE / 42 TE	0-260 V AC / 6 A

# Variable transformers– unearthed, inclusive switchable rectifier – 2nd transformer winding – analog displays

Device system highlab



Reference No.	Design
H 97.022	3 HE / 70 TE

Device system basic



Reference No.	Design
B 96.022	3 HE / 70 TE



Reference No.	Design
H 96.551	6 HE / 42 TE



Reference No.	Design
B 94.551	6 HE / 42 TE



## Technical Data:

(applicable to all models)



Design size:	3 HE / 70 TE alternatively 6 HE / 42 TE, depending on model		
Outputs:	6 safety laboratory sockets		
Output data:	Voltage:	AC 1: 0 - 260 V AC / max. 3 A unearthed AC 2: 0 - 50 V AC / max. 10 A unearthed DC 1: 0 - 200 V DC / max. 2,6 A unearthed DC 2: 0 - 40 V DC / max. 9 A unearthed	
Changeover switch 1:	from alternating current voltage to direct current voltage bridge rectifier, residual ripple approx. 48 %		
Changeover switch 2:	260 V AC / 50 V AC For safety reasons the test item must be replugged.		
Displays:	analog display for U and I voltage: moving iron instrument class 1,5 with double scale 0 - 50 V / 0 - 260 V current: moving iron instrument class 1,5 with double scale 0 - 10 A / 0 - 3 A		
Fuse protection:	primary: thermal automatic fuse secondary 1 and 2: 1 thermal magnetic automatic fuse each		
Voltage change:	< 9 % between idle running and full load with U <sub>E</sub> = 230 V or 45 V Switch-on		
current:	limitation by the automatic activator		



Variable transformers– unearthed, inclusive switchable rectifier –  
2nd transformer winding – digital displays

Device system highlab		Device system basic	
			
Reference No.	Design	Reference No.	Design
H 97.023	3 HE / 70 TE	B 96.023	3 HE / 70 TE

			
Reference No.	Design	Reference No.	Design
H 96.552	6 HE / 42 TE	B 94.552	6 HE / 42 TE

Technical Data:	
(applicable to all models)	
Design size:	3 HE / 70 TE alternatively 6 HE / 42 TE, depending on model
Outputs:	6 safety laboratory sockets
Output data:	Voltage: AC 1: 0 - 260 V AC / max. 3 A unearthed AC 2: 0 - 50 V AC / max. 10 A unearthed DC 1: 0 - 200 V DC / max. 2,6 A unearthed DC 2: 0 - 40 V DC / max. 9 A unearthed
Changeover switch 1:	from alternating current voltage to direct current voltage bridge rectifier, residual ripple approx. 48 %
Changeover switch 2:	260 V AC / 50 V AC For safety reasons the test item must be replugged.
Displays:	digital display for U and I 2 pcs. LED 3 fh-digit, TRMS precision: +-0,5 % +- 2 digit of the measured value
Fuse protection:	primary: thermal automatic fuse secondary 1 and 2: 1 thermal magnetic automatic fuse each
Voltage change:	< 9 % between idle running and full load with U <sub>e</sub> = 230 V
Switch-on current:	limitation by the automatic activator

## Variable transformers– unearthed, inclusive externally switchable rectifier, installation height 3 HE

### Device system highlab



Reference No.	Design
H 96.111	3 HE / 42 TE

### Device system basic



Reference No.	Design
B 94.061	3 HE / 42 TE

#### Technical Data:

(applicable to all models)

Design size:	3 HE / 42 TE
Outputs:	8 safety laboratory sockets
Output data:	voltage: <ul style="list-style-type: none"> <li>o - 12 V AC / max. 10 A unearthed</li> <li>o - 42 V AC / max. 6 A unearthed</li> <li>o - 260 V AC / max. 1,6 A unearthed</li> </ul>
Bridge rectifier:	externally switchable, residual ripple approx. 48 %
Fuse protection:	primary: thermal automatic fuse secondary 1, 2 and 3: 1 thermal magnetic automatic fuse each
Voltage change:	< 9 % between idle running and full load with $U_E = 230 \text{ V}$
Switch-on current:	limitation by the automatic activator

### Device system highlab



Reference No.	Design
H 96.051	3 HE / 42 TE

### Device system basic



Reference No.	Design
B 94.051	3 HE / 42 TE

#### Technical Data:

(applicable to all models)

Design size:	3 HE / 42 TE
Outputs:	11 safety laboratory sockets
Output data:	voltage: <ul style="list-style-type: none"> <li>o - 6 V AC / max. 15 A unearthed</li> <li>o - 18 V AC / max. 6 A unearthed</li> <li>o - 42 V AC / max. 3 A unearthed</li> <li>o - 260 V AC / max. 2 A not unearthed</li> </ul>
Bridge rectifier:	externally switchable, residual ripple approx. 48 %
Fuse protection:	primary: thermal automatic fuse secondary 1, 2 and 3: 1 thermal magnetic automatic fuse each
Voltage change:	< 9 % between idle running and full load with $U_E = 230 \text{ V}$
Switch-on current:	limitation by the automatic activator

Variable transformers– unearthed, inclusive externally switchable rectifier,  
installation height 6 HE

Device system highlab



Reference No.	Design
H 96.561	6 HE / 42 TE

Device system basic



Reference No.	Design
B 94.561	6 HE / 42 TE

Technical Data:		
(applicable to all models)		
Design size:	6 HE / 42 TE	
Outputs:	8 safety laboratory sockets	
Output data:	voltage:	<div>o - 12 V AC / max. 16 A unearthed</div> <div>o - 42 V AC / max. 6 A unearthed</div> <div>o - 260 V AC / max. 3 A unearthed</div>
Bridge rectifier:	externally switchable, residual ripple approx. 48 %	
Fuse protection:	primary: thermal automatic fuse	
	secondary 1, 2 and 3: 1 thermal magnetic automatic fuse each	
Voltage change:	< 9 %between idle running and full load with $U_e = 230\text{ V}$	
Switch-on current:	limitation by the automatic activator	

## Variable isolating transformers (A constant) - unearthed, installation height 6 HE analog displays

Device system highlab



Fig.: H 98.523

Device system basic



Fig.: B 95.523

### Technical Data:

(applicable to all models)

Design size:	6 HE / 56 TE and 6 HE / 19" resp.
Outputs:	1 socket without grounding contact (unearthed) resp. 1 Schuko socket (not unearthed), depending on model
Output data:	2 - 260 V AC from 3 A to 12 A, depending on model
Control:	electronic mechanical control with setpoint setting by 10 channel potentiometer or interface control precision: < ± 1,5 % v.E. in case of load change or 10 % mains fluctuations control time: approx. 0,5 to 1 second with 10 % mains fluctuation, depending on model setting time: approx. 2,3 to 5 seconds from 2 to 260 V, depending on model
Displays:	analog display for U and I 2 moving iron instruments class 1,5
Fuse protection:	primary: thermal automatic fuse secondary: thermal magnetic automatic fuse
Switch-on current:	limitation by the automatic activator
Interfaces:	without interface, optional with 0-10 V, RS 232 C, USB 2.0 or Ethernet interface The optional interfaces are led onto the back wall or, on request, can be led to the front on a separate front panel.

### Selection chart for device series highlab and basic

Reference No. System highlab	Reference No. System basic	Design size	Output voltage	Output
H 98.523	B 95.523	6 HE / 56 TE	0-260 V AC / 3 A	unearthed
H 98.533	B 95.533	6 HE / 56 TE	0-260 V AC / 6 A	unearthed
H 98.543	B 95.543	6 HE / 56 TE	0-260 V AC / 12 A	not unearthed
N 96.504	C 96.804	6 HE / 19"	0-260 V AC / 12 A	unearthed

### Rear interfaces (option)

Reference No.	Interface
NWT 1.106	Ethernet
NWT 1.107	USB 2.0
NWT 1.108	RS 232 C
NWT 1.150	0-10 V

**Note:** Front interfaces see page 55

The interfaces allow the control of the AC sources.  
Besides the complete device control, the erfi software highlink Power takes also over the room control by means of Ethernet interface.



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Variable isolating transformers (A constant) - unearthed,  
installation height 6 HE

Device system highlab



Fig.: H 98.541

Device system basic



Fig.: B 95.541

**Technical Data:**

(applicable to all models)

Design size:	3 HE / 70 TE, 6 HE / 56 TE and 6 HE / 19 ", resp., depending on model
Outputs:	2 resp. 3 safety laboratory sockets 4 mm, 1 socket without grounding contact (unearthed) resp. 1 Schuko socket (not unearthed), depending on model
Output data:	2 - 260 V AC / 2 A to 12 A, depending on model
Control:	electronic mechanical control with setpoint setting by 10 channel potentiometer or interface control precision: <+/-1,5 % v.E. in case of load change or 10 % mains fluctuations control time: approx. 1 second with 10 % mains fluctuation setting time: approx. 5 seconds from 2 to 260 V
Changeover switch:	from the socket to the laboratory socket, depending on model
Displays:	multifunctional display: U, I, P, Q, cos phi., frequency measuring (explanation see below*)
Fuse protection:	primary: thermal automatic fuse secondary: thermal magnetic automatic fuse
Switch-on current:	limitation by the automatic activator
Interfaces:	without interface, optional with 0-10 V, RS 232 C, USB 2.0 or Ethernet interface The optional interfaces are led onto the back wall or, on request, can be led to the front on a separate front panel (see page 55).

**Selection chart for device series highlab and basic**

Reference No. System highlab	Reference No. System basic	Design size	Output voltage	Output	with socket	with laboratory so- cket	with changeover switch from so- cket to laboratory socket
H 97.024	B 96.024	3 HE / 70 TE	0-260 V AC / 2 A	unearthed	-	●	-
H 98.540	B 95.540	6 HE / 56 TE	0-260 V AC / 3 A	unearthed	●	●	●
H 98.541	B 95.541	6 HE / 56 TE	0-260 V AC / 5 A	unearthed	●	●	●
N 96.532	C 96.532	6 HE / 19"	0-260 V AC / 10 A	unearthed	●	●	●
H 98.542	B 95.542	6 HE / 56 TE	0-260 V AC / 12 A	not unearthed	●	●	●

**Rear interfaces (option)**

Reference No.	Interface
NWT 1.106	Ethernet
NWT 1.107	USB 2.0
NWT 1.108	RS 232 C
NWT 1.150	0-10 V

The interfaces allow the control of the AC sources.  
Besides the complete device control, the erfi software highlink Power takes also over the room control by means of Ethernet interface.



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**\*Explanation to the multifunctional display****The multifunctional display can show the following measured values:**

Voltage	U : L1-N (V)
Current	I (A)
Active power	P (W)
Idle power	Q (VA)
Apparent power	S (VA)
Power factor	cos phi (0,10 i .. 1 .. 0,10 c)
Frequency	f (L1-N : 48-62 Hz)

**Note:** : Front interfaces see page 55

All-rounder AC / DC power supply, for integration in 19" rack V 16.301

Device system highlab



Reference No.	Design
H 56.517	12 HE / 42 TE

Device system basic



Reference No.	Design
E 54.517	12 HE / 42 TE

Technical Data:

Suitable for integration in the 19" rack V 16.301 of the furniture series varantec

Design size: 12 HE / 42 TE

Function block safety and switch units:

Operating elements:	motor protection switch:	10-16 A with built-in undervoltage release
	NFI switch:	leakage current 30 mA, nominal current 25 A <b>type B (AC/DC sensitive)</b>
	emergency stop push-button:	with additional potential-free contact for room emergency stop
	key-operated changeover switch:	with 3 key positions for changeover between
		- low voltage
		- zero voltage (off)
		- low voltage, alternating current voltage and three-phase voltage

Phase display:	phase pilot lamps for L1, L2 and L3
	pilot lamp for low voltage
	3 Schuko sockets
	5 safety laboratory sockets L1, L2, L3, N and PE

Function block variable transformers:

Outputs:	4 safety laboratory sockets: for supply of DC and AC voltage
	o - 260 V / 3 A AC or o - 260 V / 3 A DC (not unearthed)
	2 safety laboratory sockets: for supplying fixed DC voltage 230 V / 2 A (unearthed)
	2 safety laboratory sockets: for supplying mains AC voltage 230 V (not unearthed)
	4 safety laboratory sockets: for supplying DC and AC voltage
	o - 25 V / 10 A AC or o - 25 V / 10 A DC (unearthed)
	1 Schutzleitererdungsbuchse
Fuse protection:	primary: microfuse
	secondary: 3 x thermal magnetic automatic fuse

Three-phase variable transformers – not unearthed and unearthed, installation height 3 HE

Device system highlab

Device system basic



Fig.: H 97.012



Fig.: B 96.012

Technical Data:	
(applicable to all models)	
Design size:	3 HE / 70 TE
Outputs:	5 safety laboratory sockets L1, L2, L3, N and PE for not unearthed models 4 safety laboratory sockets L1, L2, L3 and N for unearthed models
Output data:	3 x 0 – 400 V / 230 V 50 Hz, max. 3 A per phase not unearthed and earthed resp. (depending on model) alternatively: 3 x 0 – 450 V / 260 V 50 Hz, max. 2 A per phase not unearthed
Displays:	analog display for U and I 2 iron movement instruments class 1,5
Voltmeter switch:	for switchover of the voltage indication between the phases or between the phases and the neutral conductor
Ammeter switch:	for activating the current indication to the various phases with 4 switch positions: L1, L2, L3 and zero
Fuse protection:	primary: 3 x thermal automatic fuse secondary: 3 x thermal magnetic automatic fuse
Switch-on current:	limitation by the automatic activator
Phase display:	3 phase pilot lamps

Selection chart for device series highlab and basic					
Reference No. System highlab	Reference No. System basic	Design size	Output voltage	Output	Display voltage and ammeter
H 97.011	B 96.011	3 HE / 70 TE	0 – 400 / 230 V AC / 3 A	not unearthed	analog
H 97.013	B 96.013	3 HE / 70 TE	0 – 450 / 260 V AC / 2 A	not unearthed	analog
H 97.012	B 96.012	3 HE / 70 TE	0 – 400 / 230 V AC / 3 A	unearthed*	analog

\*Due to the design size of the isolating transformer, the same is integrated separately in the table attachment or cockpit resp. and wired on the slide-in module.

## Three-phase variable transformers – not unearthed and unearthed, installation height 6 HE

Device system highlab



Fig.: H 96.616

Device system basic



Fig.: B 94.616

### Technical Data:

(applicable to all models)

Design size:	6 HE / 42 TE
Outputs:	5 safety laboratory sockets L1, L2, L3, N and PE for not unearthed models 4 safety laboratory sockets L1, L2, L3 and N for unearthed models
Output data:	3 x 0 – 400 V / 230 V 50 Hz, max. 3 A per phase not unearthed and earthed resp. (depending on model) alternatively: 3 x 0 – 450 V / 260 V 50 Hz, max. 2 A per phase not unearthed
Displays:	analog display for U and I 2 iron movement instruments class 1,5
Voltmeter switch:	for switchover of the voltage indication between the phases or between the phases and the neutral conductor
Ammeter switch:	for activating the current indication to the various phases with 4 switch positions: L1, L2, L3 and zero
Fuse protection:	primary: 3 x thermal automatic fuse secondary: 3 x thermal magnetic automatic fuse
Switch-on current:	limitation by the automatic activator
Phase display:	3 phase pilot lamps

### Selection chart for device series highlab and basic

Reference No. System highlab	Reference No. System basic	Design size	Output voltage	Output	Display voltage and ammeter
H 96.616	B 94.616	6 HE / 42 TE	0 – 400 / 230 V AC / 3 A	not unearthed	analog
H 96.613	B 94.613	6 HE / 42 TE	0 – 450 / 260 V AC / 2 A	not unearthed	analog
H 96.614	B 94.614	6 HE / 42 TE	0 – 400 / 230 V AC / 3 A	unearthed*	analog
H 96.615	B 94.615	6 HE / 42 TE	0 – 450 / 260 V AC / 2 A	unearthed*	analog

\*Due to the design size of the isolating transformer, the same is integrated separately in the table attachment or cockpit resp. and wired on the slide-in module.



## Three-phase variable transformers – not unearthed, installation height 6 HE

Device system highlab



Fig.: H 99.511

Device system basic



Fig.: B 97.511

**Technical Data:**

(applicable to all models)

Design size:	6 HE / 84 TE
Outputs:	not unearthed 5 safety laboratory sockets L1, L2, L3, N and PE for variable three-phase voltage; switchable to fixed three-phase voltage 1 CEE socket for variable three-phase voltage, switchable to fixed three-phase voltage 1 Schuko socket for 0 – 230 V, switchable to 230 V fixed voltage 1 Schuko socket for 230 V fixed voltage 3 safety laboratory sockets for 230 V fixed voltage
Output data:	3 x 0 – 400 V / 230 V 50 Hz, max. 5 A per phase not unearthed, infinitely variable, unstabilised, switchable to 3 x 400 V / 230 V 50 Hz fixed three-phase voltage <b>Optional models: see selection chart</b>
Displays:	voltage: 1 moving iron instrument 0-400 V, class 1,5 current: 3 moving iron instruments with overload scale 0-10 A/ 20 A, class 1,5
Voltmeter switch:	for switchover of the voltage indication between the phases or between the phases and the neutral conductor
Changeover switch:	for switchover from isolating transformer operation to fixed three-phase voltage
Fuse protection:	primary: 3 x thermal automatic fuse secondary: 3 x thermal magnetic automatic fuse
Switch-on current:	limitation by the automatic activator
Phase display:	3 phase pilot lamps

**Selection chart for device series highlab and basic**

Reference No. System highlab	Reference No. System basic	Design size	Output voltage	Output	Display voltmeter	Display 3 ammeter
H 99.511	B 97.511	6 HE / 84 TE	0 – 400 / 230 V AC / 5 A, short-term 6 A	not un- earthed	analog	analog
H 99.518	B 97.518	6 HE / 84 TE	0 – 400 / 230 V AC / 8 A, short-term 10 A	not un- earthed	analog	analog
H 99.519	B 97.519	6 HE / 84 TE	0 – 450 / 260 V AC / 4 A, short-term 5 A	not un- earthed	analog	analog
H 99.524	B 97.523	6 HE / 84 TE	0 – 500 / 290 V AC / 4 A, short-term 5 A	not un- earthed	analog	analog

## Three-phase variable transformers – not unearthed, inclusive switchable rectifier - installation height 6 HE

Device system highlab



Fig.: H 99.512

Device system basic



Fig.: B 97.512

### Technical Data:

(applicable to all models)

Design size:	6 HE / 84 TE
Outputs:	not unearthed 5 safety laboratory sockets L1, L2, L3, N and PE for 0 – 400 V / 230 V 50 Hz, max. 5 A per phase momentarily to 6 A 1 CEEsocket for 0 – 400 V / 230 V 50 Hz, max. 5 A per phase momentarily to 6 A 1 Schuko socket for 0 – 230 V 1 Schuko socket for 230 fixed voltage 2 safety laboratory sockets for 0 – 540 V DC max. 6 A
Output data:	3 x 0 – 400 V / 230 V 50 Hz, max. 5 A per phase not unearthed, infinitely variable, unstabilised, switchable to direct current voltage 0–540 V DC, max. 6 A <b>Optional models: see selection chart</b>
Displays:	voltage: 1 moving iron instrument 0–400 V, class 1,5 current: 3 moving iron instruments 0 – 6 A, class 1,5
Voltmeter switch:	for switchover of the voltage indication between the phases or between the phases and the neutral conductor
AC-DC changeover switch:	for switchover from AC operation to DC operation
Rectifier:	three-phase current bridge rectifier, residual ripple approx. 5 %
Fuse protection:	primary: 3 x thermal automatic fuse secondary: 3 x thermal magnetic automatic fuse
Switch-on current:	limitation by the automatic activator
Phase display:	3 phase pilot lamps

### Selection chart for device series highlab and basic

Reference No. System highlab	Reference No. System basic	Design size	Output voltage	Output	Display voltmeter	Display 3 ammeter
H 99.512	B 97.512	6 HE / 84 TE	0 – 400 / 230 V AC / 5 A, short-term 6 A 0 – 540 V DC / 6 A	not unearthed	analog	analog
H 99.522	B 97.521	6 HE / 84 TE	0 – 400 / 230 V AC / 8 A, short-term 10 A 0 – 540 V DC / 10 A	not unearthed	analog	analog

Three-phase variable transformers – unearthed, inclusive switchable rectifier - installation height 6 HE

Device system highlab



Fig.: N 96.512

Device system basic



Fig.: C 96.512

Technical Data:	
(applicable to all models)	
Design size:	6 HE / 19"
Outputs:	unearthed 1 CEE socket for 0 – 450 V / 260 V 50 Hz, max. 5 A per phase momentarily to 6 A, switchable to 4 safety laboratory sockets L1, L2, L3 und N 2 safety laboratory sockets for 0 - 600 V DC max. 8 A
Output data:	3 x 0 – 450 V / 260 V 50 Hz, max. 5 A per phase unearthed, infinitely variable, unstabilised, switchable to direct current voltage 0 – 600 V DC, max. 8 A <b>Optional models:</b> see selection chart
Displays:	voltage: 1 moving iron instrument 0 - 600 V, Klasse 1,5, <b>DC voltage display in DC operation</b> current: 3 iron movement instruments 0 – 6 A, class 1,5
Voltmeter switch:	for switchover of the voltage indication between the phases or between the phases and the neutral conductor
Changeover switch:	For switchover between CEE socket and safety laboratory socket. Device depth: 480 mm
AC-DC changeover switch:	for switchover from AC operation to DC operation
Rectifier:	three-phase current bridge rectifier, residual ripple approx. 5 %
Fuse protection:	primary: 3 x thermal automatic fuse secondary: 3 x thermal magnetic automatic fuse
Switch-on current:	limitation by the automatic activator
Phase display:	3 phase pilot lamps

Selection chart for device series highlab and basic						
Reference No. System highlab	Reference No. System basic	Design size	Output voltage	Output	Display voltmeter	Display 3 ammeters
N 96.512	C 96.512	6 HE / 19"	0 – 450 / 260 V AC / 5 A, short-term 6 A 0 – 600 V DC / 8 A	unearthed	analog	analog
N 96.514*	C 96.514*	6 HE / 19"	0-720 / 415 V AC / 3 A 0-970 V DC / 4 A	unearthed	analog	analog

\*: Device depth: 480 mm

## Variable isolating transformers (three-phase-AC constant) – not unearthed, installation height 6 HE – multifunctional display, digital

Device system highlab



Reference No. Design

N 96.531 Variable transformer (three-phase AC constant)

Device system basic



Reference No. Design

C 96.531 Variable transformer (three-phase AC constant)

### Technical Data:

(applicable to all models)

Design size:	6 HE / 19"
Outputs:	not unearthed 5 safety laboratory sockets L1, L2, L3, N and PE for 0 – 400 V / 230 V 50 Hz, max. 5 A per phase momentarily to 6 A 1 CEE socket for 0 – 400 V / 230 V 50 Hz, max. 5 A per phase momentarily to 6 A 1 Schuko socket for 0 – 230 V 3 safety laboratory sockets L1, N and PE
Control:	electronic mechanical control with setpoint setting by 10 channel potentiometer or interface
Displays:	multifunctional display: U, I, P, Q, cos phi., frequency measuring (explanation see below*)
Fuse protection:	primary: 3 thermal automatic fuse secondary: 3 x thermal magnetic automatic fuse
Switch-on current:	limitation by the automatic activator
Phase display:	3 phase pilot lamps
Interfaces:	without interface, optional with 0-10 V, RS 232 C, USB 2.0 or Ethernet interface The optional interfaces are led onto the back wall or, on request, can be led to the front on a separate front panel (see page 55).

### Rear interfaces (option)

Reference No.	Interface
NWT 1.106	Ethernet
NWT 1.107	USB 2.0
NWT 1.108	RS 232 C
NWT 1.150	0-10 V

### Note:

Front interfaces see page 55



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### \*Explanation to the multifunctional display

The multifunctional display can show the following measured values:

Voltage	U : L1 - N (V) / L <sub>x</sub> - N (V) / L <sub>x</sub> - L <sub>x</sub> (V)
Current	I (A)
Active power	P (W)
Idle power	Q (VA <sub>r</sub> )
Apparent power	S (VA)
Power factor	cos phi (0,10 i .. 1 .. 0,10 c)
Frequency	f (L1-N : 48-62 Hz)

The interfaces allow the control of the AC sources.

Besides the complete device control, the erfi software highlink Power takes also over the room control by means of Ethernet interface.



## Test facility power supply module



### Technical explanation / function description (applicable to all devices)

Test facility power supply modules have been developed for repair placed and test facilities. To use the power supply modules for test facilities correctly, motorised three-phase variable transformers must be connected.

The modules are suitable for single-phase and three-phase ultimate consumers and test items.

They are switched on and off by a motor protection switch with under-voltage release and an adjustable excess-current protection of 32 – 40 A. As output there is a CEE socket, a Schuko socket and eight screw-type terminals.

Through the screw-type terminals a three-phase current test item can be operated with a star or delta connection and optionally with anti-clockwise or clockwise rotating field.

The switchover is done by means of a star-delta-reversing switch. For the indication of voltage and current, a voltmeter and six resp. three ammeters are built-in (depending on model). The voltmeter can be integrated between the individual phases or between any phase and neutral conductor.

Through a further reversing switch the ammeters can be switched on in different current paths. In connection with a motorised three-phase variable transformer, the output voltage of 0-400 / 230 V is infinitely variable. The variable transformer is operated by two push-buttons for a higher or lower voltage. For phase control there are three phase pilot lamps each at the input and output.

The devices and their connected components are protected by several triple and one-way automatic fuses.

The additionally integrated continuity tester for connections of high and low resistance contributes to more functionality of the modules.

## Test facility power supply module with 3 current ranges, installation height 6 HE

Device system highlab



Reference No. : H 19.504

Device system basic



Reference No. : E 18.914

### Technical Data:

(applicable to all models)

Design size:	6 HE / 140 TE
Contactor:	motor protection switch 32-40 A with undervoltage release
Fuse protection:	2 triple automatic fuses, 2 one-way automatic fuses
Outputs:	1 CEE socket 32 A – 6 h, 8 screw-type terminals, 1 Schuko socket
Output data:	3 x 400 / 230 V 50 Hz, max. 40 A per phase, not unearthed, unstabilised 3 x 0 – 400 / 230 V 50 Hz, max. 40 A per phase, not unearthed, infinitely variable, unstabilised, only in connection with an external variable transformer with motor drive 3 current ranges: 2 A / 10 A and 40 A, switchable
Displays:	voltage 1: 1 moving iron instrument 0-400 V, class 1,5 current: 3 moving iron instruments with overload scale 0-40 / 120 A, class 1,5 current: 3 moving iron instruments with double scale 0-2 / 0-10 A, class 1,5
Voltmeter changeover switch:	for switchover of the voltage indication between the phases or between the phases and the neutral conductor
Changeover switch 1:	star-delta reversing switch with null position
Changeover switch 2:	from mains operation to transformer operation
Switch-on current:	limitation by automatic activator in transformer operation
Phase display:	3 phase pilot lamps for mains input, 3 phase pilot lamps for output
Continuity test:	<b>high resistance:</b> with 230 V AC, display by a 230 V glow lamp <b>low resistance:</b> with 24 V AC, display by a 24 V glow lamp
Input:	by series terminals

### Selection chart for device series highlab and basic

Reference No. System highlab	Reference No. System basic	Design size	Output	Current range
H 19.504	E 18.914	6 HE / 140 TE	not unearthed	3

## Test facility power supply module with 4 current ranges, installation height 6 HE

Device system highlab



Fig.: H 19.505

Device system basic



Fig.: E 18.915

**Technical Data:**

(applicable to all models)

Design size:	6 HE / 140 TE
Contactor:	motor protection switch 32-40 A with undervoltage release
Fuse protection:	3 triple automatic fuses, 2 one-way automatic fuses
Outputs:	1 CEE socket 32 A – 6 h, 8 screw-type terminals, 1 Schuko socket
Output data:	3 x 400 / 230 V 50 Hz, max. 40 A per phase, not unearthed, unstabilised 3 x 0 – 400 / 230 V 50 Hz, max. 40 A per phase, not unearthed, infinitely variable, unstabilised, only in connection with an external variable transformer with motor drive 4 current ranges: 1,5 A / 4 A / 15 A and 40 A, switchable
Displays:	voltage 1: 1 moving iron instrument 0-400 V, class 1,5 current: 3 moving iron instruments with overload scale 0-1,5 A / 0-4 A, class 1,5
Voltmeter changeover switch:	for switchover of the voltage indication between the phases or between the phases and the neutral conductor
Changeover switch 1:	star-delta reversing switch with null position
Changeover switch 2:	from mains operation to transformer operation
Switch-on current:	limitation by automatic activator in transformer operation
Phase display:	3 phase pilot lamps for mains input, 3 phase pilot lamps for output
Continuity test:	<b>high resistance:</b> with 230 V AC, display by a 230 V glow lamp <b>low resistance:</b> with 24 V AC, display by a 24 V glow lamp
Input:	by series terminals

**Selection chart for device series highlab and basic**

Reference No. System highlab	Reference No. System basic	Design size	Output	Current range
H 19.505	E 18.915	6 HE / 140 TE	not unearthed	4

## Three-phase variable transformers for test facility power supply modules



Three-phase variable transformer with motor drive to be used in connection with power supply modules.

The device supplies three-phase alternating voltage from 0-400 V and a maximum current of 25 and 40 A resp. It is very well suited for three-phase test items and three-phase consumers with a high input power.

Operation and control are effected by two push-buttons at the power supply modules.

Reference No.	Design
E 18.91 A	three-phase variable transformer 25 A, 17,3 kVA
E 18.91 B	three-phase variable transformer 40 A, 27,6 kVA

### Technical Data:

(applicable to all models)

Design size:	450 x 900 x 450 mm (width x depth x height)
Outputs:	connection through inside connecting terminals
Output data:	voltage: 3 x 400 / 50 Hz, max. 25 A or 40 A resp. per phase, depending on model
Regulating time:	0 – 400 V approx. 4 seconds
Fuse protection outputs:	3 neozed-elements
Mains supply:	3 x 400 V / 50 Hz (stressable neutral conductor or PEN required) motor drive: 230 V / 50 Hz connection: through inside connecting terminals fuse protection: none, has to be ensured by the user
Protection class:	1
Relative humidity:	60 %
Working temperature:	40 °C
Weight:	25 A three-phase current variable transformer: approx. 73 kg 40 A three-phase current variable transformer: approx. 90 kg

### Available options for three-phase variable transformer:

Reference No.	Design
E 18.91 C	voltage stabilisation unit
E 18.91 D	switch-on current limitation 25 A
E 18.91 E	switch-on current limitation 40 A

### Technical Data for E18.91 C: voltage stabilisation unit for three-phase variable transformer

Manipulating speed:	approx. 100 V/s
Regulating speed:	+/-2 % of the final value (other values on request)
Integration:	in the casing of the variable transformer

### Technical Data for E18.91 D and E18.91 E: switch-on current limitation for 25 A / 40 A

Function:	avoids the release of the pre-fuses when switching-on the transformer
Integration:	in the casing of the variable transformer, will be looped into the feed line



Three-phase bridge rectifier DB (B6)

Device system highlab



Fig.: H 16.534

Reference No.	Design
H 16.534	o - 500 V / 25 A DC
H 16.535	o- 500 V / 40 A DC

Device system basic



Fig.: B 14.532

Reference No.	Design
B 14.532	o - 500 V / 25 A DC
B 14.533	o- 500 V / 40 A DC

Technical Data:	
(applicable to all models)	
Design size:	6 HE / 42 TE
Inputs:	3 x 400 V AC / 50 Hz 3 screw-type terminals 63 A for supplying alternating current voltage with 4 mm possible plugging 1 earth conductor screw-type terminal
Output:	0-500 V/25 A DC resp. 0-500 V/40 A DC, depending on model 2 screw-type terminals 63 A for direct voltage with possible add-on of 4 mm. 1 earth conductor screw-type terminal
Displays:	voltage: moving iron instrument 0 – 500 V, class 1,5 current: moving iron instrument 0 – 25 and 40 A resp., class 1,5 depending on model
Rectifier:	three-phase current bridge rectifier, residual ripple approx. 5 % with three-phase current, residual ripple approx. 48 % with alternating current

# Tapped winding pole changing switch

Device system highlab



Reference No.	Design
H 16.536	pole changing switch 40 A

Device system basic



Reference No.	Design
B 14.534	pole changing switch 40 A

**Technical Data:**

(applicable to all models)

Design size:	6 HE / 42 TE
Pole changing switch:	tapped winding 40 A
Connection:	1 CEE socket, 5 pole, 32 A 6 screw-type terminals 63 A with 4 mm possible plugging 1U, 1V, 1W, 2U, 2V, 2W 1 earth conductor safety laboratory socket

The pole changing switch is connected to the test facility power supply module.

## erfi - Working place for motor testing inclusive motor testing system 120 kW and 120 kW three-phase current supply

The working place allows extensive tests of electric motors, transformers as well as of all thinkable electric machines and consumers. The centre-piece of the working place is

the high current module E19.611 and the 120 kW three-phase transformer. The high current module is integrated in the left-hand side of the 19"/9 HE attachment and is connected to the 120 kW three-phase transformer.



Reference No.	Design
AP 10.100	erfi working place for motor testing as per illustration inclusive all insert devices



Reference No.	Design
AP 10.101	three-phase current supply 120 kW

### erfi working place for motor testing

#### Technical description:

The test working place consists mainly of the following components:

- Laboratory table of the series ABZ with suspended storage unit
- 19" table attachment
- High current module E19.611
- 3 and 6 HE / 19" racks:
  - alternating current and three-phase current supplies
  - DC double regulating power supply
  - DC fixed voltage
  - interturn fault tester
  - mΩ-meter
  - high voltage tester
  - speed-indicator
  - VDE 0701 / 0702 –tester
  - digital multimeter

### Three-phase current supply 120 kW

#### Technical description:

Three-phase variable transformer with economy winding as per VDE 0552 for hindered operation as per § 5.

The transformer is installed next to the working place and by means of flexible cables it is connected to the high current module E19.611, integrated in the 19" attachment of the working place.

Technical Data:	
Output data:	output 1: three-phase 0 – 133 / 230 V output 2: three-phase 0 – 260 / 450 V output 3: three-phase 0 – 400 / 690 V
Current consumption:	100 A, max. 150 A
Motor drive:	setting time approx. 10 to 80 sec. current time controller through 10 channel potentiometer at the test working place
Mains supply:	3 x 400 V / 50 Hz Connection: through inside connecting terminals
Protection class:	IP 40
Working temperature:	40 °C
Cooling:	(AN) self-cooling air
Design size:	1200 x 800 x 2100 mm (width x depth x height)
Casing:	2 pcs. 19" cabinets with sheet steel door at the front
Weight:	approx. 1600 kg

## High current module E19.611



### Technical Data:

Mains connection:	three-phase to a labelled strip terminal
Fuse protection:	motor protection switch with undervoltage release, thermal release condition infinitely variable from 160 to 200 A single or triple automatic fuse for all control circuits
Main switch:	through motor protection switch
Emergency stop push-button:	with additional potential-free contact for room emergency stop
Displays:	3 three-phase pulsed current flow meters (144 x 144 mm) with meter type rectifier and linear double scale 1,5 / 5 A
Current ranges:	1,5 A, 5 A, 15 A, 50 A, 100 A (150 A)
Voltage ranges:	output 1: 3 AC      0 – 133 / 230 V output 2: 3 AC      0 – 260 / 450 V output 3: 3 AC      0 – 400 / 690 V
Outputs:	1 Schuko socket 1 CEE socket 3 pole, 16 A, blue 3 CEE sockets 5 pole, 16, 32 and 63 A, red 8 high current winged terminals 100 A with 4 mm possible plugging, arranged like a terminal board 1 star-delta reversing switch 100 A with null position
DC supply:	output 1: 0 – 150 V / 100 A output 2: 0 – 300 V / 100 A output 3: 0 – 450 V / 100 A residual ripple: approx. 18 % above Si DB rectifier
Rectifier:	<b>The rectifier is a separate rack with active air cooling.</b> <b>Design size: 6 HE / 42 TE, included in the scope of supply of the high current module E19.611.</b>
DS voltage display:	moving coil voltage meter (144 x 144 mm), switchable double scale 100 V / 500 V
DC current display:	moving coil ammeter (144 x 144 mm), switchable double scale 10 A / 100 A
Fuse protection:	internal SILIZED fuse 100 A
DC output:	2 high current winged terminals 100 A with 4 mm possible plugging
Power measuring device:	multifunctional, with mains analysis, processor-controlled, 3 independent digital displays function: see following page
Dimensions:	853 x 529 mm (width x height)



## Technical data for power measuring device, integrated in the high current module E19.611



Measured variable	Measuring path	max.	min.	Fault*
Voltage	1N, 2N, 3N	•	•	0,2%
Voltage	12, 23, 31	•	•	0,2%
Average voltage	Σ	•		0,2%
Voltage	N-E	•		0,2%
Current	1, 2, 3	•		0,2%
Current $I_{avg}$ (bi-meta-15min) (trailing pointer)	1, 2, 3	•		0,2%
Average current	Σ	•		0,2%
Neutral current	N	•		0,5%
Real power P	1, 2, 3, Σ	•		0,5%
Idle power Q	1, 2, 3, Σ	•		0,5%
Apparent power S	1, 2, 3, Σ	•		0,5%
Power factor PF (cos phi 4 quadrant indication)	1, 2, 3, Σ			0,5%
PF delivery inductive min.	1, 2, 3	•		0,5%
PF delivery capacitive min.	1, 2, 3	•		0,5%
PF discharge inductive min.	1, 2, 3	•		0,5%
PF discharge capacitive min.	1, 2, 3	•		0,5%
Frequency	U, I	•		0,02 Hz
Active energy delivery/discharge (High rate and low rate tariff)	Σ			0,5%
Neutral energy delivery/discharge (High rate and low rate tariff)	Σ			0,5%
Neutral energy inductive/capacitive (High rate and low rate tariff)	Σ			0,5%
5 each intervals real power Delivery / discharge (+ trend)	Σ	•	•	0,5%
5 each interval real power	Σ	•	•	0,5%
5 intervals apparent power	Σ	•	•	0,5%
9 general intervals average value inductive – capacitive (+ trend)	Σ	•	•	0,5%
5 intervals apparent power (+ trend)	Σ	•	•	0,5%
9 general intervals average value (+ trend)	measured variable	•	•	measured value
Voltage imbalance	Σ	•		0,5%
THD (total harmonic distortion) voltage	1N, 2N, 3N	•		1,0%
THD voltage	12, 23, 31	•		1,0%
THD current	1, 2, 3	•		1,0%
2. - 15. harmonic voltage	1N, 2N, 3N	•		1,0%
2. - 15. harmonic voltage	12, 23, 31	•		1,0%
2. - 15. harmonic current	1, 2, 3	•		1,0%

\*Fault ± referred to nominal range (frequency = absolute), { = system value

### Further technical data:

#### Advantages

- Mains and consumption analysis by measuring the harmonics, THD (total harmonic distortion), imbalance, extreme and average values
- 4-digit, 14 mm high LED display, allowing a safe and afar reading particularly in dark rooms
- User-programmable display

#### Features

- Precise measured values: U, I: 0,2 %, P, Q, S, PF, counter: 0,5 % F: 0.02 Hz
- Quadrant measurement of all factors in the alternating current network
- Retrofit extension modules with RS 232/485 interface, demand set memory, MODBUS, synchronous input, analog output, Ethernet or Profibus-DP
- Safe galvanic 3-way separation between all circuits
- 2 pulse or limit value outputs
- 4 counters for active energy: delivery/discharge with high rate and low rate tariff\*
- 4 counter for neutral energy: inductive/capacitive or delivery/discharge with high rate and low rate tariff\*
- Protection of all counter readings, records and adjustments in case of auxiliary energy failure
- Connection modes: single-phase 3L equal/unequal load (Aron, full), 4-L equal/unequal load (Open-Y, full)

## Examples of orders for motor testing place AP10.100:

Item	Ref.No.	Short description	Catalogue	Page
1	04.1.2011	<b>Laboratory working place</b> furniture series ABZ Size: 2000x1000x 780mm (widthxdepthxheight) not conductive, completely welded design inclusive steel frame reinforcement	ABZ	12
2	04-3-3065.1	<b>Suspended unit</b> of furniture series ABZ 1 material pullout, 4 steel drawers, completely organizable	ABZ	16
3	V14.203H.1	<b>19"/9HE table attachment</b> Size: 2000x360x449 mm (widthxheightxdepth)	varantec	58
<b>Equipment of table attachment from left to right:</b>				
4	E 19.611	<b>High current module</b> for connection to threephase current supply AP 10.101	instruments	137
5	C 83.016	<b>High voltage tester</b> 0-5 KV AC / 0-7 KV DC inclusive time control, HV voltage and current display	instruments	196
6	B 34.024	<b>Interturn fault tester</b> inclusive limit value input, analog display	instruments	204
7	B 22.011	<b>Fixed voltage source, linear controlled, 5 V/3</b>	instruments	141
8	B 33.013	<b>Ohmmeter</b> , digital 0,2 to 200 $\Omega$	instruments	165
9	B 97.521	<b>Three-phase variable transformer</b> , not unearthed 0 - 400 V AC / 8 A, inclusive rectifier 0 - 540 V DC / 10 A	instruments	127
10	B 25.057	<b>Double regulating power pack</b> 2 x 0-30 V / 2 A inclusive digital displays, lengthwise controlled	instruments	153
11	E 54.013	<b>Safety and switch unit</b> with key-operated switch motor protection switch and FI, three-phase	instruments	89
11	B 13.042	<b>Tachometer</b> , 5-digit digital display		
12	B 84.521	<b>VDE 0702 tester</b> , isolation, earth conductor and spare leakage current testing	instruments	202
13	B 14.515	<b>AC voltage module</b> , unearthed, isolating transformer 690 VA, in addition 5 Schuko sockets + 3 laboratory sockets, earthbound	instruments	103
14	B 33.515	Digital multi-meter to 20 A current	instruments	161
15	AP 10.101	<b>Three-phase current supply</b> 120 kW transformer, integrated in two 19" cabinets, for connection to three-phase current module E19.611	instruments	136

## Recommended additional equipment / devices

(Detailed technical description earth conductor and isolation tester see from page 195)



### Reference No. B85.013 Earth conductor tester (page 200)

Digital telecontrollable earth conductor tester 10 / 25 A  
With serial interface, telecontrollable by erfi testing software Candy,  
limit value programming, measured value logging, fully automatic  
measuring range changeover up to 0.3  $\Omega$ .

#### Accessories:

Reference No.	Designation
TS 8.004	Earth conductor test bar with integrated start
TS 8.005	Earth conductor test tongs



### Reference No. B83.013 isolation tester (page 198)

Digital telecontrollable isolation tester 500 V / 1000 V switchable, up to  
G $\Omega$ , with serial interface, telecontrollable by erfi testing software Candy,  
limit value programming, measured value logging, fully automatic  
measuring range changeover up to 1 G $\Omega$ .

#### Accessories

Reference No.	Designation
TS 8.004	Test tip with integrated start
TS 8.005	Laboratory cable with test tip without start
TS 9.004	Testing software Candy (for HS, ISO and PE testing)

**Note:** The testing software Candy controls the isolation and earth conductor tester. 1 licence is sufficient.

## Frequency inverter – unearthed, three-phase for three-phase motors up to 1,38 kVA

The modern electronic erfi frequency inverter family is based on the latest equipment technology. The frequency inverters allow the voltage

supply of a certain frequency. All inverters are parameterized by the supplier.

Applications:	Control of three-phase motors
Sinus filter:	A large factory-installed integrated sinus filter avoids transient emissions to the motor supply lines. A low limit frequency guarantees minor transient emissions. Therefore, an excellent total harmonic factor of less than 5 % with currents of higher than 0,75 A is achieved.
Fixed frequency:	400 Hz
Output:	200 V phase-to-phase, 115 V phase to zero / 4 A / unearthed

### Device system highlab



#### Reference No. Design

N 96.951 6 HE / 19"

### Device system basic



#### Reference No. Design

C 96.951 6 HE / 19"

### Technical Data:

(applicable to all models)

Design size:	6 HE / 19"
Outputs:	4 safety laboratory sockets, switchable to 1 CEE socket for supplying unearthed three-phase voltage
Output voltage:	3 x 115 phase-zero / 3 x 200 V phase-phase, unearthed
Output nominal current:	4 A
Output power:	1,38 kVA
Output fixed frequency	400 Hz
Displays:	4 moving iron instruments class 1,5 - 1 analog display for voltage 0 – 300 V - 3 analog displays for current 0 – 4 A per phase digital frequency display, 3-digit
Voltmeter reverser:	for changeover of the voltage display between the phases or between the phases and the neutral conductor
Error display:	with LED display
Fuse protection:	three-phase automatic fuse for primary and secondary side
Phase display:	3 phase pilot lamps

### Serially integrated sinus filter :

Large sinus filter:	ex works already serially integrated and wired to the output The sinus filter avoids transient emissions to the motor supply lines. The filter has a low limit frequency and thus guarantees a good EMV compatibility.
Total harmonic factor:	Due to the high-quality sinus filter: smaller than 5 % with output currents of higher than 0,75 A.

### Note / information / know-how:

The frequency inverter is so dimensioned that the starting behaviour with a motor of up to 1380 VA is guaranteed.

The integrated frequency inverter has a clearly higher output power. The output data are necessarily reduced due to the starting behaviour. Due to the integrated sinus filter no shielded motor cables are required.

The quality of the output signal of the indicated total harmonic factor of lower than 5 % is achieved because of the output filter.

Total weight inclusive sinus filter: 13 kg

## Fixed voltage sources – lengthwise controlled

Device system highlab



Fig.: H 22.011

Device system basic



Fig.: B 22.011

**Technical Data:**

(applicable to all models)

Design size:	3 HE / 14 TE and 3 HE / 21 TE resp.
Outputs:	2 safety laboratory sockets short-circuit proof, switchable in series thermal overload protection
Output voltage:	5, 12, 15, 24 V, depending on model
Output nominal current:	1 or 3 A, depending on model
Displays:	LED display for $I > I_{max}$
Control deviation:	voltage: load change 0 – 100 %: 20 mV and 50 mV resp. depending on model
Temperature coefficient:	0,01 %/K
Residual ripple:	voltage with nominal load: 0,5mV <sub>eff</sub>
Transient time:	step change in load from 0 to 100 %: 15 µs

**Selection chart for device series highlab and basic**

Reference No. System highlab	Reference No. System basic	Design size	Fixed voltage DC
H 22.011	B 22.011	3 HE / 14 TE	5 V / 3 A
H 22.013	B 22.013	3 HE / 14 TE	12 V / 1 A
H 22.014	B 22.014	3 HE / 14 TE	15 V / 1 A
H 22.101	B 22.101	3 HE / 21 TE	24 V / 3 A



Fixed voltage sources – primarily synchronised

Device system highlab



Fig.: H 24.225

Device system basic



Fig.: B 23.012

Technical Data:

(applicable to all models)

Design size:	3 HE / 28 TE
Outputs:	2 safety laboratory sockets short-circuit proof, switchable in series thermal overload protection
Output voltage:	5 V, 24 V, depending on model
Output nominal current:	5, 6, 10 and 12 A resp., depending on model
Residual ripple:	max. 50 mV <sub>eff</sub>

Selection chart for device series highlab and basic

Reference No. System highlab	Reference No. System basic	Design size	Output fixed voltage DC
H 24.105	B 23.017	3 HE / 28 TE	5 V / 5 A
H 24.408	B 23.038	3 HE / 28 TE	5 V / 12 A
H 24.103	B 23.015	3 HE / 28 TE	24 V / 6 A
H 24.225	B 23.012	3 HE / 28 TE	24 V / 10 A

## Multiple fixed voltage sources – lengthwise controlled

Device system highlab



Fig.: H 24.301

Device system basic



Fig.: B 23.301

### Technical Data:

(applicable to all models)

Design size:	3 HE / 28 TE
Outputs:	4 and 6 safety laboratory sockets resp., depending on model short-circuit proof, switchable in series thermal overload protection
Output voltage:	see selection chart
Output nominal current:	see selection chart
Displays:	LED display for $I > I_{max}$
Control deviation:	voltage: load change 0 – 100 %: 20 mV and 50 mV resp. depending on model
Temperature coefficient:	0,01 %/K
Residual ripple:	voltage with nominal load: 0,5mV <sub>eff</sub>
Transient time:	step change in load from 0 to 100 %: 15 µs

### Selection chart for device series highlab and basic

Reference No. System highlab	ReferenceNo. System basic	Design size	Number of outputs	Number of sockets	Output fixed voltage DC
H 26.034	B 24.034	3 HE / 42 TE	4	6	+5 V / 5 A, -5 V / 0,5 A, +12 V / 3 A, -12 V / 3 A
H 26.033	B 24.033	3 HE / 42 TE	4	6	+5 V / 5 A, -5 V / 0,5 A, +15 V / 3 A, -15 V / 3 A
H 24.303	B 23.303	3 HE / 28 TE	2	4	2 x 12 V / 1 A
H 24.304	B 23.304	3 HE / 28 TE	2	4	2 x 15 V / 1 A

Multiple fixed voltage sources – lengthwise controlled – with 4 ammeters

Device system highlab



Fig.: N 23.426

Device system basic



Fig.: C 23.026

Technical Data:

(applicable to all models)

Design size:	3 HE / 19"
Outputs:	2 safety laboratory sockets per output short-circuit proof, switchable in series thermal overload protection
Output voltage:	1 x 5 V, 2 x 15 V, 1 x 24 V alternatively 2 x 5 V, 2 x 15 V
Output nominal current:	3 A
Displays:	4 analog ammeters for each channel, +-2,5 % of average range, +-0,5 % of average value
Control deviation:	voltage: load change 0 – 100 %: 20 mV and 50 mV resp. depending on model
Temperature coefficient:	0,01 %/K
Residual ripple:	voltage with nominal load: 0,5 mV <sub>eff</sub>
Transient time:	step change in load from 0 to 100 %: 15 µs

Selection chart for device series highlab and basic

Reference No. System highlab	Reference No. System basic	Design size	Number of outputs	Output fixed voltage DC	Display 4 ammeters
N 23.426	C 23.026	3 HE / 19"	4	5 V / 3 A, 2 x 15 V / 3 A, 1 x 24 V / 3A	analog
N 23. 427	C 23.027	3 HE / 19"	4	2 x 5 V / 3 A, 2 x 15 V / 3 A	analog

## Multiple Fixed voltage sources – primarily synchronised

Device system highlab



Fig.: H 24.101

Device system basic



Fig.: B 23.013

### Technical Data:

(applicable to all models)

Design size:	3 HE / 28 TE
Outputs:	2 safety laboratory sockets short-circuit proof, switchable in series thermal overload protection
Output voltage:	5 V, 24 V, $\pm 12$ V, $\pm 15$ V depending on model
Output nominal current:	see selection chart
Residual ripple:	max. 50 mV <sub>eff</sub>

### Selection chart for device series highlab and basic

Reference No. System highlab	Reference No. System basic	Design size	Output fixed voltage DC
H 24.101	B 23.013	3 HE / 28 TE	5 V / 10 A, 24 V / 0,4 A, +12 V / 2 A, -12 V / 2 A
H 24.102	B 23.014	3 HE / 28 TE	5 V / 10 A, 24 V / 0,4 A, +15 V / 1,8 A, -15 V / 1,8 A
H 24.041	B 23.033	3 HE / 28 TE	+15 V / 2 A, -15 V / 2 A,



Current and voltage sources (calibration sources)

Device system highlab



Fig.: H 24.211

Device system basic



Fig.: B 23.011

Technical Data:	
Design size:	3 HE / 28 TE
Design:	1 mV - 20 V, 1 µA - 21 mA
Output voltage:	range 1: 1 mV - 1,999 V range 2: 10 mV - 19,99 V
Output current:	range 1: 1 µA - 2,1 mA range 2: 10 µA - 21 mA
Burden voltage:	max. 18,5 V
Burden current:	max. 25 mA
Adjustment:	digital switch 4-digit
Output:	through 4 mm safety laboratory socket, short-circuit proof

Selection chart for device series highlab and basic			
Reference No. System highlab	Reference No. System basic	Design size	Designation
H 24.211	B 23.011	3 HE / 28 TE	19,99 V / 21 mA

Other current and voltage ranges are also deliverable (e.g. up to 199,99 mA).



## The new $\mu$ -processor-controlled regulating power pack generation highlab and basic

Due to the innovative processor technology the new erfi regulating power packs possess an unequalled degree of functionality. This functionality is subject to a utility model. German utility model No. 20 2004 004 623

### Technical highlights:

- Plug-and-play function in connection with the innovative control software highlink Power
- Integrated ramp generator for long-term tests
- Chart function by means of ramp generator
- Many programmable parameters for a flexible control
- All models are optionally telecontrollable (Ethernet, USB 2.0, RS232 C)
- Optional interface on the front or back
- Easy handling due to simple block commands in ASCII format

- All voltage and current values are continuously measured and transferred to the interface
- Manual and tele-controlled operation
- Precision regulator, switchable in series and in parallel
- All parts of the power pack from 45 Watt with step pre-control (depending on the respective output voltage, minimization of the thermal losses)



### Technical Data for the power range of up to 120 and 600 Watt resp. (lengthwise controlled power packs)

		up to 120 Watt	up to 600 Watt
Partial and full racks of 19" technology			
Control deviation 1 with load change 0-100 %	voltage	2 mV/A	0,2 mV/A
	current	0,2 mA/V	0,2 mA/V
Control deviation 2 with mains change 10 %	voltage	< 0,01 %	< 0,01 %
	current	< 0,01 %	< 0,01 %
Temperature coefficient	voltage	0,005 %/K	0,007 %/K
	current	0,013 %/K	0,02 %/K
Residual ripple	voltage	0,2 mVeff	0,5 mVeff
	current	0,5 mAeff	5 mAeff
Transient time with step change in load from 0-100 %		15 $\mu$ s	20 $\mu$ s
Transient time with step change in load from 100-0 %		500 $\mu$ s	1 ms
Ambient temperature		0 - 40° C	0 - 40° C

### Technical Data for the power range higher than 600 Watt (synchronised power packs)

Modern secondary regulators of a high degree of efficiency, low transient emissions and low heat development.

Racks of 19" technology	Width 84 TE, height 6 HE
Input voltage	4 x 400/230 V $\pm$ 10 %
Input frequency	48-62 Hz
Superposed alternating current voltage at the output	< 30 mVeff, < 100 mVss
Transient time	< 0,5 ms
Load control time with step change in load of 0-100 %	< 0,1 s
Temperature coefficient of the output voltage	< 150 ppm/V
Ambient temperature	0-40° C

### Rear interfaces (option)

Reference No.	Interface
NWT 1.106	Ethernet
NWT 1.107	USB 2.0
NWT 1.108	RS 232 C

The interfaces allow the control of the power packs. Besides the complete device control, the erfi software highlink Power takes also over the room control by means of Ethernet interface.

### Note:

Front interfaces see page 55



LabVIEW device driver  
free download  
[www.erfi.de/software](http://www.erfi.de/software)

Single power packs, lengthwise controlled, up to 90 Watt – installation height 3 HE



Device system highlab



Fig.: H 24.025

Device system basic



Fig.: B 23.025

Technical Data:

(applicable to all models)

Design size: 3 HE / 28 TE and 3 HE / 42 TE resp.

Displays: 1 digital display for U and I, switchable

Selection chart for device series highlab and basic

Reference No. System highlab	Reference No. System basic	Plug-in size	Voltage	Current	Display voltage	Display current
H 24.037	B 23.029	3 HE/28 TE	0-30 V	0-1 A	digital	digital
H 24.025	B 23.025	3 HE/28 TE	0-30 V	0-2 A	digital	digital
H 26.012	B 24.014	3 HE/42 TE	0-30 V	0-3 A	digital	digital
H 24.026	B 23.026	3 HE/28 TE	0-60 V	0-1 A	digital	digital

Note:

All power packs are optionally available with PRESET function (OUTPUT OFF).

Reference No. PR 1.100

Rear interfaces (option)

Reference No.	Interface
NWT 1.106	Ethernet
NWT 1.107	USB 2.0
NWT 1.108	RS 232 C

Note:

Front interfaces see page 55.

The interfaces allow the control of the power packs. Besides the complete device control, the erfi software highlink Power takes also over the room control by means of Ethernet interface

## Single power packs, lengthwise controlled, 120 to 300 Watt – installation height 3 HE

Device system highlab



Fig.: H 28.015

Device system basic



Fig.: B 25.015

### Technical Data:

equipped with four-wire system

Design size: 3 HE / 56 TE

Displays: 1 digital display for U, 1 digital display for I

### Selection chart for device series highlab and basic

Reference No. System highlab	Reference No. System basic	Plug-in size	Voltage	Current	Display Voltage	Display Current
H 28.015	B 25.015	3 HE/56 TE	0-30 V	0-4 A	digital	digital
H 28.122	B 25.122	3 HE/56 TE	0-30 V	0-5 A	digital	digital
H 27.016	B 26.012	3 HE/70 TE	0-30 V	0-10 A	digital	digital
H 28.016	B 25.016	3 HE/56 TE	0-60 V	0-2 A	digital	digital
H 27.017	B 26.013	3 HE/70 TE	0-60 V	0-5 A	digital	digital

### Note:

All power packs are optionally available with PRESET function (OUTPUT OFF).

Reference No. PR 1.100

### Rear interfaces (option)

Reference No.	Interface
NWT 1.106	Ethernet
NWT 1.107	USB 2.0
NWT 1.108	RS 232 C

### Note:

Front interfaces see page 55.

The interfaces allow the control of the power packs. Besides the complete device control, the erfi software highlink Power takes also over the room control by means of Ethernet interface.



Single power packs, lengthwise controlled, 450 to 600 Watt – installation height 3 HE



Device system highlab



Fig.: N 23.016

Device system basic



Fig.: C 23.056

Technical Data:

equipped with four-wire system

Design size: 3 HE / 19"

Displays: 1 digital display for U, 1 digital display for I

Selection chart for device series highlab and basic

Reference No. System highlab	Reference No. System basic	Voltage	Current	Display Voltage	Display Current
N 23.015	C 23.055	0-30 V	0-15 A	digital	digital
N 23.016	C 23.056	0-60 V	0-10 A	digital	digital

**Note:** All power packs are optionally available with PRESET function (OUTPUT OFF).

Reference No. PR 1.100

Rear interfaces (option)

Reference No.	Interface
NWT 1.106	Ethernet
NWT 1.107	USB 2.0
NWT 1.108	RS 232 C

The interfaces allow the control of the power packs. Besides the complete device control, the erfi software highlink Power takes also over the room control by means of Ethernet interface.

**Note:**  
Front interfaces see page 55.

# Single power packs, lengthwise controlled, go to 600 Watt – installation height 6 HE

Device system highlab



Fig.: H 26.526

Device system basic



Fig.: B 24.526

## Technical Data:

(applicable to all models)

Design size: 6 HE / 42 TE

Displays: 1 digital display for U, 1 digital display for I

## Selection chart for device series highlab and basic

Reference No. System highlab	Reference No. System basic	Voltage	Current	Display Voltage	Display Current
H 26.526	B 24.526	0-30 V	0-3 A	digital	digital
H 26.527	B 24.527	0-30 V	0-6 A	digital	digital
H 26.519	B 24.563	0-30 V	0-10 A	digital	digital
H 26.551	B 24.551	0-60 V	0-3 A	digital	digital
H 26.528	B 24.528	0-60 V	0-6 A	digital	digital
H 26.561	B 24.561	0-60 V	0-10 A	digital	digital
H 26.702	B 24.702	0-160 V	0-3 A	digital	digital

## Note:

All power packs are optionally available with PRESET function (OUTPUT OFF).

Reference No. PR 1.100

## Rear interfaces (option)

Reference No.	Interface
NWT 1.106	Ethernet
NWT 1.107	USB 2.0
NWT 1.108	RS 232 C

## Note:

Front interfaces see page 55.

The interfaces allow the control of the power packs. Besides the complete device control, the erfi software highlink Power takes also over the room control by means of Ethernet interface.

Single power packs, synchronized, 600 to 1500 Watt (high current power pack) – installation height 6 HE



Device system highlab



Fig.: H 29.025

Device system basic



Fig.: B 27.525

Technical Data:	
(applicable to all models)	
Design size:	6 HE / 19"
Displays:	1 digital display for U 1 digital display for I

Selection chart for device series highlab and basic					
Reference No. System highlab	Reference No. System basic	Voltage	Current	Display Voltage	Display Current
H 29.014	B 27.514	0-30 V	0-20 A	digital	digital
H 29.015	B 27.515	0-30 V	0-30 A	digital	digital
H 29.025	B 27.525	0-30 V	0-50 A	digital	digital
H 29.046	B 27.546	0-50 V	0-30 A	digital	digital
H 29.037	B 27.537	0-60 V	0-16 A	digital	digital
H 29.036	B 27.536	0-60 V	0-25 A	digital	digital
H 29.602	B 27.602	0-125 V	0-10 A	digital	digital
H 29.604	B 27.604	0-300 V	0- 4 A	digital	digital

**Note:**  
All power packs are optionally available with PRESET function (OUTPUT OFF).  
**Reference No. PR 1.100**

Rear interfaces (option)	
Reference No.	Interface
NWT 1.106	Ethernet
NWT 1.107	USB 2.0
NWT 1.108	RS 232 C

**Note:**  
Front interfaces see page 55.

The interfaces allow the control of the power packs. Besides the complete device control, the erfi software highlink Power takes also over the room control by means of Ethernet interface.

# Double DC Powersupply, optionally with Arbitrary-Function, Master-Slave-Mode Parallel-/Serial-Mode (internally switchable), Tracking-Mode

Device system highlab



fig.: H 28.407

Device system basic



fig.: B 25.066

## Technical Data:

(valid for all models)

Size:	3 HU / 56 DU or 3 HU / 70 DU
Display:	overall 4 Digitaldisplays, each channel 1 Display for voltage and current

## Selection chart for device series highlab and basic

Order no System highlab	Order no System Basic	Size	Voltage Channel 1	Current Channel 1	Voltage Channel 2	Current Channel 2	2 Displays Voltage	2 Displays Current	5 V/3 A constant voltage
H 28.317	B 25.057	3HU/56DU	0-30 V	0-2 A	0-30 V	0-2 A	digital	digital	-
H 28.407	B 25.066	3HU/56DU	0-30 V	0-2 A	0-30 V	0-2 A	digital	digital	●
H 28.025	B 25.025	3HU/56DU	0-30 V	0-3 A	0-30 V	0-3 A	digital	digital	-
H 29.024	B 26.024	3HU/70DU	0-30 V	0-3 A	0-30 V	0-3 A	digital	digital	●
H 28.323	B 25.058	3HU/56DU	0-60 V	0-1 A	0-60 V	0-1 A	digital	digital	-
H 28.408	B 25.067	3HU/56DU	0-60 V	0-1 A	0-60 V	0-1 A	digital	digital	●

## Options:

Order no	Function	
PR 1.100	<b>Preset Function:</b>	The output can be switched on or off (OUTPUT-OFF/ON). If it is switched off max. current is displayed and can be changed. The circuit must not be manually disconnected from power supply. An important advantage!
OP 1.100	<b>Arbitrary Function:</b>	Realization of arbitrary- and standard waveforms such as sine, square, triangle, sawtooth. 100 points, just transferred via interface in internal memory and can be accessed with the Software <b>highlink</b> power or buy using a simple block programming on your own. Frequency up to 500 Hz at ohmic load. The unit operates directly from the data points from internal memory and enabling the functions of arbitrary waveform generators with high electrical power outputs. By this way, for example Car ignition pulses are simulated. Note: Please use the option " <b>rear interface (remote control)</b> " (see below)
OP 1.101	<b>Comfortpackage:</b>	includes the following 3 positions: <ul style="list-style-type: none"> <li>• <b>Seriell-/Parallel-Mode:</b> The 2 Outputs are internally switchable between serial or parallel. This can either double the voltage or twice the current take. Functions individually activated by a button</li> <li>• <b>Master- Slave-Mode:</b> coupling of both outputs. Slave channel (right channel) follows the master channel (left channel). Both channels are galvanically separated. Function can be activated</li> <li>• <b>Tracking-Mode:</b> The removal of negative and positive voltage. Range -30 ... 0 ... +30 V Function can be activated by a button</li> </ul>

## Rear interface (remote Control)

Order No.	Interface
NWT 1.106	Ethernet
NWT 1.107	USB 2.0
NWT 1.108	RS 232 C

The interfaces allow control of the control network devices. The software erfi high link power absorbs next to the complete device control even the room controls with the Ethernet interface.

**Note:** front interfaces see page 55.



Double power packs, lengthwise controlled with and without 5 V / 3 A fixed voltage source up to 2 x 90 Watt – 2 digital displays – installation height 6 HE



Device system highlab



Fig.: H 28.020

Device system basic



Fig.: B 28.020

Technical Data:

(applicable to all models)	
Design size:	3 HE / 56 TE and 3 HE / 70 TE resp.
Displays:	in total 2 digital displays per channel 1 switchable digital display for U and I

Selection chart for device series highlab and basic

Reference No. System highlab	Reference No. System Basic	Plug-in size	Voltage channel 1	Current channel 1	Voltage channel 2	Current channel 2	Two displays switchable V/A	5 V/3 A fixed- voltage
H 28.020	B 28.020	3HE/56TE	0-30 V	0-2 A	0-30 V	0-2 A	digital	-
H 29.018	B 26.018	3HE/70TE	0-30V	0-2 A	0-30V	0-2 A	digital	●
H 28.027	B 25.027	3HE/56TE	0-30 V	0-3 A	0-30 V	0-3 A	digital	-
H 29.028	B 26.028	3HE/70TE	0-30V	0-3 A	0-30V	0-3 A	digital	●
H 28.022	B 28.022	3HE/56TE	0-60 V	0-1 A	0-60 V	0-1 A	digital	-
H 29.020	B 26.020	3HE/70TE	0-60V	0-1 A	0-60V	0-1 A	digital	●

**Note:**  
All power packs are optionally available with PRESET function (OUTPUT OFF).  
Reference No. PR 1.100

Rear interfaces (option)

Reference No.	Interface
NWT 1.106	Ethernet
NWT 1.107	USB 2.0
NWT 1.108	RS 232 C

The interfaces allow the control of the power packs. Besides the complete device control, the erfi software highlink Power takes also over the room control by means of Ethernet interface.

**Note:**  
Front interfaces see page 55.

Double power packs, lengthwise controlled with 3 fixed voltage sources (5 V / 3 A,  $\pm 15$  V / 1 A) up to 2 x 90 Watt – 4 digital displays – installation height 6 HE

#### Device system highlab



Fig.: N 23.425

#### Device system basic



Fig.: C 23.015

#### Technical Data:

(applicable to all models)

Design size: 3 HE / 19 "

Displays: in total 4 digital displays  
per channel 1 digital display for U and 1 digital display for I

#### Selection chart for device series highlab and basic

Reference No. System highlab	Reference No. System basic	Voltage channel 1	Current channel 1	Voltage channel 2	Current channel 2	Two display for Voltage	Two display for Current	Fixed voltages 5 V/3 A $\pm 12$ V/ $\pm 15$ V/1 A switchable
N 23.425	C 23.015	0-30 V	0-2 A	0-30 V	0-2 A	digital	digital	available
N 23.431	C 23.031	0-30 V	0-3 A	0-30 V	0-3 A	digital	digital	available
N 23.428	C 23.428	0-60 V	0-1 A	0-60 V	0-1 A	digital	digital	available

#### Note:

All power packs are optionally available with PRESET function (OUTPUT OFF). **Reference No. PR 1.100**

#### Rear interfaces (option)

Reference No.	Interface
NWT 1.106	Ethernet
NWT 1.107	USB 2.0
NWT 1.108	RS 232 C

The interfaces allow the control of the power packs. Besides the complete device control, the erfi software highlink Power takes also over the room control by means of Ethernet interface.

#### Note:

Front interfaces see page 55.

Double power packs, lengthwise controlled with and without 5 V / 3 A fixed voltage source up to 2 x 180 Watt – 4 digital displays – installation height 6 HE



Device system highlab



Fig.: H 26.652

Device system basic



Fig.: B 24.652

Technical Data:

(applicable to all models)	
Design size:	6 HE / 42 TE
Displays:	in total 4 digital displays per channel 1 digital display for U and 1 digital display for I

Selection chart for device series highlab and basic

Reference No. System highlab	Reference No. System basic	Plug-in size	Voltage channel 1	Current channel 1	Voltage channel 2	Current channel 2	Two displays for Voltage	Two displays for Current	5 V/3 A Fixed voltage
H 26.637	B 24.637	6HE/42TE	0-30 V	0-2 A	0-30 V	0-2 A	digital	digital	-
H 26.652	B 24.652	6HE/42TE	0-30 V	0-2 A	0-30 V	0-2 A	digital	digital	●
H 26.639	B 24.639	6HE/42TE	0-30 V	0-3 A	0-30 V	0-3 A	digital	digital	-
H 26.692	B 24.692	6HE/42TE	0-30 V	0-3 A	0-30 V	0-3 A	digital	digital	●
H 26.645	B 24.645	6HE/42TE	0-30 V	0-5 A	0-30 V	0-5 A	digital	digital	-
H 26.695	B 24.695	6HE/42TE	0-30 V	0-5 A	0-30 V	0-5 A	digital	digital	●
H 26.649	B 24.649	6HE/42TE	0-60 V	0-2 A	0-60 V	0-2 A	digital	digital	-
H 26.668	B 24.668	6HE/42TE	0-60 V	0-2 A	0-60 V	0-2 A	digital	digital	●
H 26.681	B 24.681	6HE/42TE	0-60 V	0-3 A	0-60 V	0-3 A	digital	digital	-
H 26.670	B 24.670	6HE/42TE	0-60 V	0-3 A	0-60 V	0-3 A	digital	digital	●

**Note:**  
All power packs are optionally available with PRESET function (OUTPUT OFF).  
**Reference No. PR 1.100**

Rear interfaces (option)

Reference No.	Interface
NWT 1.106	Ethernet
NWT 1.107	USB 2.0
NWT 1.108	RS 232 C

The interfaces allow the control of the power packs. Besides the complete device control, the erfi software highlink Power takes also over the room control by means of Ethernet interface.

**Note:**  
Front interfaces see page 55.

# Universal tester with DC and AC power supply, function and rotary current generator, voltage and current measurement interface, full remote control

Ideal for all basic tests and further testing of the electrical / electronic and digital and analog technology

Device system highlab



fig.: H 38.060

Device system basic



fig.: B 35.060

## Technical Data:

<b>Size:</b>	3 HU / 56 DU alternatively as a teaching tool in A4 - plate design		
<b>Function groups:</b>			
<b>DC:</b>	fixed voltage 1:	+ 15 V / 2 A, - 15 V / 0,5 A for OP-booster	
	fixed voltage 2:	5 V / 2 A for TTL	
	standard power supply:	0-30 V / 0,8 A, indexed and short-circuit proof	
	<b>full remote control</b>		
	<b>integrated chute generator</b>		
	Output-OFF-function		
	<b>Full remote control with all functions (U, I, measuring function for U and I, chute)</b>		
	<b>Incl. 3 optional selectable fixed voltages</b>		
<b>AC:</b>	fixed voltage 1 and 2:	12 V / 0,1 A, 50 Hz, switchable of 24 V / 0,1 A, 50 Hz	
<b>3-phase-rotary generator:</b>	with 3 phase and N, 7 / 12 Veff, 50 mA (star- / triangle)		
	3 outputs , 120° out-of-phase, rotary field, 50 Ohm output resistance		
	fixed frequency 50 Hz		
<b>Function generator:</b>	functions:	sine, triangle, oblong	
	frequency area:	1 Hz – 1 MHz	
	amplitude:	0-20 Vss	
	max. output circuit:	300 mA	
	attenuator:	20 dB	
	output resistance:	50 Ohm	
	TTL-output:	5 V	
	<b>full remote control with all functions</b>		
<b>Measurement Inputs:</b>	2 measuring inputs for voltage +/- 10 V		
	2 measuring inputs for current +/- 1 A		
	<b>full remote control with all functions</b>		
	<b>all measuring inputs can be imported</b>		
<b>Interfaces:</b>	USB 2.0 and Ethernet rear by 19" devices, on front by DIN A4 teaching tools		

## Selection table for device system highlab, basic and erfi-Didactic-teaching tool on DIN A4-size

Order No System highlab	Order No System basic	Order No System DIN A4	Size:
H 38.060	B 35.060		3 HU / 56 DU
H 36.514	B 34.512		6 HU / 42 DU
		D 06.001	153 x 297 x 5 mm



## Lab VIEW-device-driver

Available free on quest:  
[www.erfi.de/software](http://www.erfi.de/software)

## Tip to remote control:

The device contains the latest microcontroller technology and can be controlled remotely via USB or Ethernet interface. Here, the device controls the remote control mode 2 different ways of working, in which the user can switch:

### a) Remote control modus 1: (fully automatic)

In this mode the device exclusive follows the commands of the software highlink power. The device does not respond to manual intervention by the user on the device itself.

### b) Remote control modus 2: (semi automatic)

In this mode the device follows on the one hand the commands of the software highlink and on the other hand, the users are given the opportunity, through the control dial to intervene and change the values manually by himself. The respective values are immediately transmitted to the interface and using the software displays high power link.

The universal tester is also available in the teaching tool format DIN A4.

fig.: D 06.001





# I/O-Multiplexer/Matrix, digital and analog



Ideally suited for automated processes in industry and education  
(for all basic tests and further tests of electronics as well as the digital and analog technology)

Device system highlab

Device system basic



fig. H 16.301

The device has 8 digital inputs, 8 digital outputs as well as 2 analog inputs (0 – 10 V and 0 – 20 mA) and 2 analog outputs (0 – 10 V and 0 – 20 mA). The built-in Ethernet interface allows in connection with the innovative control software highlink power the remote control of all outputs and all inputs.  
Complex testing and automated test sequences are easy to handle. It can by way of example measuring device or power supplies switched to



fig. E 14.301

different switching points. All inputs and outputs are connected with 4 mm safety laboratory bushings.

**Special feature:**  
The digital outputs have built-in switching relays with a breaking capacity of 260 V / 2 A. The relays are completely wired to 4 mm laboratory bushings.

Applications:	
Analog electronic:	read in of analog signals ( 0- 10 V, 0 – 20 mA) output of analog signals ( 0- 10 V, 0 – 20 mA)
Digital electronic:	read in of switching states design and programming of logical circuits
Sensoric:	inputs and outputs process of sensors
Control technology:	control of digital actuators and pneumatic components
Measurement:	switching devices in a variety of different measuring points processing of analog input signals

Technical Data:	
size:	3 HU / 56 DU
digital inputs:	8 digital inputs 24 V
digital outputs:	8 digital outputs with switching power 260 V / 2 A, floating
analog input 1:	0-10 V
analog input 2:	0-20 mA
analog output 1:	0-10 V
analog output 2:	0-20 mA
interface:	Ethernet

**Advice for remote control:**  
The device contains the latest microcontrol technology and can fully remote controlled with the Ethernet interface.

Selection table for device system highlab and basic		
Order no. System highlab	Order no. System basic	size:
H 16.301	E 14.301	3 HU / 56 DU

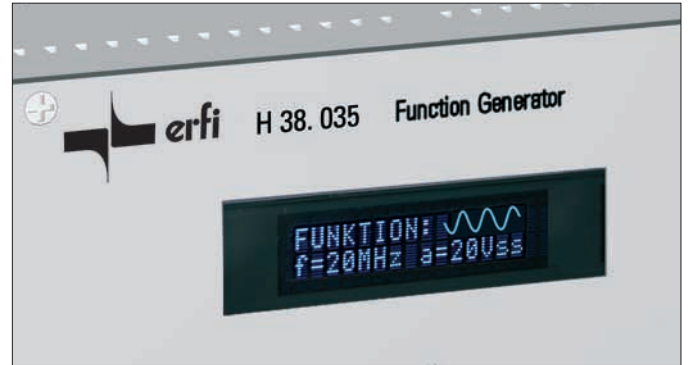


**Lab VIEW-device-driver**  
Available free on quest:  
[www.erfi.de/software](http://www.erfi.de/software)

## Telecontrollable function generators with back-measurement function and integrated counter

erfi are the pioneer in the field of electronic laboratory equipment and were the first company in the year 2002 to introduce telecontrollable and networked laboratory instruments which, with the help of the innovative software highlink, revolutionized the complete market. The entirely newly developed function generator family offers excellent parameters and an excellent functionality such as tele-control by means

of the most modern software, large frequency ranges up to 20 MHz, amplitudes of up to 30 V<sub>ss</sub> and frequency counters of up to 100 MHz. This new device generation satisfies all imaginable demands. Multilingual menu guidance in connection with the elegant shaft encoder and the new Comand function keys emphasize the superiority of this device class.



- Telecontrollable by means of Ethernet, USB2.0, TS232-C-interface (options)
- Extensive control software highlink Power (option, page 48 ff) or LabVIEW device driver (option page 54)
- Innovative menu guidance by a modern graphic display in blue colour
- Comand function keys for the fast access to the main functions
- Elegant shaft encoder for the easy-to-operate menu guidance
- Outstanding frequency range up to 20 MHz
- 8-digit frequency counter up to 100 MHz

The new graphic display in vacuum fluorescent technology allows an excellent reading even at a distance of 3 m, independently of the reading angle. The display is in blue and has a very high image sharpness and brilliance.

Technical Data:	
Display:	graphic display in vacuum fluorescent technology, blue
Menu language:	reversible German / English
Operating concept:	elegant shaft encoder with pressure function as well as Comand function keys for the optimal handling
Functions:	Sinus, triangle, rectangle, saw tooth, ramp operation, amplifier, DC, single current pulse, variable pulse duty factor
Operating modes:	free-wheeling, externally wobblable, (Sweep operation), PWM operation
Frequency range:	0,1 Hz -20 MHz for models H 38.035 and H 38.037 0,1 Hz -10 MHz for models H 38.036 and H 38.038
Amplitudes:	0-20 V <sub>ss</sub> for models H 38.035 and H 38.037 0-30 V <sub>ss</sub> for models H 38.036 and H 38.038
Amplifier:	approx. 20 dB amplification, DC
Single current pulse:	variable, positive current pulse released by a key, adjustable current pulse length
Outputs:	20 V <sub>ss</sub> idling for models H 38.035 and H 38.037 30 V <sub>ss</sub> idling for models H 38.036 and H 38.038 5 V TTL-compatible, 50 Ω-output impedance
Inputs:	external, internal PWM In, VCO IN, attenuator: 0-30 dB continuously, additionally 20 dB and 40 dB to be activated through the same bushing
DC offset:	-10 V to +10 V, 0 V with push-button
<b>Wobble operation, external:</b>	
VCO input:	0-5 V control voltage input for frequency change of max. 1:1000
<b>Wobble operation, internal:</b>	
Sweep operation, start and stop frequency, wobble frequency: max. 100 Hz in steps of 1 Hz	
<b>PWM operation:</b>	
Control input:	-2,5V to +2,5V control voltage input for pulse-pause operation
<b>Frequency counter:</b>	
Measuring range:	0,1 Hz to 30 MHz for models H 38.035 and H 38.036 0,1 Hz to 100 MHz for models H 38.037 and H 38.038
Input:	external, BNC bushing
Input voltage:	0,5 V <sub>eff</sub> to 100 V <sub>eff</sub>
Display:	2 x 16 characters



## Tele-control operation for function generators (options)

Due to the optionally available interfaces (Ethernet, USB2.0 and RS232-C) the new function generators have become all-rounders. The tele-control allows the programming of the function generators and the integrated counters. This functionality makes it possible to use the new function generator family for automated measuring and regulating operations.

The telecontrollable function generators have been developed for the industrial use as well as for didactic training. They are an ideal and up-to-date tool for today's requirements, allowing many valuable functions.

The optionally available software highlink Power and "LabVIEW device driver" resp. facilitate the easy access to the device.

The following parameters are programmable by means of the optional interfaces (Ethernet, USB2.0 or RS232 within the respective limits:

- Selection of operating mode: free-wheeling, externally wobbbable, internally wobbbable (Sweep operation, PWM-operation)
- Functions/wave form: Sinus, triangle, rectangle, saw tooth, ramp operation, rectifier, DC, single current pulse, variable pulse duty factor
- Frequency: 0-20 MHz and 0-10 MHz resp.
- Amplitude: 0-20 V<sub>ss</sub> or 0-30 V<sub>ss</sub>
- DC offset: -10 V to +10 V
- Attenuator: 0-30 dB, 20 dB and 40 dB
- Sweep parameter: start and stop frequency wobbbable frequency
- Counter frequency: can be read out

Selection chart for device series highlab and basic

Reference No. System highlab	Reference No. System basic	Size	Design
H 38.035	B 35.035	3 HE / 56 TE	0,1 Hz – 20 MHz, 20 V <sub>ss</sub> , counter up to 30 MHz
H 38.036	B 35.036	3 HE / 56 TE	0,1 Hz – 10 MHz, 30 V <sub>ss</sub> , counter up to 30 MHz
H 38.037	B 35.037	3 HE / 56 TE	0,1 Hz – 20 MHz, 20 V <sub>ss</sub> , counter up to 100 MHz
H 38.038	B 35.038	3 HE / 56 TE	0,1 Hz – 10 MHz, 30 V <sub>ss</sub> , counter up to 100 MHz



LabVIEW device driver  
free download  
[www.erfi.de/software](http://www.erfi.de/software)



### Rear interfaces (option)

Reference No.	Interface
NWT 1.106	Ethernet
NWT 1.107	USB 2.0
NWT 1.108	RS 232 C

#### Note:

Front interfaces see page 55.

The interfaces allow the control of the function generators.

In addition to the complete device control, erfi software highlink Power takes also over the room control by means of Ethernet interface.

## Power amplifier with amplifier input, 25 W<sub>eff</sub> and 40 W<sub>eff</sub> resp.

The modern power amplifier allows a wider use of the function generator family. Coils and test circuits of a high power input can be operated according to the scope of the power amplifier.

The power amplifier is directly connected to the function generator, allowing the modular use of the same. Also for training equipment this power amplifier is often integrated in the instructor's table. The loop

wiring systems installed in the room can be ideally supplied. The trainee gets the pre-specified signal on the training place. The power amplifier is deliverable with 25 and 40 Watt.

Device system highlab



Fig.: H 36.033

Device system basic



Fig.: B 35.015

### Technical Data:

(applicable to all models)

Design size:	3 HE / 42 TE
Output power:	25 W <sub>eff</sub> and 40 W <sub>eff</sub> resp. continuous power with sinus on 5 Ω 80 W peak power with rectangle on 5 Ω
Output voltage:	max. 40 V <sub>ss</sub>
Range:	DC up to 100 kHz – 0,3 dB idle running and with nominal load
Input:	BNC-connection
Output:	BNC connection, unearthed 2 safety laboratory sockets
Output resistance:	approx. 50 mΩ with 20 kHz approx. 330 mΩ from 20 to 100 kHz
Displays:	LED display for overload
Excess temperature:	temperature surveillance
External voltage protection:	through Triac and fuse
Short-circuit proof:	yes (with an extended short-circuit, response of the excess temperature protection)
L and C load:	switching on and off is possible without problem
Transient time:	approx. 750 ns
Input impedance:	approx. 50 kΩ and 180 pF
Input protection:	230 V <sub>eff</sub>

### Selection chart for device series highlab and basic

Reference No. System highlab	Reference No. System basic	Design size	Design
H 36.032	B 34.014	3 HE / 42 TE	25 W <sub>eff</sub>
H 36.033	B 35.015	3 HE / 42 TE	40 W <sub>eff</sub>



# Compact function generators for the high-end range with integrated counter and integrated power amplifier

The compact function generator series are characterised by their modular design and their excellent signal waveform. 3 different models of this generator class are available.  
The first stage (models B34.011 and H36.011 resp.) is frequently integrated in training places.

The second stage offers a frequency display as well as an integrated counter.  
The third stage allows in the same design size the 40 W power amplifier which is described in the previous page.

## Device system highlab



Fig.: H 36.011 (stage 1)



Fig.: H 36.031 (stage 3 inclusive counter and power amplifier)

## Device system basic



Fig.: B 34.011 (stage 1)



Fig.: B 34.013 (stage 3 inclusive counter and power amplifier)

Function generators – stage 1 (H36.011 and B34.011):	
Design size:	3 HE / 42 TE
Functions:	sinus, triangle, rectangle, tooth saw
Operation modes:	free-wheeling, externally wobblable
Frequency range:	0,1 Hz – 1 MHz
Total harmonic factor:	< 0,5 % up to 50 kHz, < 1 % up to 100 kHz, < 3 % up to 1 MHz
Outputs (BNC):	20 V <sub>ss</sub> /50 Ω, -20dB/50 Ω, TTL/50 Ω
VCO input:	5 V control voltage input for frequency changes 1:2 up to 1:100

Function generators – stage 2 (H36.021 and B34.012):	
Technical data identical with stage 1, however, in addition:	
Functions:	single current pulse and variable pulse duty factor
Frequency counter:	0,1 Hz up to 1 MHz for internal signals 5 Hz up to 10 MHz for external signals
Inputs:	counter input for external signals

Function generators – stage 3 (H36.031 and B34.013):	
Technical data identical with stage 2, however, in addition:	
Power amplifier:	40 W <sub>eff</sub> continuous power with sinus on 5 Ω 80 W peak power with rectangle on 5 Ω
Output voltage:	max. 40 V <sub>ss</sub>

Selection chart for device series highlab and basic				
Reference No. System highlab	Reference No. System highlab	Design size	Design	Expansion stage
H 36.011	B 34.011	3 HE / 42 TE	• function generator 0,1 Hz-1 MHz	1
H 36.021	B 34.012	3 HE / 42 TE	• function generator 0,1 Hz-1 MHz • inclusive counter up to 10 MHz	2
H 36.031	B 34.013	3 HE / 42 TE	• function generator 0,1 Hz-1 MHz • inclusive counter up to 10 MHz • and power amplifier 40 W <sub>eff</sub>	3

## Digital multi-meter 4 ½ -digit

Device system highlab



Fig.: H 34.033



Fig.: H 34.515

Device system basic



Fig.: B 33.012



Fig.: B 33.515

4 1/2 - digit digital multi-meter with free area selection, 5 different types of measurement are available for DC voltage, AC voltage, DC current, AC current and resistance with totally 28 measuring ranges. When measuring the AC voltage and the AC current, the real effective value is dis-

played. The measuring kind as well as the measuring range are selected by a key bank. Among other things, the device is characterized by the fact that currents of up to 10 A can be measured.

### Technical Data:

(applicable to all models)

Design size: 3 HE / 35 TE and 6 HE / 35 TE resp.

### Measuring types/measuring ranges:

DC voltage: 0,2 V, 2 V, 20 V, 200 V, 1000 V

AC voltage: 0,2 V, 2 V, 20 V, 200 V, 1000 V

Three-phase voltage: 0,2 mA, 2 mA, 20 mA, 200 mA, 2 A, 20 A

DC current: 0,2 mA, 2 mA, 20 mA, 200 mA, 2 A, 20 A

AC voltage: 200 Ω, 2 kΩ, 20 kΩ, 200 kΩ, 2000 kΩ, 20 MΩ

Resistance: 10 MΩ/70 pF in all voltage measuring ranges

Input resistance: approx. 250 mV for the area end with all current measuring ranges

Voltage drop: in the Ohm range max. 2 V at the item to be measured

Measuring voltage: digital 4 1/2 -digit, LED with 10 mm high characters

Display: <+/- (0,05 % of average value+0,01% of actual value) for DC voltage  
 <+/- (0,2 % of average value+0,01% of actual value) for DC voltage outside the 20 A range  
 <+/- (0,7 % of average value+0,01% of actual value) for DC voltage within the 20 A range  
 <+/- (0,1 % of average value+0,01% of actual value+50 MΩ) for resistance  
 <+/- (0,5 % of average value+0,07% of actual value) 40 Hz ... 10kHz for three-phase voltage within the range of 0,2 V, 2 V, 20 V  
 <+/- (1,0 % of average value+0,07% of actual value) 20Hz ... 500 Hz for three-phase voltage within the range of 200 V, 2000 V  
 <+/- (1,0 % of average value+0,07% of actual value) 40 Hz ... 400 Hz for three-phase current within the range of 2 A, 20 A

Basic precision: 0,05 % within the range of 0-40°C

AC interfacing: real effective value crest factor >3

Connection: 4 pcs. safety laboratory sockets

### Selection chart for device series highlab and basic

Reference No. System highlab	Reference No. System basic	Design size
H 34.033	B 33.012	3 HE / 35 TE
H 34.515	B 33.515	6 HE / 35 TE

Analog – Digital – Multi-meter

Device system highlab



Fig.: H 34.712

Device system basic



Fig.: E 33.515

Technical Data:	
(applicable to all models)	
Design size:	6 HE / 28 TE
Resolution:	6000 digits and analog bargraph
Voltage:	100 mV ... 600 V DC and 100 mV ... 600 V AC
Current	10 µA ... 10 A DC (16 A 30 s) and 10 µA ... 10 A AC (16 A 30 s)
Resistance:	100 mΩ - 40 MΩ
Frequency measurement:	0,1 Hz - 1 kHz
Precision temperature measurement:	-200,0 ... +400°C thermocouple Typ K
Further functions:	automatic and manual selection of measuring range throughput and diode test min./max. measured value memory and DATA hold automatic socket lock ABS signalling of overload and defective fuse

Selection chart for device series highlab and basic			
Reference No. System highlab	Reference No. System basic	Design size	
H 34.712	E 33.515	6 HE / 28 TE	digital multi-meter
Z 01.300			temperature probe type K

## Precision digital multi-meter inclusive RS232 interface (basic precision 0,012 %)

Device system highlab



Fig.: H 38.205

The basic precision of 0,012 % and various special functions of this multi-meter meet all requirements asked for by nowadays modern measurement technology. Real effective measurement 20 Hz – 100 kHz (AC, AC + DC), 2/4 wire resistance measurement, dBm-measurement, data-hold function, diode continuity test – all these functions show the versatile use of this multi-meter. In addition the device is equipped with a sorting function with adjustable limits as well as with a storage mode for recording the minimum and maximum values.

Device system basic



Fig.: B 35.205

Technical Data:	Model 4 4/5-digit	Model 5 1/2-digit
<b>Design size:</b>	3 HE / 56 TE	3 HE / 56 TE
<b>Display figures:</b>	4 4/5digit	5 1/2 digit
<b>Display:</b>	dual display, 50 000 digits each	dual display, 120 000 digits each
<b>Display type:</b>	vacuum fluorescent	vacuum fluorescent
<b>Real effective value:</b>	AC/ AC + DC	AC/ AC + DC
<b>Voltage range DC:</b>	500 mV – 1000 V	120 mV – 1000 V
<b>Precision:</b>	from 0,02 % rdg + 4 digits	from 0,02 % rdg + 5 digits
<b>Resolution:</b>	10 µV – 100 mV	1 µV – 10 mV
<b>Voltage range AC:</b>	500 mV – 750 V	120 mV – 750 V
<b>Precision:</b>	from 0,35 % rdg + 15 digits	from 1,5 % rdg + 200 digits
<b>Resolution:</b>	10 µV – 100 mV	1 µV – 10 mV
<b>Frequency range Volt:</b>	30 Hz – 10 kHz	40 Hz – 30 kHz
<b>Current measuring rang DC</b>	500 µA – 10 A	12 mA – 10 A
<b>Precision:</b>	from 0,05 % rdg + 4 digits	from 0,1 % rdg + 8 digits
<b>Resolution:</b>	10 nA – 1 mA	0,1 µA – 100 µA
<b>Current measuring range AC:</b>	500 µA – 10 A	12 mA – 10 A
<b>Precision:</b>	from 0,02 % rdg + 4 digits	from 1,5 % rdg + 200 digits
<b>Resolution:</b>	0,1 µA – 100 µA	0,1 µA – 100 µA
<b>Frequency range amp</b>	30 Hz – 20 kHz	40 Hz – 5 kHz
<b>Basic precision dBm:</b>	0,2 dBm	0,6 dBm
<b>Resolution dBm:</b>	0,1 dBm	0,1 dBm
<b>Resistance range:</b>	500 Ω – 50 MΩ	120 Ω – 300 MΩ
<b>Precision:</b>	from 0,1 % rdg + 3 digits	from 0,1 % rdg + 5 digits
<b>Resolution:</b>	10 mΩ – 1 kΩ	1mΩ – 1 kΩ
<b>2 Wires / 4 wires selectable:</b>	2-wire/ -	• / •
<b>Frequency measurement:</b>	500 Hz – 500 kHz	5 Hz – 1 MHz
<b>Precision:</b>	from 0,01 % rdg + 3 digits	from 0,005 % rdg + 2 digits
<b>Resolution:</b>	0,01 Hz – 10 Hz	0,01 Hz – 10 Hz
<b>Diode / passage:</b>	• / •	• / •
<b>Sampling rate DCV:</b>	3	slow 2, medium 5, fast 20



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### Rear interfaces (option)

Reference No.	Interface
NWT 1.106	Ethernet
NWT 1.107	USB 2.0

### RS232 C-interface in series

**Note:** Front interfaces see page 55.

### Selection chart for device series highlab and basic

Reference No. System highlab	Reference No. System basic	Design
H 38.205	B 35.205	digital multi-meter 4 4/5 digit
H 38.206	B 35.206	digital multi-meter 5 1/2 digit
Z 01.310		4-wire test cable with Kelvin clips
Z 01.311		PC software



Digital multi-meter 5 3/4-digit, up to 20 A inclusive RS232 interface and USB 2.0 interface



Device system highlab



Fig.: H 38.025

Device system basic



Fig.: E 35.015

Technical Data:

Design size: 3 HE / 56 TE

General technical characteristics:

LED displays for high security, protects the user and the device against damages

12 different high-power measuring functions e.g. inductive capacity, capacity, resistance, temperature, logic test

Current measurement up to 20 A AC/DC

Real effective value measurement

Diode test, continuity test function and logic test

Temperature measurement selectable °C / ° F

Data memory and recall function (max. 10 values)

Relative value measuring function and automatic and manual area selection

Measuring types/measuring ranges:

DC voltage:	400 mV/4/40/400/1000 V; 1 µV; ± 0,1 % + 10 dgt.
AC voltage:	400 mV/4/40/400/750 V; 1 µV; ± 0,5 % + 10 dgt.
DC current:	40/400 mA/20 A; 100 nA; ± 0,8 % + 10 dgt.
AC current:	40/400 mA/20 A; 100 nA; ± 0,5 % + 10 dgt.
Resistance:	400 Ω/4/40/400 kΩ/4/40 MΩ; 1 mΩ; ± 0,8 % + 5 dgt.
Frequency:	10 Hz - 40 MHz; 1 Hz; ± 0,1 %; + 5 dgt.
Capacity:	400 nF/4/40/400/4000 µF; 1 pF; ± 2,0 % + 10 dgt.
Inductivity:	400 mH; 10 µH; ± 1,0 % + 10 dgt.
Temperature:	-40 ... + 1200°C; 0,1°C; ± 3,0 % + 2°C

Selection chart for device series highlab and basic

Reference No. System highlab	Reference No. System basic	Design size
H 38.025	E 35.015	3 HE / 56 TE

Rear interfaces (option)

Reference No.	Interface
NWT 1.106	Ethernet

RS232 C-interface in series  
Note: Front interfaces see page 55.



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## Resistance measuring device, digital 3 1/2 -digit

Device system highlab



Reference No.	Design size
H 34.013	3 HE / 28 TE

Device system basic



Reference No.	Design size
B 33.013	3 HE / 28 TE

**Technical Data:**

((applicable to all models)

Design size:	3 HE / 28 TE
Measuring range:	2 Ω, 20 Ω, 200 Ω, 2 kΩ, 20 kΩ, 200 kΩ, 2 MΩ
Constant currents:	200 mA, 20 mA, 2 mA, 1 mA, 100 μA, 20 μA, 1 μA
Display error:	< 0,3 % v.E. +/- 1 digit
Measuring rate:	approx. 3 measurements per second
Measuring type:	four-wire measuring technology
Anschluss:	on the front by 4 pcs. 4 mm sockets, on the back by DIN plug

## Power measuring device single-phase, processor measuring device with two limit contacts



Device system highlab



Reference No.	Design size
H 36.122	3 HE / 42 TE

Device system basic



Reference No.	Design size
B 34.022	3 HE / 42 TE

**Technical Data:**

(applicable to all models)

Design size:	3 HE / 42 TE	Power factor:	-1,000 ... 1,0000
Display:	digital	Active energy:	-9999 ... 99999 kWh
Voltage measurement:	0 - 400 V	Apparent energy:	0 - 99999 kVAh
Current measurement:	0,03 - 25 A	Reactive energy:	-9999 - 99999 kvarh
Real power:	-9999 - 99999 W	Measuring time:	0 ... 99999 h
Apparent power:	0 - 99999 VA		
Idle power:	-9999 - 99999 var		

**Rear interfaces (option)**

Reference No.	Interface
NWT 1.106	Ethernet
NWT 1.107	USB 2.0
NWT 1.108	RS 232 C

**Note:** Front interfaces see page 55.


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# Multi-functional power measuring device three-phase, 500 V / 16 A



Device system highlab



Fig.: N 33.503

- Measurement of current, voltage, active power, idle power and apparent power power factor, active energy and reactive power, total harmonic factor and harmonic components
- Precise measured values with error limits 0,25 % for U and I
- Communication-compatible
- Current inputs galvanically separated
- Two limit values with any measured value allocation
- Good readability by high-contrast LED displays, 14 mm high

### Display of energy:

For displaying the energy there are eight energy counters integrated in the device which indicate the following energy values

- Active energy for the conductors 1, 2 and 3 as well as for the complete system
- Reactive power for the conductors 1, 2 and 3 as well as for the complete system

Device system basic



Fig.: C 33.501

### Harmonics analysis:

With the 32 averaged samples per signal and mains period a harmonics analysis is carried out approx. once per second. The FFT (fast Fourier transformation) supplies the harmonics up to the 15th harmonic. This is the basis for calculating the effective values of the fundamental (HD 1) and the individual harmonic waves (HD 2 ... 15) as well as the total distortion (THD). With the phase currents these effective values are indicated and with the phase voltages the total harmonic factor (effective values referring to the effective value of the complete signal). Since the power measurement instrument has no special anti-aliasing filter, existing distortions of higher than 17th order can influence the measurement result of the higher harmonic.



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### Technical Data:

(applicable to all models)

Design size:	6 HE / 19"
Display:	digital displays
Scope of display:	energy: 999999999 power factor: 1,00 other sizes: 9999
Voltage measurement:	conductor-conductor: 0 - 500 V, 45 ... 65 Hz conductor N (earth): 0 - 290 V, 45 ... 65 Hz
Current measurement:	up to 16 A per phase
Energy:	active power, reactive power
Performance:	active, reactive and apparent power, power factor
4-quadrant-operation:	measurement: supply and delivery, inductive, capacitive
Measuring time:	up to max. 60 min.
Harmonics analysis:	1 analysis / second, Fast Fourier Transformation (FFT) up to 15th harmonic (see above)

### Selection chart for device series highlab and basic

Reference No. System highlab	Reference No. System basic	Design size
N 33.503	C 33.501	6 HE / 19"

### Rear interfaces (option)

Reference No.	Interface
NWT 1.106	Ethernet
NWT 1.107	USB 2.0
NWT 1.108	RS 232 C

**Note:** Front interfaces see page 55.

# Multi-functional power measuring device three-phase, 500 V / 5 A

## Device system highlab



Fig.: H 38.515

- Measurement of current, voltage, active power, idle power and apparent power, active energy and reactive energy, neutral current, power factor and frequency
- Precise measured values for U, I < 0,5 %, F < 0,02 Hz, remaining 1 %
- 4 counters for active energy: supply/delivery with high-rate and low-rate tariff
- 4 counters for idle energy: inductive/capacitive with high-rate and low-rate tariff
- 5 average values each of active, idle and apparent power with programmable interval period
- Two So-outputs for pulse or limit value outputs
- Transducer conditions programmable
- 5 freely programmable intervals

## Device system basic



Fig.: B 35.512

- Flexible auxiliary energy supply by AC/DC far range power packs
- Retrofit extension modules:
  - data logger
  - for 2 analog outputs
  - for 2 MB data memories, real time clock and Ethernet
- minimum-maximum value storage
- measurement in single-phase mains, three-wire and four-wire networks in 4-quadrant operation. The electric network can extensively be evaluated in all 4 quadrants.



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## Technical Data:

(applicable to all models)

Design size:	6 HE / 56 TE
Display:	3 digital displays
Scope of display:	energy: 9999 power factor: 1,00 other sizes: 9999
Voltage measurement:	conductor-conductor: 0 - 500 V, 45 ... 65 Hz conductor N (earth): 0 - 290 V, 45 ... 65 Hz
Current measurement:	up to 5 A per phase
Energy:	8 energy counters, active power, reactive power (see above)
Performance:	active, reactive and apparent power, power factor
Average values:	5 each P, Q, S average values
4-quadrant-operation:	measurement: supply and delivery, inductive, capacitive
Measuring time:	up to max. 60 min.
Output:	1 CEE socket 1 Schuko socket

## Selection chart for device series highlab and basic

Reference No. System highlab	Reference No. System basic	Designation
H 38.515	B 35.512	power measuring device, three-phase, 6 HE / 56 TE
Z 01.320	Z 01.320	extension module RS232 interface/data logger
Z 01.321	Z 01.321	extension module 2 analog outputs
Z 01.322	Z 01.322	extension module Ethernet, 2 MB data memories, real time clock

## Rear interfaces (option)

Reference No.	Interface
NWT 1.106	Ethernet
NWT 1.107	USB 2.0
NWT 1.108	RS 232 C

**Note:** Front interfaces see page 55.



# Hameg modular system 8000 – inclusive current supply module



## Device system highlab



Fig.: H 46.013

## Device system basic



Fig.: B 44.013

Due to a relevant basic unit (recording cassette with power supply) the integration of the Hameg modular device series 8000 has been made possible.

<b>Design 1:</b>	<b>With programmable power pack (flexible concept)</b>
	A programmable power pack allows the installation of all models in each position. The power pack automatically recognises the inserted Hameg device and supplies always the right voltage. The programmable power pack is even designed for the triple power pack HM8040-3 which has the highest power input. Due to the necessary capacity, only 2 models maximum can be integrated in a 6 HE rack with this variant. Installation height: 3 HE / 42 TE (for 1 Hameg device) Installation height: 6 HE / 42 TE (for 2 Hameg devices)
	<b>Technical data of the programmable power pack:</b> 2 x 8 V AC loadable with 0,5 A each 2 x 5 V DC loadable with 1 A each 4 x 20 V DC loadable with 0,5 A each Voltage values between 5 V and 20 V programmable (any polarity) Available power: for 2 modules max. 36 Watt
<b>Design 2:</b>	<b>With fixed voltage supply (fixed concept)</b>
	This economic design is adapted to the respective device type. For this purpose the devices are allocated to a fixed installation position and are only provided with the necessary voltage supply. A later modification is, therefore, not possible with this variant because the integrated voltage supply is not programmable. The relevant voltage supply is integrated in the basic unit and wired accordingly for the installation position. Design size: 3 HE / 42 TE (for 1 Hameg device) Design size: 6 He / 42 TE (for 2, optionally 3 Hameg devices)

Selection chart for device series highlab and basic			
Reference No. System highlab	Reference No. System basic	Designation	Design size
H 46.013	B 44.013	basic unit, design 1, for 1 Hameg device	3 HE / 42 TE
H 46.523	B 44.523	basic unit, design 1, for 2 Hameg devices	6HE / 42 TE
H 46.014	B 44.014	basic unit, design 2, for 1 Hameg device	6 HE / 42 TE
H 46.524	B 44.524	basic unit, design 2, for 2 Hameg devices	6 HE / 42 TE
H 46.525	B 44.525	basic unit, design 2, for 3 Hameg devices	6 HE / 42 TE

**Note when ordering:**

- 1) Please choose the desired basic unit
- 2) ) Please choose the desired Hameg devices for the selected basic unit (depending on the basic unit, 1 or 2 devices)

# Hameg modular system 8000

## Triple power pack



Fig.: HM 8040-3

### Technical Data:

#### Outputs:

2 x 0-20 V and 5 V

with a push-button for switching on and off, linear voltage regulator with temperature protection, potential-free for operation in parallel / series, adjustable current limitation and electronic fuse

#### 20 V Output

Setting range: 2 x 0 – 20 V, infinitely variable

Residual ripple:  $\leq 1 \text{ mV}_{\text{eff}}$

Output current: max. 0,5 A

Current limitation/  
electronic fuse: 0 – 0,5 A infinitely variable

#### 5 V Output

Setting range: 5 V  $\pm$  0,5 V with trimmer potentiometer

Residual ripple:  $\leq 1 \text{ mV}_{\text{eff}}$

Output current: max. 1 A in continuous operation, short-circuit proof

### Selection chart

#### Reference No. Design

HM 8040-3 triple power pack\*

\*Note: Please order the power supply module separately.

## 4 3/4-digit programmable multi-meter



Fig: HM 8012

### Technical Data:

#### DC voltage

Measuring range: 500 mV, 5 V, 50 V, 500 V, 600 V

Resolution: 10  $\mu\text{V}$ , 100  $\mu\text{V}$ , 1 mV, 10 mV, 100 mV

#### DC current

Measuring range: 500  $\mu\text{A}$ , 5 mA, 50 mA, 500 mA, 10 A

Resolution: 10 nA, 100 nA, 1  $\mu\text{A}$ , 10  $\mu\text{A}$ , 1 mA

#### db function

Resolution: 0,01 dB above 18 % of the range

#### AC voltage

Measuring range: 500 mV, 5 V, 50 V, 500 V, 600 V

Resolution: 10  $\mu\text{V}$ , 100 mV, 1 mV, 10 mV, 100 mV

#### AC current

Measuring range: 500  $\mu\text{A}$ , 5 mA, 50 mA, 500 mA, 10 A

Resolution: 10 nA, 100 nA, 1  $\mu\text{A}$ , 10  $\mu\text{A}$ , 1 mA

#### Resistance

Measuring range: 500  $\Omega$ , 5 k $\Omega$ , 50 k $\Omega$ , 500 k $\Omega$ , 5 M $\Omega$ , 50 M $\Omega$

Resolution: 10 m $\Omega$ , 100 m $\Omega$ , 1  $\Omega$ , 10  $\Omega$ , 100  $\Omega$ , 1 k $\Omega$

#### Interfaces

RS 232 C option

USB 2.0 option

Ethernet option

### Selection chart

#### Reference No. Design

HM 8012 4 3/4 - digit programmable multi-meter\*

\*Note: Please order the power supply module separately.

### Rear interfaces (option)

#### Reference No. Interface

NWT 1.106 Ethernet

NWT 1.107 USB 2.0

NWT 1.108 RS 232 C

**Note:** Front interfaces see page 55.

Hameg modular system 8000

10 MHz function generator



Fig.: HM 8030-6

Technical Data:	
Kind of range	
Sinus, rectangle, triangle, pulse; free-wheeling, internally or externally frequency modulated, with or without DC offset	
Frequency range	
0,05 Hz up to 10 MHz in 8 decadal steps variable: x 0,09 to x 1,1 (12:1)	
FM input	
(VCF, BNC socket on the back of the device)	
Frequency change: approx. 1:100	
Input voltage:	max. ± 30 V
Internal wobble	
Wobble speed:	20 ms to 15 s
Wobble stroke:	approx. 1:100
Outputs:	
short-circuit proof, separate fixed voltage strength up to ± 45 V <sub>DC</sub> (30 s)	
Impedance:	50 Ω
Output voltage:	10 V <sub>ss</sub> on 50 Ω load; idle running 20 V <sub>ss</sub>
Voltage graduation:	max. 60 dB
2 divisors:	each 20 dB ± 0,2 dB, variable: 0 bis 20 dB
Amplitude errors: (sinus / triangle)	
0,5 Hz to 0,5 MHz:	max. 0,2 dB
0,5 MHz to 10 MHz:	max. 0,5 dB
DC offset:	variable (to be switched on and off)
an 50 Ω load:	max. ± 2,5 V
In idle speed:	max. ± 5 V
Trigger output:	to the signal output synchronous rectangular signal +5 V/TTL

Selection chart	
Reference No.	Design
HM 8030-6	10 MHz function generator*

\*Note: Please order the power supply module separately.

1,6 GHz universal counter



Fig.: HM 8021-4

Technical Data:	
Measuring functions	
Frequency A/C; time of oscillation A, occurrence counting A; pulse width positive / negative (average value), occurrence counting A	
Input characteristics	
Frequency range:	0 – 150 MHz: ; input A 100 MHz – 1,6 GHz: : input C
Frequency measurement: (input A)	
LSD:	2,5 x 10 <sup>-7</sup> s x frequency / measuring time
Resolution:	± or 2 LSD
Measurement of time of oscillation	
Range:	10000 sec to 66,6 ns
LSD:	2,5 x 10 <sup>-7</sup> s x period/measuring time
Resolution:	± 1 or 2 LSD
Occurrence counting (manual / external control)	
Range:	DC to 20 MHz
Min. pulse duration:	25 ns
LSD:	± 1 occurrence

Selection chart	
Reference No.	Design
HM 8021-4	1,6 GHz universal counter*

\*Note: Please order the power supply module separately.

# Hameg modular system 8000

## LCR meter



Fig.: HM 8018

Technical Data:	
Measuring functions and conditions	
Measurable parameters:	R, C, L, $\Theta$ , D,   Z
Switching mode:	in series, in parallel
Measuring type:	2-wire, 4-wire
Measuring range:	R: 0,001 $\Omega$ - 99,9 M $\Omega$ C: 0,001 pF - 99,9 mF L: 0,01 $\mu$ H - 9999 H Q: 0,0001 - 99,9
Basic precision:	0,2 %
Test frequency:	100 Hz, 120 Hz, 1 kHz, 10 kHz, 25 kHz
Sampling rate:	2 measurements/second

## Selection chart

Reference No.	Design
HM 8018	LCR meter*

\*Note: Please order the power supply module separately.



## Digital storage oscilloscope up to 200 MHz TDS 1000B / 2000B series



Device system highlab



Fig.: Basic unit H38.511 with oscilloscope TDS 2012 B

The digital storage oscilloscopes of the series TDS 1000B and TDS 2000B offer a combination of superior power potential and easy handling at a favourable price.

Device system basic

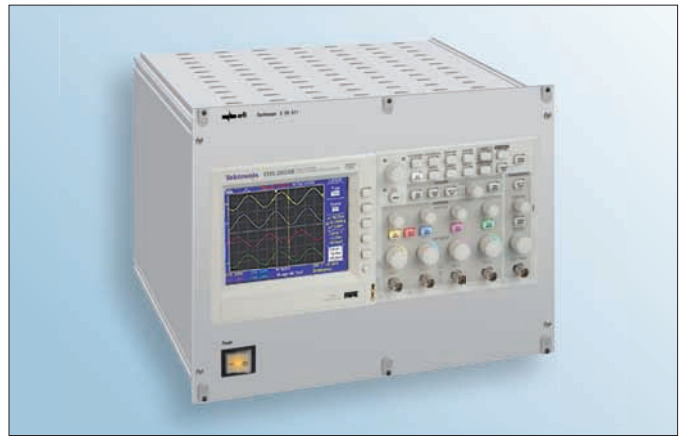


Fig.: Basic unit B36.511 with oscilloscope TDS 2024 B

### Note for ordering:

1. Please choose the desired basic unit (6 HE / 70 TE cassette)
  2. Please choose the desired oscilloscope for the basic unit
- Of course, the oscilloscopes are also deliverable without basic unit as stand-alone device.

### Selection chart oscilloscopes

Reference No.	TDS1001B	TDS1002B	TDS1012B	TDS2002B	TDS2004B	TDS2012B	TDS2014B	TDS2022B	TDS2024B
Display (1/4 VGA LCD)	Mono	Mono	Mono	Colour	Colour	Colour	Colour	Colour	Colour
Channels:	2	2	2	2	4	2	4	2	4
Range width:	40 MHz	60 MHz	100 MHz	60 MHz	60 MHz	100 MHz	100 MHz	200 MHz	200 MHz
Sample rate per channel:	1,0 GS/s	1,0 GS/s	1,0 GS/s	1,0 GS/s	1,0 GS/s	1,0 GS/s	1,0 GS/s	2,0 GS/s	2,0 GS/s
Memory depth:	2500 points (for all models)								
Vertical resolution:	8 Bit ((for all models)								
Vertical sensitivity:	2 mV/Div – 5 V/Div with calibrated fine adjustment (for all models)								
DC error:	± 3 % (for all models)								
Vertical zoom:	vertical enlargement or diminution or a live measured or stored curve graph								
Input interfacing:	AC, DC, GND (for all models)								
Input impedance:	1 MΩ parallel to 20 pF								
Time basis – range (/Div):	5 ns-50 s	5 ns-50 s	5 ns-50 s	5 ns-50 s	5 ns-50 s	5 ns-50 s	5 ns-50 s	2,5 ns-50 s	2,5 ns-50 s
Time basis - precision:	50 ppm								
Horizontal zoom:	horizontal enlargement or diminution of a live measured or stored curve graph								
Trigger system:	auto, normal, single cycle								
Trigger types:	wing, video, pulse width								
Digital operating modes:	peak detect, sample, average, single								
Measuring system:	11 automatic measurement functions								
Signal processing:	multiplication, addition, subtraction, FFT								
Interfaces:	2 x USB 2 x USB standard / GPIB through adapter TEK USB-488								
Scope of delivery:	sensor head (1 per channel), Doku calibration certificate, software, OpenChoice								

### Selection chart

Reference No. System highlab	Reference No. System basic	Designation	Design size Execution
H 38.511	E 36.511	basic unit for 1 oscilloscope	6 HE / 70 TE, inclusive device cutout



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## PC digital oscilloscopes with 2 and 4 channels resp. inclusive USB2.0 and Ethernet interface

Device system highlab



Fig.: H 38.027

Device system basic



Fig.: B 35.027

The new 2 and 4 channel oscilloscopes are powerful compact devices and can be operated with a PC by means of USB and Ethernet interface. Ideal for the training equipment!

### Technical Data:

Design size:	3 HE / 56 TE
Range width:	150 MHz
Basic precision:	$\pm 2 \%$
Sampling rate:	100 MS/s
Channel type:	2 or 4 channels
Time basis:	1 ns/DIV - 200 s/DIV
Sampling rate:	100 MS/s (200 MS/s single shot)
Vertical deflection:	2.5 mV/DIV – 100 V/DIV
Vertical sensitivity:	250 $\mu$ V/div – 100 V/div
Overvoltage category:	CAT II 300

### Additional description:

Different trigger settings:	auto, triggered, single shot
Math. function:	+, -, x, /, FFT and editor for individual measuring functions
Horizontal zoom:	from x1 to x100
Data record:	possible from 2 seconds to 31 days
Automatic measurement:	from 2 – 19 measurements
Displays:	RMS and THD values
Interfaces:	<b>USB 2.0</b> and <b>Ethernet (10 MB)</b> in series

### Selection chart

Reference No. System highlab	Reference No. System basic	Design	Design size
H 38.026	E 35.026	2 channels	3 HE / 56 TE
H 38.027	E 35.027	4 channels	3 HE / 56 TE



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Central compressed air regulation (room air regulator)

Device system highlab



Reference No.	Design
H 78.011	3 HE / 56 TE 1 variable compressed air withdrawal

Device system basic



Reference No.	Design
E 75.011	3 HE / 56 TE 1 variable compressed air withdrawal

Device system highlab



Reference No.	Design
H 78.013	3 HE / 56 TE 2 variable compressed air withdrawals 1 fixed compressed air withdrawal

Device system basic



Reference No.	Design
E 75.013	3 HE / 56 TE 2 variable compressed air withdrawals 1 fixed compressed air withdrawal

**General description:**  
Central compressed air regulation for release and adjustment of the compressed air supply to the connected working places or compressed air connections. A special feature of this device is the high through flow

volume of 4600 l/min. which allows to supply a complete room with several working places.

Technical Data:	
(applicable to all models)	
Design size:	3 HE / 56 TE
Input pressure:	max. 16 bar
Input:	on the back for a hose of 9 mm inside diameter, the fed in compressed air must be filtered, oil-free and free of condensation water.
Output pressure:	0,5 to 10 bar continuously adjustable, pressure reducer with fine adjustment and relief pressure valve, nominal through flow 4600 l/min. (with 8 bar pre-pressure, 6 bar output pressure and 2 bar pressure drop)
Output:	with the models H78.011 and E75.011 resp: 1 coupling socket DN 5, self-stopping for variable compressed air withdrawal with the models H78.013 and E75.013 resp: 1 coupling socket DN 5, self-stopping for fixed compressed air withdrawal 2 coupling sockets DM 5, self-stopping for variable compressed air withdrawal
Display:	manometer 0-10 bar, class 1,6 as per DIN, nominal size 63 mm

Compressed air output, not adjustable

Device system highlab



Fig.: H 72.021



Fig.: H 72.511

Reference No.	Design
H 72.021	3 HE / 14 TE
H 72.511	6 HE / 14 TE

Device system basic



Fig.: E 72.011



Fig.: E 72.512

Reference No.	Design
E 72.011	3 HE / 14 TE
E 72.512	6 HE / 14 TE

Technical Data:

(applicable to all models)	
Design size:	3 HE / 14 TE and 6 HE / 14 TE, resp., depending on model
Input pressure:	max. 16 bar
Input:	on the back for a hose of 6 mm inside diameter
Output pressure:	conforms to the input pressure, max. 16 bar
Output:	1 coupling socket DN 5, self-stopping



Compressed air output, not adjustable, inclusive manometer

Device system highlab



Reference No.	Design
H 72.023	3 HE / 14 TE

Device system basic



Reference No.	Design
E 72.013	3 HE / 14 TE

Device system highlab



Reference No.	Design
H 76.524	6 HE / 42 TE

Device system basic



Reference No.	Design
E 74.514	6 HE / 42 TE

Technical Data:	
(applicable to all models)	
Design size:	3 HE / 14 TE alternatively 6 HE / 42 TE
Input pressure:	max. 16 bar
Input:	on the back for a hose of 6 mm inside diameter
Output pressure:	max. 10 bar (manometer up to 10 bar)
Output:	1 coupling socket DN 5, self-stopping
Display:	for models of installation height 3 HE: manometer 0-10 bar, class 2,5 as per DIN for models of installation height 6 HE: manometer 0-10 bar, class 1,0 as per DIN nominal size 100 mm, precision indication

## Compressed air regulation for individual working places, without compressor, 3 adjustable outputs

Device system highlab



Reference No. Design  
H 74.011 3 HE / 28 TE

Device system basic



Reference No. Design  
E 73.011 3 HE / 28 TE

Device system highlab



Reference No. Design  
H 76.521 6 HE / 42 TE

Device system basic



Reference No. Design  
E 74.511 6 HE / 42 TE

### Technical Data:

(applicable to all models)

Design size:	3 HE / 28 TE alternatively 6 HE / 42 TE
Input pressure:	max. 16 bar
Input:	on the back for a hose of 6 mm inside diameter
Output pressure:	0,5 to 10 bar, continuously adjustable pressure reducer with locking device and pressure relief valve
Output:	3 coupling sockets DN 5, self-stopping
Display:	for models of installation height 3 HE: manometer 0-10 bar, class 2,5 for models of installation height 6 HE: manometer 0-10 bar, class 1,0 nominal size 100 mm, precision indication

## Compressed air regulation for individual working places, without compressor, 1 adjustable output, 1 fixed output

Device system highlab



Reference No.	Design
H 74.014	3 HE / 28 TE

Device system basic



Reference No.	Design
E 73.014	3 HE / 28 TE

### Technical Data:

Design size:	3 HE / 28 TE alternatively 6 HE / 42 TE
Input pressure:	max. 16 bar
Input:	on the back for a hose of 6 mm inside diameter
Output pressure:	1. coupling socket: max. 16 bar (input pressure = output pressure) 2. coupling socket: 0,5 to 10 bar, continuously adjustable pressure reducer with locking device and pressure relief valve
Output:	1 coupling socket DN 5, self-stopping for fixed compressed air withdrawal 1 coupling socket DM 5, self-stopping for variable compressed air withdrawal
Display:	manometer 0-10 bar, class 2,5

Device system highlab



Reference No.	Design
H 76.014	3 HE / 42 TE

Device system basic



Reference No.	Design
E 74.014	3 HE / 42 TE

The special feature of this model is that the 3 output coupling sockets can be switched off by means of a key-operated switch and a 230 V solenoid valve.

### Technical Data:

Design size:	3 HE / 42 TE
Input pressure:	max. 16 bar
Input:	on the back for a hose of 6 mm inside diameter
Output pressure:	0,5 to 10 bar, continuously adjustable pressure reducer with locking device and pressure relief valve
Output:	3 coupling sockets DN 5, self-stopping
Key-operated switch:	to switch off the 3 coupling sockets DN 5, by 230 V solenoid valve
Display:	manometer 0-10 bar, class 2,5

## Compressed air regulation for individual working places, with compressor

Device system highlab



Reference No.	Design
H 76.512	6 HE / 42 TE

Device system basic



Reference No.	Design
B 74.512	6 HE / 42 TE

### Technical Data:

Design size:	6 HE / 42 TE
Compressed air supply:	by a built-in compressor for producing oil-free instrument air, $P_{\text{nom}} 7$ bar, capacity 35 l/min., mains supply compressor: 230 V AC
Output pressure:	0,5 to 7 bar, continuously adjustable, pressure reducer with locking device and pressure relief valve
Output:	3 coupling sockets DN 5, self-stopping
Display:	manometer 0-10 bar, class 1,0, nominal size 100 mm, precision indication

## Vacuum gauge, with and without vacuum pump

Device system highlab



Fig.: H 76.522

Reference No.	Design
H 76.522	6 HE / 42 TE without vacuum pump
H 76.513	6 HE / 42 TE with vacuum pump

Device system basic



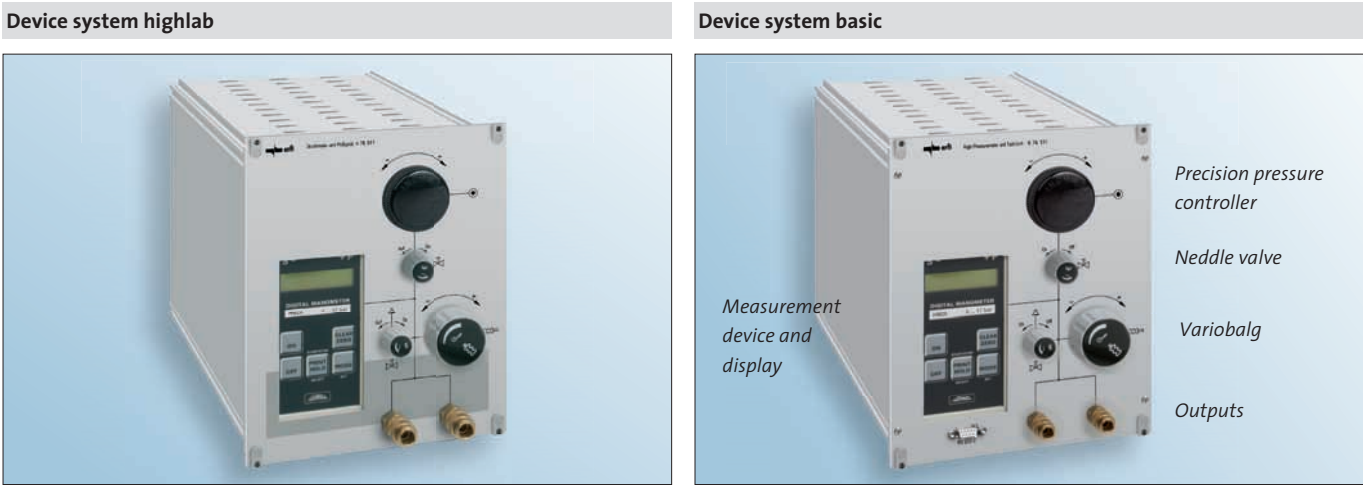
Fig.: E 74.512

Reference No.	Design
E 74.512	6 HE / 42 TE without vacuum pump
B 74.513	6 HE / 42 TE with vacuum pump

### Technical Data:

Design size:	6 HE / 42 TE
Vacuum:	0 to 850 mbar, adjustable by precision pressure controller
Input vacuum:	for models without vacuum pump: on the back (vacuum must be fed on site)
Vacuum generation:	for models with vacuum pump: approx. 850 mbar, approx. 35 l/min., adjusting range approx. 100 to 850 mbar vacuum
Output:	1 coupling socket DN 5, self-stopping, with preceding needle valve
Vacuum display:	fine pressure gauge 0-1000 mbar, class 0,6 a per DIN, nominal size 160 mm

Pressure measurement and calibration device with data logging, interface, precision controller, Variobalg and needle valves



Reference No.	Design
H 76.511	6 HE / 42 TE

The modern pressure measurement and calibration device convinces by its versatility. With this device, the input pressure can be adjusted by means of a precision pressure controller. Needle valves allow the precise pressure adjustment. Functions are available on the display for leakage rate, min./max. values and for storing the measured values.

Reference No.	Design
B 74.511	6 HE / 42 TE

With the data logging function, the measured values can be filed in an integrated data storage and from there, can be recorded directly through a connected printer by the RS232 interface. A software under Windows is optionally available. The measurement device allows measurements in the field of overpressure and vacuum, differential pressure and absolute pressure.

Technical Data:		
(applicable to all models)		
Design size:	6 HE / 42 TE	
Input pressure:	max. 17 bar	
Input:	on the back for a hose of 6 mm inside diameter	
Output pressure:	0 to 17 bar, continuously adjustable, by precision pressure relief valve	
Output:	2 coupling sockets DN 5, self-stopping	
Measuring media:	instrument air, inert gas and all media which are compatible with stainless steel 18/8 (DIN 1.4305)	
Unit of measurement:	mbar, bar, kPa, hPa, Mpa, mmH <sub>2</sub> O, mH <sub>2</sub> O, mmHg, psi, inH <sub>2</sub> O, inHg	
Measuring range:	0 to 17 bar	
Temperature calibration:	10 to 35 °C	
Measuring rate:	class 0,2 %:	20 measurements/second
	class 0,1 %/ 0,05 %:	10 measurements/second
Storing intervals:	manually 1 to 60 seconds / minutes, selectable	
Needle valve / Variobalg:	function needle valve 1:	admit input pressure: for filling the system lock input pressure: for leakage test
	function needle valve 2:	fine pressure reduction: pressure can be precisely regulated in the filled up system
	function Variobalg:	fine pressure increase: device has an integrated Variobalg, allowing the precise pressure regulation

Accessories:	
Windows software for the control of the pressure measurement device	
Reference No.	Design
Z 01.500	Windows software / measuring software



## Pressure measurement device with data logging and interface

Device system highlab



Reference No.	Design
H 76.525	6 HE / 42 TE

Device system basic



Reference No.	Design
E 74.515	6 HE / 42 TE

The modern pressure measurement convinces by its extensive measurement technology.

It is a pure measurement device.

The pressures to be measured (vacuum and overpressures) are fed in on the front. As with the previous models, functions for leakage rate, min./max. values and for the storage of measured values are available on the

display. The measured values can be filed in an integrated data storage and from there, can be recorded directly through a connected printer by the RS232 interface.

A software under Windows is optionally available.

The measurement device allows measurements in the field of overpressure and vacuum, differential pressure and absolute pressure.

### Technical Data:

(applicable to all models)

Design size:	6 HE / 42 TE	
Input pressure:	max. 17 bar	
Input / air supply:	on the front through 2 coupling sockets DN 5, self-stopping coupling socket 1 for overpressure (connection of a compressor) coupling socket 2 for vacuum (connection of a vacuum pump)	
Measuring media:	instrument air, inert gas and all media which are compatible with stainless steel 18/8 (DIN 1.4305)	
Unit of measurement:	mbar, bar, kPa, hPa, Mpa, mmH <sub>2</sub> O, mH <sub>2</sub> O, mmHg, psi, inH <sub>2</sub> O, inHg	
Measuring range:	0 to 17 bar	
Temperature calibration:	10 to 35 °C	
Measuring rate:	class 0,2 %:	20 measurements/second
	class 0,1 % / 0,05 %:	10 measurements/second
Storing intervals:	manually 1 to 60 seconds / minutes, selectable	

### Accessories:

#### Windows software for the control of the pressure measurement device

Reference No.	Design
Z 01.501	Windows software / measuring software

Rotating field indicator

Device system highlab



Reference No.	Design
H 12.531	6 HE / 14 TE

Device system basic



Reference No.	Design
E 12.531	6 HE / 14 TE

Technical Data:	
(applicable to all models)	
Design size:	6 HE / 14 TE
Display:	through glow lamps for: rotating field, clockwise and anticlockwise phase control L1,L2, L3
Measuring voltage:	400 V <sub>eff</sub> (phase – phase)
Connection:	34 mm safety laboratory sockets

Continuity tester, visual and audible

Device system highlab



Fig.: H 12.572

Reference No.	Design
H 12.572	6 HE / 14 TE
H 14.041	3 HE / 28 TE

Device system basic



Fig.: E 12.572

Reference No.	Design
E 12.572	6 HE / 14 TE
E 13.041	3 HE / 28 TE

Technical Data:	
(applicable to all models)	
Design size:	3 HE / 28 TE and 6 HE /14 TE, depending on model
Display:	visually through a green luminous field for low ohmic resistances audibly through loudspeaker for high ohmic resistances
Connection:	2 pcs. 4 mm safety laboratory sockets for visual testing 2 pcs. 4 mm safety laboratory sockets for audible testing
Electric strength:	up to approx. 400 V AC with audible continuity testing
Test voltage:	approx. 24 V AC with visual continuity testing

## NF Tester, 30 Watt power meter and NF-HF-signal tracer

### Device system highlab



#### Reference No. Design

H 38.401 3 HE / 56 TE inclusive NF-HF-test tip

### Device system basic



#### Reference No. Design

E 35.401 3 HE / 56 TE inclusive NF-HF-test tip

#### Technical Data:

(applicable to all models)

Design size: 3 HE / 56 TE

#### Power measurement:

Display: 0-30 W through moving coil instrument with square scaling 0,1 to 30

Measured value conversion: electronic  $P = U^2/R$

Load resistances: switchable: 4  $\Omega$ , 8  $\Omega$ , 16  $\Omega$ , max. 30 W and 220  $\Omega$  max. 5 W

Connection: loudspeaker plug connector as per DIN 41529 or 4 mm safety laboratory sockets

Audible testing: through control loudspeaker max. 1 W with amplifier and sound level regulation

#### Signal tracing:

Input sensitivity: 2 mV for full conduction

Input resistance: 100 k  $\Omega$

Input: 5 pole multiple plug connector as per DIN 41524

HF demodulator: built-in **NF/HF test tip (included in the scope of delivery !)**

Audible output: through control loudspeaker max. 1 W with amplifier and sound level regulation

## Thermometer PT 100-200° C up to +850° C

### Device system highlab



#### Reference No. Design

H 32.302 3 HE / 14 TE inclusive PT 100 universal temperature probe

### Device system basic



#### Reference No. Design

B 32.302 3 HE / 14 TE inclusive PT 100 universal temperature probe

#### Technical Data:

(applicable to all models)

Design size: 3 HE / 14 TE





Measuring range: range 1: -199°C to +199°C, resolution 0,1 °C  
range 2: -200°C to +850 °C, resolution 1°C

Display: digital 3 1/2 -digit

Measuring inaccuracy: <+/- 0,05% v. E. +/- 1 digit (with 23° C ambient temperature)



Temperature probe: PT 100, four-wire technology

Soldering station 80 Watt without temperature reading (RoHS conform)

Device system highlab		Device system basic	
			
Fig.: H 12.016		Fig.: B 12.083	
Fig.: H 12.581		Fig.: E 12.581	
Reference No.	Design	Reference No.	Design
H 12.016	3 HE / 14 TE	B 12.083	3 HE / 14 TE
H 12.581	6 HE / 14 TE	E 12.581	6 HE / 14 TE

Technical Data:	
(applicable to all models)	
Design size:	3 HE / 14 TE and 6 HE / 14 TE, depending on model
Temperature range:	up to 450° C for unleaded brazing solder, RoHS conform
Temperature pre-selection:	through potentiometer
Adjustment setting:	electronic full wave adjustment with set-actual comparison
Adjustment indication:	LED for smaller, adjusted and higher
Soldering rod:	soldering pencil WSP 80 inclusive filing rack, make Weller
Potential equalisation:	through socket

Soldering station 80 Watt with temperature reading (RoHS conform)

Device system highlab		Device system basic	
			
Reference No.		Reference No.	
Design		Design	
H 14.028	3 HE / 28 TE	B 13.083	3 HE / 28 TE

Technical Data:	
(applicable to all models)	
Design size:	3 HE / 28 TE
Temperature range:	up to 450° C for unleaded brazing solder, RoHS conform
Temperature pre-selection:	through up/down push-button
Temperature indication:	3 -digit
Adjustment setting:	electronic full wave adjustment with set-actual comparison
Soldering rod:	soldering pencil WSP 80 inclusive filing rack, make Weller
Potential equalisation:	through socket

# Soldering and unsoldering station with 2 temperature indications (RoHS conform)

## Device system highlab



### Reference No. Design

H 18.041 3 HE / 56 TE

The new multi-functional soldering/unsoldering station is perfectly adapted to professional repair works of the individual production engineering as well as for repair shops, development departments and laboratories.

### Technical Data:

Design size:	3 HE / 56 TE
Channels:	2 independent channels with automatic tool recognition for the simultaneous use of 2 soldering tools
Temperature range:	soldering and unsoldering: 50 – 450° C hot air: 50 – 550° C
Temperature stability:	+/- 5° C
Display:	LCD display
Pump:	built-in rotary disc pump for producing vacuum and air through flow vacuum 0,7 bar and hot air 1 – 10 litre/min.
ECO operation:	ECO key, for temperature reset to the customer's programmed work units
Programmable:	freely programmable key for repeated functions
Control:	digital control electronics, indication by LED
ESD:	ESD safe
Tools:	Powerful soldering tools such as the new high-power soldering rod WP 200 with 200 Watt or the 100 Watt hot air tool HAP 1 can be connected without any problems.



## Device system basic



### Reference No. Design

B 15.041 3 HE / 56 TE

### Included in the scope of delivery:

#### Weller soldering rod set 80 Watt

##### Soldering rod for unleaded soldering

consisting of:  
1 soldering rod WP 80 and safety tray with 4-step inclination adjustment



#### Weller unsoldering rod set DCV 80 Watt

Unsoldering rod for horizontal operations in an angle of 45° with external tin collecting tank for quick changeover. Suction nozzles with eccentric fastening for quick changeover, consisting of:  
1 unsoldering rod DSX 80 safety rack and cleaning set for suction nozzles



#### Weller soldering fume exhaust with speed regulator and exhaust arm, funnel, hose and table clamp

Reference No. Z 01.600

### Technical Data:

Speed regulation:	through cable remote control for max. 2 working places
Filter:	built-in fine dust filter H 12 with active carbon foam for clean breathing air
Exhaust arm:	with funnel for easy table installation by table clamps and hose plug-in system
Power:	175 VA
Max. vacuum:	2000 Pa
Delivery volume:	120m³/h
Noise level:	< 50 dbA, low-noise turbine for a quiet working place
Dimensions:	320 x 320 x 395 mm (length x width x height)

### Scope of delivery:

Soldering fume exhaust with exhaust arm and hose 60 mm diameter, length 1 m, funnel nozzle, throttle flap and table clamp set.



Load resistances 50 W

Device system highlab



Fig.: H 16.201

Reference No.	Design
H 16.201	0,4 - 10 Ω and 2 - 100 Ω 50 W
H 16.202	20 Ω - 1 kΩ and 200 Ω - 10 kΩ 50 W

Device system basic



Fig.: E 14.201

Reference No.	Design
E 14.201	0,4 - 10 Ω and 2-100 Ω 50 W
E 14.202	20 Ω - 1 kΩ and 200 Ω - 10 kΩ 50 W

Technical Data:	
(applicable to all models)	
Design size:	3 HE / 42 TE
Resistance data:	approx. 0,4 Ω - 10 Ω 50 W max. 2,2 A approx. 2 Ω - 100 Ω 50 W max. 0,7 A approx. 20 Ω - 1 kΩ 50 W max. 0,22 A approx. 200 Ω - 10 kΩ 50 W max. 0,07 A
Number of resistances:	2 per plug-in unit
Overload protection:	thermal automatic fuse for each variable resistance in the tap
Connection:	4 mm safety laboratory socket

Load resistances 50 W

Device system highlab



Reference No.	Design
H 16.541	with 6 resistances (see below)

Device system basic



Reference No.	Design
E 14.511	with 6 resistances (see below)

Technical Data:	
(applicable to all models)	
Design size:	6 HE / 42 TE
Resistance data:	approx. 0,4 Ω - 10 Ω 50 W max. 2,2 A approx. 1 Ω - 47 Ω 50 W max. 1 A approx. 2 Ω - 100 Ω 50 W max. 0,7 A approx. 10 Ω - 470 Ω 50 W max. 0,3 A approx. 20 Ω - 1 kΩ 50 W max. 0,22 A approx. 200 Ω - 10 kΩ 50 W max. 0,07 A
Number of resistances:	6 per plug-in unit
Overload protection:	thermal automatic fuse for each setting resistance in the tap
Connection:	4 mm safety laboratory socket

## Load resistances 250 W

### Device system highlab



Reference No.	Design
H 16.511	with 2 resistances (see below)

### Device system basic



Reference No.	Design
B 14.521	with 2 resistances (see below)

#### Technical Data:

(applicable to all models)

Design size: 6 HE / 42 TE

Resistance data: approx. 0,4  $\Omega$  - 10  $\Omega$  250 W max. 5 A  
approx. 20  $\Omega$  - 1 k $\Omega$  250 W max. 0,5 A

Number of resistances: 2 per plug-in unit

Overload protection: fusible cut-out for each variable resistance in the tap

Connection: 4 mm safety laboratory socket

## Three-phase voltage and current transmitter, unearthed

### Device system highlab



Fig.: H 99.523

Reference No.	Design
H 99.523	0-260 V / 0,8 A and 0-10 V / 15 A
H 99.520	0-260 V / 1,5 A and 0-10 V / 15 A

### Device system basic



Fig.: B 97.522

Reference No.	Design
B 97.522	0-260 V / 0,8 A and 0-10 V / 15 A
B 97.520	0-260 V / 1,5 A and 0-10 V / 15 A

#### Technical Data:

(applicable to all models)

Design size: 6 HE / 84 TE

Current transmitter unearthed: 3 variable transformers with downstream current transformer  
current range: 0 to 15 A, off-load voltage: 0 to 10 V  
3 moving-iron instruments for current measurement 0-15 A, inclusive over-current indication, class 1,5  
2 safety laboratory sockets for each current output (I<sub>1</sub>, I<sub>2</sub>, I<sub>3</sub>)

Voltage transmitter unearthed: 3 variable transformers  
voltage range: 0 to 260 V, load current: max. 0,8 and 1,5 A resp.  
fuse protection on secondary side: thermal magnetic protected switch  
3 moving-iron instruments for voltage measurement 0-300 V, class 1,5  
2 safety laboratory sockets for each current output (U<sub>1</sub>, U<sub>2</sub>, U<sub>3</sub>)

## Electronic load 400 V / 25 A, dynamic tests



Device system highlab



Fig.: H 18.513

**Reference No. Design**

H 18.513	6 HE / 56 TE
N 13.231	3 HE / 19"

Device system basic



Fig.: B 15.512

**Reference No. Design**

B 15.512	6 HE / 56 TE
C 13.231	3 HE / 19"

**Description:**

Intelligent electronic load for testing batteries, power packs etc. With the modern electronic load it is possible to carry out dynamic tests. Constant voltage, current, power, resistance, saw tooth, trapezoidal and rectangular

signals, adjustable wings and pulse-pause conditions, extremely quick control values, battery test mode, analog as well as optionally digital interface plug-in cards (RS232/CAN/USB) automate your tests and burn-in application in laboratory and test field.

**Technical Data:**

(applicable to all models)

Design size:	6 HE / 56 TE bzw. 3 HE / 19"	
Input voltages:	up to 400 V DC	
Currents:	up to 25 A	
DC power:	up to 400 W	
LCD display:	2 x 40 characters with all values (set/actual)	
4 Operating modes:	constant voltage (CV) constant current (CC) constant power (CP) constant resistance (CR)	
Trigger input:	for A and B operation (slew rate)	
Trigger output:	available	
Dynamic functions:	level: 2 adjustable load levels switch-on times: adjustable 50 µs to 100 s slew rate: adjustable 30 µs to 200 ms precision: +- 10 % trigger input: external level changeover rise time/dropout time: 50 µs	
Battery test function:	with cut-off when reaching a defined end-of-charge voltage mode: current, power or resistance battery protection: adjustable end-of-discharge voltage display: expired time and consumed battery capacity	
Interfaces:	analog interface as standard control inputs: 0 to 10 V for U, I, P, R (0 to 100 % nominal value) monitor outputs: 0 to 10 V for U, I (0 to 100 % nominal value) control signals: internal / external, input on / off resistance range 1 / 2 / internal / external, standby, R range 1 / 2 status signal: excess voltage or excess temperature outputs: eference voltage 10 V	
Further interfaces:	optional plug-in cards (retrofit): USB, RS232, CAN	
Connections:	load input:	on the front through safety terminals



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## R-Decade

Device system highlab



Reference No.	Design
H 14.411	1 $\Omega$ bis 1 M $\Omega$

Device system basic



Reference No.	Design
E 13.031	1 $\Omega$ bis 1 M $\Omega$

**Technical Data:**

(applicable to all models)

Design size:	3 HE / 28 TE
Resistance range:	1 $\Omega$ to 999,999 k $\Omega$ in steps of 1 $\Omega$
Precision:	< +/- 1% above 40 $\Omega$ < +/- 4 % from 10 $\Omega$ bis 13 $\Omega$ < +/- 6 % from 12 $\Omega$ bis 3 $\Omega$ < +/- 10 % with 2 $\Omega$ und 1 $\Omega$
Load capacity:	max. 1 W, max. 250 V (50 Hz)
Potential equalisation:	4 mm earth conductor socket

## C-Decade

Device system highlab



Reference No.	Design
H 14.421	100 pF to 9,9999 $\mu$ F

Device system basic



Reference No.	Design
E 13.040	100 pF to 9,9999 $\mu$ F

**Technical Data:**

(applicable to all models)

Design size:	3 HE / 28 TE
Capacity range:	100 pF to 9,9999 $\mu$ F
Precision:	< +/- 2 % above 1 nF < +/- 10 % from 1 nF to 100 pF
Voltage:	max. 250 V DC
Switch:	switching sequence interruptive
Discharge circuit:	key with changeover switch and discharge resistance 10 k $\Omega$ Single-sided separation of the decade output during discharge.

RC-Decade

Device system highlab



Reference No.	Design
H 14.431	1 Ω to 999,999 kΩ 100 pF to 9,9999 μF

Device system basic



Reference No.	Design
E 13.511	1 Ω to 999,999 kΩ 100 pF to 9,9999 μF

Technical Data:	
(applicable to all models)	
Design size	6 HE / 28 TE
Resistance range:	1 Ω to 999,999 kΩ in steps of 1 Ω
Precision:	< +/- 1% above 40 Ω, < +/- 4 % from 10 Ω to 13 Ω    < +/- 6 % from 12 Ω to 3 Ω,    < +/- 10 % with 2 Ω and 1 Ω
Load capacity:	max. 1 W, max. 250 V (50 Hz)
Capacity range:	100pF to 9,9999 μF
Precision:	< +/- 2 % above 1 nF    < +/- 10 % from 1nF to 100 pF
Voltage:	max. 250 V DC
Switch:	switching sequence interruptive
Discharge circuit:	key with changeover switch and discharge resistance 10 kΩ

RC-Logade

Device system highlab



Reference No.	Design
H 14.615	RC-Logade

Device system basic



Reference No.	Design
E 13.514	RC-Logade

Technical Data:	
(applicable to all models)	
Design size	6 HE / 28 TE
Capacity range:	100 pF - 0,68 μF
Precision:	± 10 %
Operating voltage:	100 pF - 6,8 nF / 1000 V DC
Resistance range:	100 Ω - 680 kΩ
Precision:	± 2 %
Load:	1 W
Operating voltage:	max. 500 V



## Inductive Logade

### Device system highlab



Fig.: H 12.101

Reference No.	Design
H 12.054	3 HE / 14 TE, 1 $\mu$ H to 4700 $\mu$ H
H 12.101	6 HE / 14 TE, 1 $\mu$ H to 4700 $\mu$ H

### Device system basic



Fig.: E 12.561

Reference No.	Design
E 12.061	3 HE / 14 TE, 1 $\mu$ H to 4700 $\mu$ H
E 12.561	6 HE / 14 TE, 1 $\mu$ H to 4700 $\mu$ H

#### Technical Data:

(applicable to all models)

Design size:	6 HE / 28 TE												
Inductive range:	1 $\mu$ H to 4700 $\mu$ H stepwise as per the line E 6												
Inductive values in $\mu$ H:	1	1,5	2,2	3,3	4,7	6,8	10	15	22	33	47	68	
	100	150	220	330	470	680	1000	1500	2200	3300	4700		
Precision:	1 $\mu$ H to 33 $\mu$ H +/- 10 %, 47 $\mu$ H to 4700 $\mu$ H +/- 5 %												
Operating voltage:	max. 100 V DC												
Operating current:	max. 63 mA, with a fine fuse protection												

## Pt 100 – Simulator

### Device system highlab



Reference No.	Design
H 14.122	simulation from $-30^{\circ}\text{C}$ to $+100^{\circ}\text{C}$

### Device system basic



Reference No.	Design
E 13.022	simulation from $-30^{\circ}\text{C}$ to $+100^{\circ}\text{C}$

#### Technical Data:

(applicable to all models)

Design size:	3 HE / 28 TE										
Application:	simulation of Pt 100 standard sensors in the range of $-30^{\circ}\text{C}$ to $+100^{\circ}\text{C}$										
Adjustment:	30 fixed temperature values, adjustable by turn-switch										
Temperature values in $^{\circ}\text{C}$ :	-10	-25	-20	-15	-10	-8	-6	-4	-2	0	
	+2	+4	+6	+8	+10	+15	+20	+25	+30	+35	
	+40	+45	+50	+55	+60	+65	+70	+80	+90	+100	
Calibration:	as per IEC 751										
Limit of error:	$\pm(-0,082 + 0,0003 \cdot t)$ in $^{\circ}\text{C}$ $t$ =adjusted value in $^{\circ}\text{C}$										
Other:	simulation of supply resistances 0, 5, 10, 20, 25, 30, 40 $\Omega$										

Decade Pt 10 Simulator

Device system highlab



Reference No.	Design
H 14.471	simulation from -99,9°C to +499,9°C

Device system basic



Reference No.	Design
E 13.021	simulation from -99,9°C to +499,9°C

Technical Data:	
(applicable to all models)	
Design size:	3 HE / 28 TE
Application:	simulation of Pt 100 sensors
Simulation range:	from -99°C to 499,9°C
Adjustment:	by a precision step switch
Resolution:	0,1 K
Measurement current:	max. 50 mA
Calibration:	as per IEC 751
Limit of error:	+/- 0,5 K
Other:	simulation of supply resistances 10 Ω + 20 Ω +/- 1 %

Insert plate for hollow space wall socket

Device system highlab



Reference No.	Design
H 14.057	empty plate with a breakthrough of 68 mm for hollow space wall socket

Device system basic



Reference No.	Design
E 13.057	empty plate with a breakthrough of 68 mm for hollow space wall socket

Technical Data:	
(applicable to all models)	
Design size:	3 HE / 28 TE

## Selection Pole Field

### Device system highlab



Reference No.	Design
H 12.031	6 pcs. 4 mm safety laboratory sockets

### Device system basic



Reference No.	Design
E 12.011	6 pcs. 4 mm safety laboratory sockets

#### Technical Data:

(applicable to all models)

Design size:	3 HE / 14 TE
Equipment:	6 pcs. 4 mm safety laboratory sockets with 6,3 mm flat plugs for connection to a ring or branch line, not wired

### Device system highlab



Reference No.	Design
H 14.050	9 pcs. 4 mm safety laboratory sockets 2 pcs. BNC sockets

### Device system basic



Reference No.	Design
E 13.050	9 pcs. 4 mm safety laboratory sockets 2 pcs. BNC sockets

#### Technical Data:

(applicable to all models)

Design size:	3 HE / 28 TE
Equipment:	9 pcs. 4 mm safety laboratory sockets with 6,3 mm flat plugs for connection to a ring or branch line, not wired 2 BNC sockets, not wired

## Interface fields 3 HE



Selection chart			
Reference No. system highlab	Reference No. system basic	Width	Interface
H 11.011	E 11.011	7 TE	2 pcs. PS2-sockets for keyboard and mouse, incl. connection cable, length 1,8 m and mating plug
H 11.012	E 11.012	7 TE	2 pcs. PS2-sockets, incl. connection cable, length 1,8 m and mating plug
H 11.013	E 11.013	7 TE	2 pcs. SubD-plug 9 pole, incl. connection cable length 1,8 m and mating plug
H 11.014	E 11.014	7 TE	1 pc. SubD-socket 25 pole, incl. connection cable length 1,8 m and mating plug
H 11.015	E 11.015	7 TE	2 pcs. stereo jack plugs 3,5 mm incl. connection cable length 1,8 m and mating plug
H 11.016	E 11.016	7 TE	1 pc. VGA SubD-socket 15 pole, incl. connection cable length 1,8 m and mating plug
H 11.017	E 11.017	7 TE	1 pc. DVI-I-socket incl. connection cable length 1,8 m and mating plug
H 11.018	E 11.018	7 TE	2 pcs. audio sockets, Chinch, red and white, incl. connection cable length 1,8 m and mating plug
H 11.019	E 11.019	7 TE	1 pc. S-VHS-socket 4 pole, Mini-DIN, incl. connection cable length 1,8 m and mating plug
H 11.020	E 11.020	7 TE	2 pcs. RJ45 sockets CAT 8 pole, rear plug-in connection incl. patch cable length 3 m and mating plug

Further interface fields			
Reference No. system highlab	Reference No. system basic	Width	Interface
H 11.106	E 11.106	7 TE	1 pc. Fire-Wire-IEEE 1394 incl. connection cable length 1,8 m and mating plug
H 11.107	E 11.107	7 TE	1 pc. IEEE 488 socket, GPIB, 24 pole, incl. connection cable 1,8 m and mating plug
H 11.108	E 11.108	7 TE	2 pcs. BNC straight-run socket, 50 Ω
H 11.109	E 11.109	7 TE	ASI interface field with 4 pcs. safety laboratory sockets 4 mm
H 11.110	E 11.110	7 TE	PROFI NET interface field with 1 pc. RJ45 socket CAT 6, 8 pole, rear plug-in connection, incl. Patch cable length 3 m and mating plug
H 11.111	E 11.111	7 TE	PROFI BUS interface field with 1 pc. SubD-plug 9 pole, incl. connection cable length 1,8 m and mating socket
H 11.112	E 11.112	7 TE	1 pc. HDMI plug connector type A, incl. connection cable length 3 m and counter piece
H 13.059	E 13.059	28 TE	multiple interface field width - 2 pcs. USB sockets, incl. connection cable length 1,8 m and mating plug - 2 pcs. PS2-socket for keyboard and mouse, incl. connection cable length 1,8 m and mating plug - 1 pc. SubD-plug 9 pole, incl. connection cable length 1,8 m and mating socket - 1 pc. SubD-socket 15 pole, incl. connection cable length 1,8 m and mating plug - 2 pcs. stereo jack plugs 3,5 mm, incl. connection cable length 1,8 m and mating plug - 2 pcs. RJ45 sockets CAT 6, 8 pole, rear plug-in connection

## The new Compact Tester Series

The new compact tester series from erfi is characterized by the high flexibility and modularity. Besides the high voltage and isolation tests, the leakage current test is now part of the concept.

The previous manual high voltage tester family has been extended and has generally been improved. The new HV testers are equipped with an integrated time control as well as with analog interfaces for logging the HV-sided secondary current. The isolation and protective conductor testers have been completely newly developed and have been equipped with a comprehensive direct intelligence. The microprocessor controlled devices have serial interfaces. Thus, all measured values can be further

processed with the erfi testing software Candy. Due to the modular design the components are made into complete VDE0113 / EN 60204 testers. On request, also USB2.0 and Ethernet interfaces can be integrated.

The new device series are ideally suited for manufacturers of complete lines and of components for electronic and electric products, using switch cabinets. The devices are also predestined for the use in laboratories, testing fields, repair shops and training centres.

### Overview – Technical Data for VDE0113 / EN60204 – Compact Testing System

#### High voltage testers (4 models)

Design size:	19"/3HE full-sized plug-in unit
High voltage test:	0-5 kV AC, alternatively 0-5 kV AC and 0-7 kV DC
Power:	500 VA power
Measuring range:	up to 120 mA
Testing time (time function):	1 to 99 sec (option)
Interfaces:	analog interface for current and voltage measured values (option)

#### Insulation testers (3 models)

Design size:	3 HE / 28 TE - partial plug-in unit
Insulation test:	500 V DC, alternatively 500 V DC / 1000 V DC reversible
Measuring range:	up to 500 MΩ up to 1 GΩ (option)
Testing time (time function):	1 to 99 sec. (option)
Interface:	RS232 interface (series) analog interface for current and voltage measured values (option)

#### Protective conductor testers (2 models)

Design size:	3 HE / 56 TE - partial plug-in unit
Protective conductor test:	10 / 25 A reversible and 0-25 A variable
Measuring range:	up to 500 mΩ
Testing time (time function):	1 to 99 sec. (option)
Interface:	RS232 interface (series) analog interface for current and voltage measured values (option)

#### Leakage current tester (1 model)

Design size:	3 HE / 56 TE - partial plug-in unit
Leakage current test:	for single-phase test items up to 10 A
Testing mode:	A and B, reversible
R/C combination:	reversible
Measuring range:	up to 5 mA

#### Tele-control with testing software Candy

All devices with a RS232 interface are telecontrollable. The modern testing software Candy (reference No. TS9.004) allows to parameterise and control the individual tests in succession. Thus, all testing plans and all measured values are stored and filed according to standards.

Min./max. limit values are adjustable and programmable for all tests. Potential-free contact outputs for GOOD and ERROR are available.



*HV tester*



*ISO tester*



*protective conductor tester*



*leakage current tester*



High voltage testers, manual

High voltage testers, telecontrollable, inclusive time control and analog interface for current and voltage

Device system highlab



Fig.: N 83.512

Device system basic



Fig.: C 83.012

Modern high voltage testers for testing the insulation strength of electric and electronic devices or lines according to the safety regulations presently in force. Ideally suited for the use in manual, semiautomatic or fully automatic testing systems.

Technical Data:	
(applicable to all models)	
Design size:	3 HE / 19 inch
Output voltage:	0 - 5 kV AC and 0 - 5 kV AC resp. and 0-7 kV DC, depending on model infinitely variable, unearthed, unstabilised
Display:	voltage analog instrument 0-5 kV AC and double scale 0-5 kV AC/0-7 kV DC current analog instrument 0-12 mA and 0-120 mA
Output power:	power of the HV transformer: 500 VA
Short circuit current:	> 200 mA from 400 V
Switch off current:	2 - 120 mA infinitely variable, peak value cut-out
Flashover message	visibly by a red lamp, audibly by a permanent alert or 10 s long alert
Burning out:	no cut-out of high voltage in case of flashover, for localising the place of the flashover
Switch status:	operational, ready switching on, in operation
HV switching on:	in voltage zero point
HV switching off:	in current zero point
Switch off time:	< 20 ms
Output:	on the front: through HV sockets with screw-type locking (on request also possible on the back) on the back: 1 potential-free changeover contact for flashover or error message
HV interruption:	primary, on rear plug-in connector for connection to forced opening switches
Connection possibilities:	foot-operated switch, two-hand operation and warning lamp through rear plug-in connector
Preselection of test time:	1-99 seconds in steps of 1 second (see selection chart time control)
Interfaces:	analog interface (0-10 V) to read out current and voltage values (see selection chart analog interface)

Selection chart for device series highlab and basic					
Reference No. System highlab	Reference No. System basic	Design size	Output voltage	Time control	Analog interface
N 83.512	C 83.012	3 HE / 19"	0-5 kV AC unearthed	-	-
N 83.515	C 83.015	3 HE / 19"	0-5 kV AC eunearthed	●	●
N 83.511	C 83.011	3 HE / 19"	0-5 kV AC / 0-7 kV DC unearthed	-	-
N 83.516	C 83.016	3 HE / 19"	0-5 kV AC / 0-7 kV DC unearthed	●	●

# Insulation testers manual

## Device system highlab



Reference No.: H 84.301

## Device system basic



Reference No. : B 83.011

Modern insulation testers for testing the insulation resistance of electric and electronic devices or lines according to the safety regulations presently in force. Ideally suited for manual and quick measurements such as for repairs or small series.

### Technical Data:

(applicable to all models)

Design size:	3 HE / 28 TE
Output voltage:	500 V +- 1% unearthed
Measuring range:	numbers 2, reversible range 1: 1 MΩ to 10 MΩ range 2: 10 MΩ to 100 MΩ
Display:	moving coil instrument 40 μA, class 1,5 with resistance scale range 1: 1 MΩ to 10 MΩ range 2: 10 MΩ to 100 MΩ
Short circuit current:	max. 12mA direct current
Short circuit time:	max. 15 s
Output:	on the front 2 safety laboratory sockets 4 mm
Voltage strength:	max. 600 V DC or AC resp. for max. 10 s

### Selection chart for device series highlab and basic

Reference No. System highlab	Reference No. System basic	Design size	Output voltage
H 84.301	B 83.011	3 HE / 28 TE	500 V DC

# Insulation testers telecontrollable, inclusive time control and interface for resistance measured values



Device system highlab



Fig.: H 84.303

Device system basic



Fig.: B 83.013

This newly developed insulation tester allows an easy-to-operate test of the insulation resistance, simultaneously logging the measured values. Limit values can be defined just as well as testing times. In connection

with the modern testing software, this device class can be perfectly well used in testing systems. An easily programmable instruction set allows also the use as OEM-product.

## Technical Data:

(applicable to all models)

Design size:	3 HE / 56 TE
Measuring range:	numbers 2, reversible range 1: 0,4 MΩ to 20 MΩ range 2: 20 MΩ to 500 MΩ
Display:	digital, LED 3 1/2-digit, TRMS automatic measuring range switchover
Front output:	2 safety laboratory sockets 4 mm, 1 Schuko socket
Rear output:	GOOD contact (potential-free) ERROR contact (potential-free) contacting error (potential-free)
Front inputs:	start socket
Rear inputs:	start socket
Test voltage:	500 V DC, <b>reversible to 1000 V DC</b> (with models H83.303 and B83.013)
Test time:	1 – 99 seconds in steps of 1 second
Limit value surveillance:	by means of potentiometer, adjustable on the front. When falling below the adjusted limit value, there is a visible and audible error message
Interfaces:	<b>RS232 interface (in series).</b> The interface allows to read out the measured value.

**Note:**

- Control by erfi testing software Candy TS9.004
- For connection of test items with different mains plugs, various connection adapters are available.

## Selection chart for device series highlab and basic

Reference No. System highlab	Reference No. System basic	Design size	Output voltage	Time control	Serial interface
H 84.303	B 83.013	3 HE / 28 TE	500 / 1000 V DC reversible	●	●
H 84.304	B 83.014	3 HE / 28 TE	500 V DC	●	●

## Rear interfaces (option)

Reference No.	Interface
NWT 1.106	Ethernet
NWT 1.107	USB 2.0

**Note:**  
Front interfaces see page 55.



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## Protective conductor testers manual

**Device system highlab**


Reference No.: H 88.101

**Device system basic**


Reference No.: B 85.011

Modern protective conductor testers for testing the protective conductor resistance of electric and electronic devices or lines according to the safety regulations in force. Ideally suited for manual and quick measurements for repairs or small series.

**Technical Data:**

(applicable to all models)

Design size:	3 HE / 56 TE
Testing current:	0-10 A with 6 V off-load voltage and $R_{max} < 0,5 \Omega$ 0-25 A with 12 V off-load voltage and $R_{max} < 0,25 \Omega$
Off-load voltage:	6 V reversible to 12 V
Measuring range:	numbers 2, reversible range 1: 0-0,25 $\Omega$ – test current up to 25 A range 2: 0-2,5 $\Omega$ – test current up to 2,5 A
Display:	2 analog instruments class 2,5 for protective conductor resistance 0-0,25 $\Omega$ / 0-2,5 $\Omega$ test current: 0-30 A / 0-3 A
LED display:	off-load voltage too high test current too high test current too low
Measuring type:	four-pole measurement
Connection:	by 4 pcs. 4 mm safety laboratory sockets

**Note:**

For connection of test items with different mains plugs, various connection adapters are available.

**Selection chart for device series highlab and basic**

Reference No. System highlab	Reference No. System basic	Design size	Test current
H 88.101	B 85.011	3 HE / 56 TE	0 – 10 A / 0 – 25 A

Protective conductor testers telecontrollable, inclusive time control and interface for resistance measured values



Device system highlab



Fig.: H 88.103

This newly developed protective conductor tester allows an easy-to-operate test of the protective conductor resistance, simultaneously logging the measured values. Limit values can be defined just as well as testing

Device system basic



Fig.: B 85.013

times. In connection with the modern testing software, this device class can be perfectly well used in testing systems. An easily programmable instruction set allows also the use as OEM-product.

Technical Data:	
(applicable to all models)	
Design size:	3 HE / 56 TE
Measuring range:	numbers 2, reversible 10 A - range: 10 mΩ to 500 mΩ 25 A - range: 10 mΩ to 350 mΩ
Display:	digital, LED 3 1/2-digit, TRMS
Front output:	2 safety laboratory sockets 4 mm for sensor circuit 2 safety laboratory sockets 4 mm for high test currents 1 Schuko socket
Rear output:	GOOD contact (potential-free) ERROR contact (potential-free) I > I Nominal (potential-free)
Front inputs:	start socket
Rear inputs:	start socket
Test currents:	10 A, <b>reversible to 25 A</b>
Test voltage:	6 V / 12 V reversible
Test time:	1 - 99 seconds in steps of 1 second
Limit value surveillance:	by means of potentiometer, adjustable on the front. When falling below the adjusted limit value, there is a visible and audible error message
Interfaces:	<b>RS232 interface (in series).</b> The interface allows to read out the measured value.
<b>Note:</b>	
- Control by erfi testing software Candy TS9.004	
- For connection of test items with different mains plugs, various connection adapters are available.	

Selection chart for device series highlab and basic					
Reference No. System highlab	Reference No. System basic	Design size	Test current	Time control	Serial interface
H 88.103	B 85.013	3 HE / 56 TE	10 A / 25 A	●	●

Rear interfaces (option)	
Reference No.	Interface
NWT 1.106	Ethernet
NWT 1.107	USB 2.0

**Note:**  
Front interfaces see page 55.



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free download  
[www.erfi.de/software](http://www.erfi.de/software)



# Leakage current tester manual

Device system highlab



Fig.: H 88.121

Device system basic



Fig.: B 85.121

Modern leakage current tester for testing the leakage current of electric and electronic devices or lines according to the safety regulations in force. Ideally suited for manual and quick measurements for repairs or small series.

Technical Data:	
(applicable to all models)	
Design size:	3 HE / 56 TE
Type of test:	test type A and B reversible test type A: L1 against PE test type B: N against PE
Test:	for single-phase test items up to 10 A nominal current
Supply voltage:	externally through rubber connector (external isolating transformer)
Measuring range:	numbers 2, reversible range 1: 500 µA
Range 2:	5 mA
Display:	1 digital display 3 ½ -digit for leakage current
Measuring mode:	four-pole measurement
R/C combination:	reversible from R to R/C combination
Connection of test item:	Schuko socket reversible to test tip
<b>Note:</b>	
For connection of test items with different mains plugs, various connection adapters are available.	

Selection chart for device series highlab and basic			
Reference No. System highlab	Reference No. System basic	Design size	Leakage current
H 88.121	B 85.121	3 HE / 56 TE	10 mA max. 10 A nominal current

## Device tester VDE 0701 and VDE 0702



## Device system highlab



Fig.: H 86.521

Due to the computer-aided design a manual as well as an automatic test sequence in the prescribed order is possible. The measurement of the protective conductor current is made according to the differential current procedure. The device is equipped with a plastic foil keyboard.

The display of the measured values is digital by a four-line LCD display. The entire adjustment and remote control of the device as well as logging of the tests is possible with a PC (Windows 7/98/ME/NT/2000) and the software supplied with it.

**The programme allows the following functions:**

- Transfer of the measured data from the device tester to the PC
- Management of customer and/or device data
- Sorting of data as per defined criteria (next test, customer, device type etc.)
- Edition and printout of individual or collective record

**Technical Data:****Measuring and testing sequence as per VDE 0701****Protective conductor resistance measurement**

0–1000 mΩ

Measuring range:

Limit value as per DIN VDE 0701: &lt; 300 mΩ

Measuring current 0,2 A DC (automatic polarity reversal of the measuring current)

**Insulation resistance measurement**

Measuring range: 0,2–20 MΩ

Test voltage: 500 V DC

Short-circuit current: 4,9 mA

Limit value as per DIN VDE 0701: device protection class 1:  $\geq 1 \text{ M}\Omega$   
device protection class 2:  $\geq 2 \text{ M}\Omega$ **Substitute leakage current measurement**

0–20 mA

Measuring range:

Measuring voltage: 40 V AC

Limit value as per DIN VDE 0701: for devices with heating resistance  $\leq 3,5 \text{ kW}$ :  $\leq 3,5 \text{ mA}$   
for devices with heating resistance  $> 3,5 \text{ kW}$ :  $\leq 1 \text{ mA/kW}$ 

## Device system basic



Fig.: B 84.521

**Technical Data:****Measuring and testing sequence as per VDE 0702**

Test step as per VDE 0702:

**Substitute leakage current****measurement** 0–20 mA

Measuring range:

Measuring voltage: 40 V AC

Limit value as per DIN VDE 0701: for devices with heating resistance  $\leq 3,5 \text{ kW}$ :  $\leq 3,5 \text{ mA}$   
for devices with heating resistance  $> 3,5 \text{ kW}$ :  $\leq 1 \text{ mA/kW}$ **Protective conductor resistance measurement**

Measuring range: 0–1000 mΩ

Limit value as per DIN VDE 0701: &lt; 300 mΩ

Measuring current 0,2 A DC (automatic polarity reversal of the measuring current)

**Measuring of the protective conductor current as per the differential current procedure**

With this measurement the device is operated with nominal voltage. Devices with 230 V nominal voltage (devices of protection class 1) and max. 16 A current draw can be connected to the test socket of the tester.

Measuring range: 0–10 mA

Limit values: = 3,5 mA (automatic polarity reversal of the measuring current)

**Measuring of the touch-current (devices of protection class 2)**

Measurement with nominal voltage

Devices with 230 V nominal voltage and max. 16 A current draw can be connected to the test socket of the tester.

Measuring range: 0–10 mA

Limit values:  $\leq 0,5 \text{ mA}$ 

(automatic polarity reversal of the measuring current)

Remark: The test item is operated with nominal voltage.

**Selection chart for device series highlab and basic**

Reference No. System highlab	Reference No. System basic	Design size	VDE 0701 / 0702	Audible and visible display	Serial interface RS 232 C
H 86.521	B 84.521	6 HE / 42 TE	●	●	●

# Cable test system

## Device system highlab



Reference No. : N 86.521

The erfi cable test system is equipped with serial interfaces by the manufacturer to read out individual measured values. The device allows the safe testing of almost all types of cables in the single-phase and three-phase field.

### Technical Data:

#### Continuity test:

Integrated continuity testers /5 V / 5 A) for testing single conductors. For this purpose the continuity tester is scanned by means of a turn-switch. Error display by means of LED's.

#### Insulation test:

The test items is connected to the insulation tester (partial plug-in unit). The measured values can be read out on the digital display. All measured values are recorded by the Candy testing software.

#### Protective conductor test:

The test item is connected to the protective conductor tester (partial plug-in unit). The measured values can be read out on the digital display. All measured values are recorded by the Candy testing software.

#### Connection of test item:

The cable test system is serially equipped with the following connections:

- Schuko socket and Schuko coupling
- Schuko socket and CEE coupling 16 A
- Connection of low heat device
- 5 Safety laboratory sockets L1, L2, L3, N and PE for loose cable ends

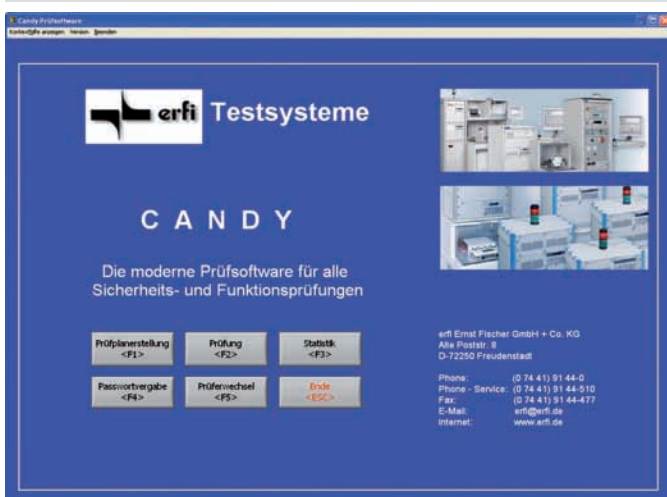
## Device system basic



Reference No. : C 86.521

The basis for it are the insulation and protective conductor testers of the latest generation. A connection field ensures the connection of the test item.

## Software Candy – Reference No. TS9.004



### With candy the tester becomes an all-rounder!

- Management of test plans and of all measurement results
- Statistics package
- User password management included

Further explanations see detailed description from page 206

## Selection chart for device series highlab and basic

Reference No. System highlab	Reference No. System basic	Design size	Cable test system	Audible and visible display	Serial interface RS 232 C
N 86.521	C 86.521	6 HE / 19"	●	●	●

## Additionally available adapters for cable test system:

Reference No.	Design
Z 01.400	adapter 16 A CEE plug on 32 A CEE coupling
Z 01.401	adapter 16 A CEE coupling on 32 A CEE plug
Z 01.402	adapter 16 A CEE coupling on 16 A Perilex plug
Z 01.403	adapter 16 A CEE plug on 16 A Perilex coupling

Interturn fault tester

Device system highlab



Reference No.: H 36.124

The manual interturn fault tester allows the safe recognition of damage to the paint finish of the interturn insulation. By checking the turns later faults and failures of coiled material can be avoided.

The WPV (testing procedure of interturns) developed by erfi allows a quick GOOD/FAULT conclusion about the coiled material. The result is displayed visibly and audibly. The limit values are largely adjustable and thus allow a broadband use.

Device system basic



Reference No. : B 34.024

Due to the NF-method a faulty test item is safely recognised. The device is taken in operation with the help of a GOOD test item. For this, the voltage source is altered so that the analog indication instrument is at maximum. Faulty products are an additional load on the source and the change of amplitude resulting herefrom becomes visible.

By additional coding switches the limit value can be chosen. When falling below the limit value, the device signals the error status visibly and audibly.

Technical Data:

Program-ming:	The digital potentiometer indicates the adjusted value. With another test item type only the coding switches have to be altered.
Measuring mode:	NF method (definite fault recognition)
Measurement vol-tage:	max. 300 V
Output current:	max. 3 mA
Output frequency:	500 Hz bis 5 kHz
Display:	output voltage: analog indication instrument
Pre-specified limit value:	by digital potentiometer
Start test:	by push-button on the front plate or 24 V relay for external start
Error message:	visible and audible display as well as potential-free contact for external control
Test item connec-tion:	2 safety laboratory sockets

Selection chart for device series highlab and basic

Reference No. System highlab	Reference No. System basic	Design size	Audible and visible display
H 36.124	B 34.024	3 HE / 42 TE	●

## Accessory kit for high voltage testers



### 1 Warning lamp kit as per DIN EN 50191

Indicates the operating status ready for operation and ready for switch-on.  
Compulsory.



### 1 Pair of high voltage test guns

with pluggable high voltage plugs on the front, protected against pulling out.  
Cable length 2 m



### 1 Foot-operated switch

to start the high voltage test in connection with the two high voltage test guns.  
The high voltage is switch-on in zero crossing.

Reference No.	Design
---------------	--------

TS 8.254	Accessory kit for high voltage tester (warning lamp kit, HV guns, foot-operated switch)
----------	---

## Accessory kit for insulation testers



### 1 Pair of test tips

4 mm lamella-type plug, highly flexible measuring cable (red and black)  
Cable length 2 m



### 1 Insulation test rod

with integrated start function  
Exchangeable test tip  
Cable length 2 m

Reference No.	Design
---------------	--------

TS 8.255	Accessory kit for insulation tester (test tips, insulation test rod)
----------	--

## Accessory kit for protective conductor testers



### 1 Protective conductor test rod

with integrated start function  
Exchangeable test tip  
Cable length 2 m



### 1 Protective conductor test terminal block

Solid connector block for safe contact  
Cable length 2 m

Reference No.	Design
---------------	--------

TS 8.256	Accessory kit for protective conductor testers (protective conductor test rod, protective conductor test terminal block)
----------	--



## Testing software Candy

Nowadays Candy is one of the most modern testing software packages in the field of test systems. Due to many innovations Candy is leading on the market.

With the testing software version TS9.004, the new semi-automatic models of the series highlab and basic can easily be programmed just like the high-end device series CANclass.

### The basic menu:

In this basic menu the user can quickly branch the individual sub-menus.

Candy is divided in 4 main areas like the software for big lines:

- Test planning
- Test sequence
- Statistics
- Password control

This defines already the professional design and demand of this package!

All software areas are designed for touch-screen function. A comprehensive help function is also normal just like the optionally available multi-lingual version.

With candy you establish your desired test plan within a very short time and you obtain a professional documentation of all measurement results. The serial statistics functions allows a perfect overview of your measurement data.

The result is an all-over documentation for you and your customers. The retro-traceability required by ISO 9001 is thus ensured. Candy gives you the security which you need for meeting the product liability act.



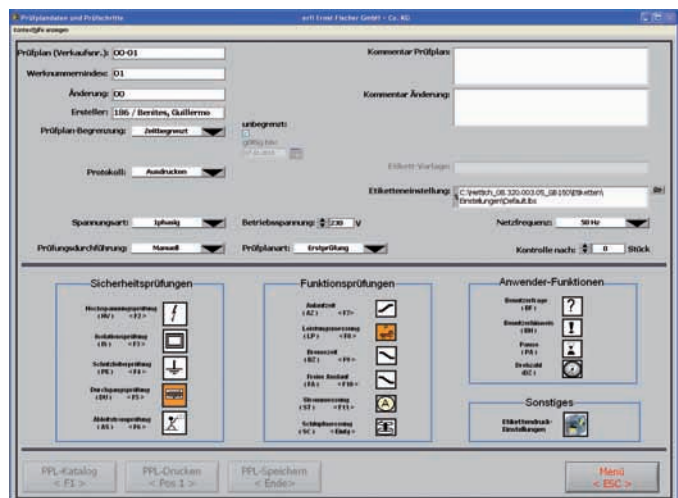
### The test planning

Candy guarantees, in an unequalled way, an elegant and highly efficient test planning.

The sequence of individual partial tests for high voltage, insulation, protective conductor, leakage current and function tests can be altered during the test planning.

In addition Candy accepts freely formulated user questions and user details in which image files can be integrated.

The parameters of the different safety and function tests are determined in the partial test plans.

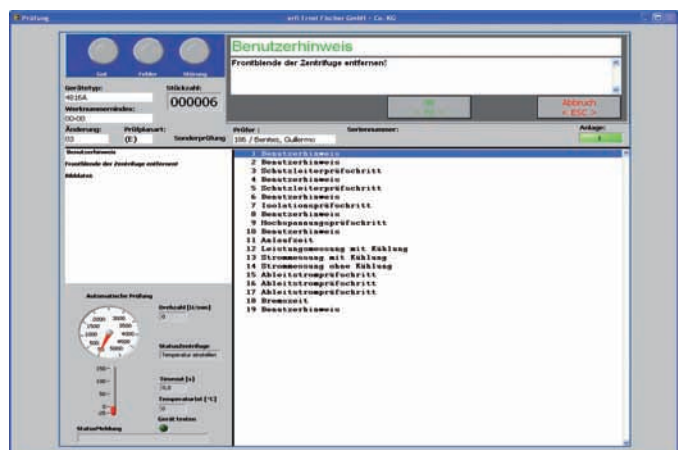


### The test procedure

Candy informs the user about the present status of the test and the measurement results at any time.

The relevant test parameters appear on the left half of the screen. The actual measured values are visualised accordingly. Candy ensures the fully automatic evaluation.

The user is informed about the result and the actions to be taken at any time!



Reference No.	Design
TS 9.004	Testing software Candy

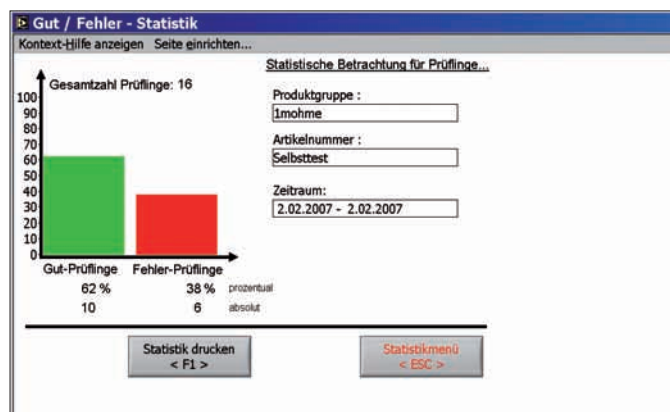
# Testing software Candy

## Testing software Candy

At the push of a button the GOOD/ERROR analysis permits a quick overview of quality and kind of error.

The implemented search criteria function of Candy allows the immediate localisation of each result of each test item, each order or each series and of each article.

The results of the measured values can directly be sent off by e-mail and there is no need to overwork them.



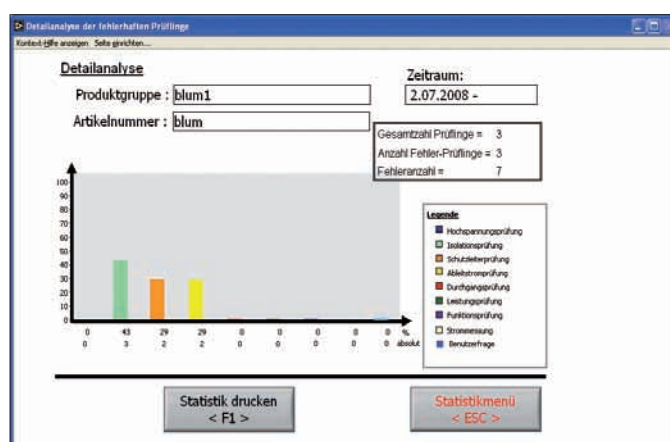
## The detail analysis

With the statistic package it is possible to start a detail analysis. Then all faulty test items become immediately transparent.

At the push of a button all errors and weak points of the product are made clear with respect to electric safety and function tests. The intelligent data management of Candy allows a quick processing and visualisation of the measured values results.

The data can be managed by Candy in almost every desired form.

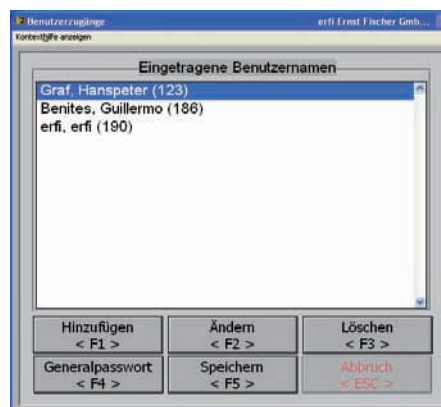
- XML
- SQL
- d Base
- Excel
- and other are available on request.



## The password management

The module password management guarantees the safe handling of sensitive measurement data and test plan data.

First of all, all users are established.



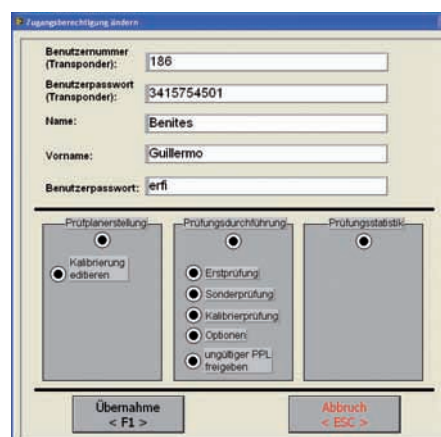
The programme package test planning, test sequence and statistics can be assigned to the user.

For example, it is possible to allow the quality manager access to all modules.

The material tester in the production will only be allowed access to the first test.

The test planning and statistics will then be locked for this user.

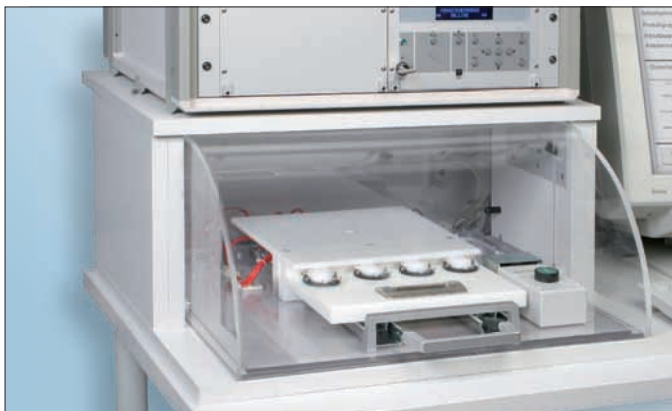
Candy permits a flexible control and thus secures your sensitive measurement data.



Reference No.	Design
TS 9.004	Testing software Candy

## Test hoods

### Test hood model 1



#### Reference No. Design

TS 10.010	Test hood model 1
-----------	-------------------

#### Technical description:

This model is characterised by its low space requirements and its extremely high robustness.

Small to medium-sized test items can be tested touch-proof under a swivel-mounted Makrolon hood.

Integrated safety switches guarantee the safe cut-out of high voltage. Start connection points as well as all other contacting connections are either on the side or alternatively on the rear side.

A double back wall equipped with a sufficient number of plug-in contacts ensure the flexible connection of the test item as well as the integration of small switchover units such as a high voltage matrix. An exchangeable base plate included in the scope of delivery allows to quickly change the adaption of the test item.

The photograph shows an example with a customer-specific test item holder made of high voltage resistant Delrin, allowing to place in 4 strip conductors each, extrusion-coated with plastics, for the automotive industry.

#### Outside dimensions:

600 x 550 x 260 mm (width x depth x height), casing inclusive swivel-mounted hood

#### Test room:

480 mm wide, diameter of hood 405 mm

### Test hood model 2



#### Reference No. Design

TS 10.011	Test hood model 2
-----------	-------------------

#### Technical description:

The model 2 offers sufficient space for most of the test items. Also with this model the double rear wall and the exchangeable base plate are serially included in the scope of delivery.

A Makrolon hood inclusive safety switches protect the tester.

The illustration shows a completely mounted model with a Schuko socket wired to the base plate for the test item ready to plug in.

#### Outside dimensions:

600 x 880 x 370 mm (width x depth x height), casing inclusive swivel-mounted hood

#### Test room:

476 mm wide, diameter of hood 365 mm

### Test hood model 3



#### Reference No. Design

TS 10.012	Test hood model 3
-----------	-------------------

#### Technical description:

The model 3 corresponds to model 2 except of the outside dimensions. Wide and flat test items can be integrated in the hood.

The illustration shows the test hood with the serially integrated base plate and a test item adapter mounted onto it for medical-technical devices.

#### Outside dimensions:

800 x 880 x 300 mm (width x depth x height), casing inclusive swivel-mounted hood

#### Test room:

676 mm wide, diameter of hood 305 mm

## Test hoods

### Test hood model 4



Reference No.	Design
TS 10.013	Test hood model 4

#### Technical description:

The model 4 corresponds to model 2 except of the outside dimensions. Wide and flat test items can be integrated in the hood. The illustration shows the test hood with the serially integrated base plate and a test item adapter mounted onto it for bus bars.

#### Outside dimensions:

1200 x 880 x 300 mm (width x depth x height), casing inclusive swivel-mounted hood

#### Test room:

1050 mm wide, diameter of hood 305 mm

### Test hood model 5



Reference No.	Design
TS 10.014	Test hood model 5

#### Technical description:

The model 5 has been designed for very wide and very high test items which are to stay within the sight field of the material tester during the test.

The test item can also be observed from the top during the test. The Makrolon test hood can be swivelled upwards without hardly any physical effort by means of two high-quality gas pressure spring, thus giving access for an easy loading.

#### Outside dimensions:

1200 x 880 x 900 mm (width x depth x height), casing inclusive swivel-mounted hood

#### Test room:

1100 x 700 x 800 mm (width x depth x height)

#### Maximum dimensions of the test item:

1080 x 670 x 770 mm (width x depth x height)

### Test hood model 6



Reference No.	Design
TS 10.015	Test hood model 6

#### Technical description:

The model 6 allows the integration of narrow and high test items (e.g. automatic coffee dispenser).

The illustration shows the test hood with the serially integrated base plate. On request the test hood can be equipped with a pneumatic cylinder which takes over the operation of the test hood.

#### Outside dimensions:

500 x 1500 x 800 mm (width x depth x height), casing inclusive swivel-mounted hood

#### Test room:

450 mm wide, diameter of hood 605 mm

#### Note regarding the illustration:

On request, the model 6 can also be incorporated in a mobile station.



## Test room and double test chambers

### Test room model 7



#### Technical description:

The model 7 has been designed for very wide and very high test items. Contrary to the test hoods, this solution is a test room equipped with a Makrolon pane on the front which opens vertically. The Makrolon pane can be powerlessly opened by means of counter-weights and guide rollers.

The test room has a double rear wall and in the top part there is sufficient space to integrate switchover fields or PC's.

#### Outside dimensions:

1000 x 800 x 1200 mm (width x depth x height)

#### Test room:

950 x 600 x 600 mm (width x depth x height)

#### Maximum dimensions of the test item:

920 x 570 x 570 mm (width x depth x height)

#### Pull-out base plate:

On request the model 7 can also be equipped with a pull-out base plate which allows an easy and ergonomic loading.

Reference No.	Design
TS 10.016	Test room model 7

### Double test chamber 1



#### Technical description:

This model has been designed for a high number of tests in multi-shift operation and allows an enormous throughput.

While the material tester loads the left-hand test chamber, the test is carried out automatically in the right-hand test chamber. An integrated switchover matrix ensures the reciprocal locking so that the material tester is always safely separated from the high voltage during loading. In both test chambers there is a GOOD and ERROR display. Customer-specific adapters can be integrated in the chamber.

#### Outside dimensions:

1200 x 880 x 900 mm (width x depth x height)

#### Test room at the left-hand side:

600 x 700 x 800 mm (width x depth x height)

#### Test room at the right-hand side:

600 x 700 x 800 mm (width x depth x height)

#### Maximum dimensions of the test item:

580 x 670 x 770 mm (width x depth x height)

Reference No.	Design
TS 10.017	Double test chamber 1

### Double test chamber 2



#### Technical description:

This big model has been designed for a high number of tests in multi-shift operation and for very big test items. Just like the above shown small model, the double test chamber allows a high throughput.

While the material tester loads the left-hand test chamber, the test is carried out automatically in the right-hand test chamber. An integrated switchover matrix ensures the reciprocal locking so that the material tester is always safely separated from the high voltage during loading. In both test chambers there is a GOOD and ERROR display. Customer-specific adapters as well as comprehensive matrixes can be integrated in the chamber. Inclusive pull-out base plate per chamber.

#### Outside dimensions:

2200 x 880 x 900 mm (width x depth x height)

#### Test room at the left-hand side:

1100 x 700 x 800 mm (width x depth x height)

#### Test room at the right-hand side:

1100 x 700 x 800 mm (width x depth x height)

#### Maximum dimensions of the test item:

1070 x 670 x 770 mm (width x depth x height)

Reference No.	Design
TS 10.018	Double test chamber 2



## Empty plates and empty cassettes

### Empty plates



Fig.: H 06.601

#### Technical Data:

Design size	Empty plates outside dimensions			
	Height/mm	Width/mm	highlab Thickness/mm	basic Thickness/mm
3 HE / 14 TE	128,5	70,8	2,5	3
3 HE / 28 TE	128,5	141,9	2,5	3
3 HE / 42 TE	128,5	213,0	2,5	3
3 HE / 56 TE	128,5	284,1	2,5	3
3 HE / 70 TE	128,5	355,6	2,5	3
3 HE / 84 TE	128,5	426,4	2,5	3
3 HE / 19"	132,5	482,6	4	4
6 HE / 14 TE	261,9	70,8	2,5	3
6 HE / 28 TE	261,9	141,9	2,5	3
6 HE / 42 TE	261,9	213,0	2,5	3
6 HE / 56 TE	261,9	284,1	2,5	3
6 HE / 70 TE	261,9	355,6	2,5	3
6 HE / 84 TE	261,9	426,4	2,5	3
6 HE / 19"	265,9	482,6	4	4

#### Selection chart empty plates

Reference No. System highlab	Reference No. System basic	Design size	
H 02.301	E 02.010	3 HE / 14 TE	
H 04.301	E 03.010	3 HE / 28 TE	
H 06.301	E 04.010	3 HE / 42 TE	
H 08.301	E 05.010	3 HE / 56 TE	
H 07.301	E 06.010	3 HE / 70 TE	
H 09.301	E 07.010	3 HE / 84 TE	
N 03.001	C 03.310	3 HE / 19 "	with handles
N 03.002	C 03.300	3 HE / 19 "	without handles
H 02.601	E 02.510	6 HE / 14 TE	
H 04.601	E 03.510	6 HE / 28 TE	
H 06.601	E 04.510	6 HE / 42 TE	
H 08.601	E 05.510	6 HE / 56 TE	
H 07.601	E 06.510	6 HE / 70 TE	
H 09.601	E 07.510	6 HE / 84 TE	
N 06.001	C 06.610	6 HE / 19 "	with handles
N 06.002	C 06.600	6 HE / 19 "	without handles

### Empty cassettes



Fig.: H 04.511

#### Technical Data:

Design size	Selection chart empty cassettes		
	Height/mm	Width/mm	Depth/mm
3 HE / 14 TE	101,5	54,8	220
3 HE / 28 TE	101,5	125,9	220
3 HE / 42 TE	101,5	197,0	220
3 HE / 56 TE	101,5	268,1	220
3 HE / 70 TE	101,5	339,2	220
3 HE / 84 TE	101,5	410,3	220
3 HE / 19"	125	439	255
6 HE / 28 TE	239,3	128,2	260
6 HE / 42 TE	239,3	199,3	260
6 HE / 56 TE	239,3	270,4	260
6 HE / 70 TE	239,3	341,5	260
6 HE / 84 TE	239,3	412,6	260
6 HE / 19"	262	439	255

#### Selection chart empty cassettes

Reference No. System highlab	Reference No. System basic	Design size	
H 02.311	B 02.011	3 HE / 14 TE	
H 04.311	B 03.011	3 HE / 28 TE	
H 06.311	B 04.011	3 HE / 42 TE	
H 08.311	B 05.011	3 HE / 56 TE	
H 07.311	B 06.011	3 HE / 70 TE	
H 09.311	B 07.011	3 HE / 84 TE	
N 03.011	C 03.012	3 HE / 19 "	with handles
N 03.013	C 03.011	3 HE / 19 "	without handles
H 03.511	B 03.511	6 HE / 28 TE	
H 04.511	B 04.511	6 HE / 42 TE	
H 05.511	B 05.511	6 HE / 56 TE	
H 06.510	B 06.511	6 HE / 70 TE	
H 07.511	B 07.511	6 HE / 84 TE	
N 06.011	C 06.011	6 HE / 19 "	with handles
N 06.511	C 06.511	6 HE / 19 "	without handles

Shieldings are deliverable for all 19 inch full-sized plug-in units against additional charge.

### 3 HE Adapters

3 HE Adapters



Fig.: H 06.041

The 3 HE adapter can accept 3 HE partial plug-in units in a 6 HE rack.  
Due to the side panels supplied with of 7 TE each the actual width of the adapter is:  
Useful width /e.g. 42 TE) + 2 x 7 TE, with this example 56 TE.

Technical Data	3 HE Adapter
Use:	Acceptance of 3 HE / 19" partial plug-in units of a depth of 220 mm in 6 HE racks
Width:	2 x 3 HE / 42 TE = 42 TE + (2 x 7 TE side panels) = 56 TE 2 x 3 HE / 56 TE = 56 TE + (2 x 7 TE side panels) = 70 TE 2 x 3 HE / 70 TE = 70 TE + (2 x 7 TE side panels) = 84 TE 2 x 3 HE / 84 TE = 84 TE + (2 x 7 TE side panels) = 98 TE
Material:	aluminium anodised or colourless chromated
Scope of delivery:	3 HE adapter completely mounted, consisting of: side panels, module guide rails in front, Z-rails at the rear, side cover plates, installation material

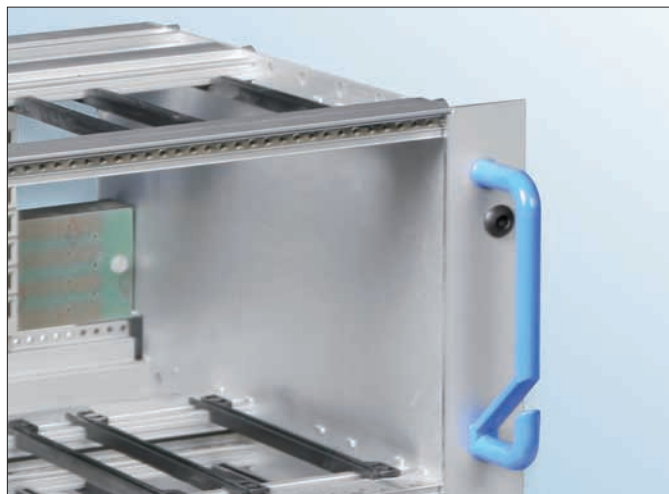
Selection chart			
Reference No. System highlab	Reference No. System basic	Design size	Acceptance size
N 06.041	C 06.041	6 HE / 56 TE	2 x 3 HE / 42 TE
N 06.042	C 06.042	6 HE / 70 TE	2 x 3 HE / 56 TE
N 06.043	C 06.043	6 HE / 84 TE	2 x 3 HE / 70 TE
N 06.044	C 06.044	6 HE / 98 TE	2 x 3 HE / 84 TE

## Module rack / Mains bus system

### Module rack



Fig.: N 06.021 with mains bus and handles



#### Modular system

The concept of the module rack takes above all into account the design conform to standards and the quick changing of devices without requiring any installation.

#### Guide rail system

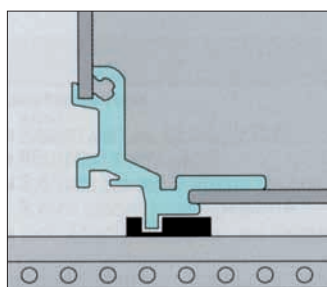
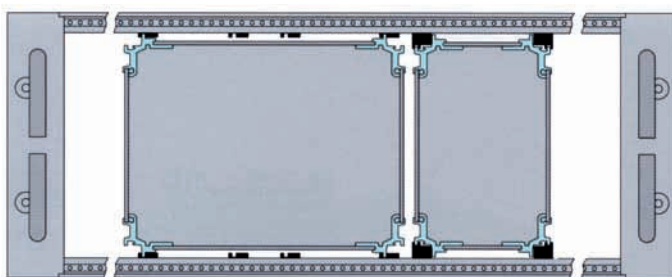
In DIN 41494 part 5 9/80 provides only for 3 HE, guide rails for 100 mm high European cards.

These guide rails are, however, completely inappropriate for exchangeable partial plug-in units because the distance between the sliding rails must always be adapted to the different cassette widths.

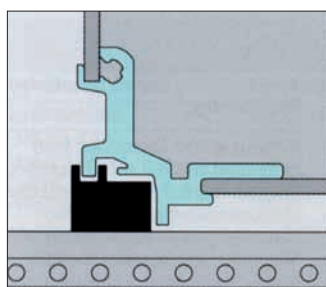
erfi have developed an aluminium profile for the 19" devices which is based on a guiding height of 111,76 mm (IEC 297-3).

Partial plug-in units of 14 TE grid width can be positioned on the rail system in all combinations without having to displace the guide rails.

The aluminium profile of the cassettes has been designed according to the afore mentioned rails of 100 mm guiding height (DIN standards).



Guiding rail system IEC standard  
guiding height 111,76 mm



DIN and IEC standard  
guiding height 100 mm

#### Handles at the device (cable guiding)

The opened handles of the module rack and the 19" full-size plug-in units resp. help to put in order the test cables in the cockpit. On request the module racks are optionally deliverable with handles.

#### Mains bus (option)

The single-phase mains voltage (230 V) is supplied to the six DIN sockets through a conductor plate which excludes the accidental inversion of plug-in connections and ensures a reliable power supply.

A plastic covering protects the active parts of the conductor plate against touching. At a distance of 14 TE there is one DIN socket. Since erfi produce all devices of a grid dimension of 14 TE, each device can be integrated in any place.

#### Benefit from this flexibility!

#### Sliding rails

For cockpits, portable and cabinet system, erfi offer sliding rails which allow the statically perfect positioning of 6 HE modular racks. Within the guiding area of the sliding rails the height of the module rack is reduced so that the HE grid dimension remains constant.

#### Kind of delivery

As a rule the module racks are supplied completely mounted, wired, equipped with partial plug-in units and are integrated in the cockpit, portable etc. The scope of delivery includes connection cables which conform to the respective application: for cockpits etc. with touch-proof mains adapter connector, 3 and 5 pole resp., for portables with Schuko plugs and CEKON plugs resp. 16 A, 5 pole, 6h.

## Module rack / Mains bus system

Technical Data	
Application:	Acceptance of 19" partial plug-in units and European cards
Outside dimensions:	3 HE: 132,5 mm high, 482 mm wide, 273 mm deep 6 HE: 265,9 mm high, 482 mm wide, 273 mm deep
Inside dimensions:	3 HE: 1x84 partial units for a device depth of 220 mm 6 HE: 1x84 and 2x84 partial units resp. for a device depth of 220 mm
Material:	aluminium anodised and colourless chromated
Guide rails:	design with mains bus: 24 pcs. per 84 TE for 111,76 mm cassette guidance (IEC 297-3)
Mains bus:	230 V +/-10% 50 Hz max. 16 A power supply circuit board covered touch-proof
Scope of delivery:	module rack completely mounted, consisting of: side panels, module guide rails in front, Z-rails at the rear, side cover plates with handles (depending on model) installation material mains bus (option) integrated and wired, consisting of: mains bus circuit board with cover, plug-in connector DIN 41612 design size H 15 mains adapter connector, guide rails, wiring and installation material, connection cable single-phase
Weight:	3 HE with mains bus: approx. 2,6 kg 6 HE with mains bus: approx. 4,3 kg

### Selection chart module rack with defined wiring

Reference No. System highlab		Reference No. System basic		Design size	Acceptance size
with handles	without handles	with handles	without handles		
N 03.024	N 03.031	C 03.051	C 03.031	3 HE / 19 "	1 x 3 HE / 84 TE
N 06.024	N 06.032	C 06.052	C 06.032	6 HE / 19 "	2 x 3 HE / 84 TE
N 06.025	N 06.031	C 06.051	C 06.031	6 HE / 19 "	1 x 6 HE / 84 TE

#### Note:

With this design the guide rails and mains plug for partial plug-in units are assigned to the relevant device.

### Selection chart module rack with mains bus (allows any mounting)

Reference No. System highlab		Reference No. System basic		Design size	Acceptance size
with handles	without handles	with handles	without handles		
N 03.021	N 03.061	C 03.021	C 03.061	3 HE / 19 "	1 x 3 HE / 84 TE
N 06.021	N 06.061	C 06.021	C 06.061	6 HE / 19 "	2 x 3 HE / 84 TE
N 06.034	N 06.062	C 06.034	C 06.062	6 HE / 19 "	1 x 6 HE / 84 TE

#### Note:

With this design a DIN-plug is positioned at a distance of 14 TE each. The circuit board of the mains bus ensures that all DIN-plugs are connected with one another. Since erfi manufacture all devices of a grid size of 14 TE, each device can be integrated in any place.

## Mains bus system for 19" attachments / cockpits

The modern mains bus from erfi is now optionally available for all 19" table attachments and device cockpits. The bus system covers the entire width of the table attachment and like the mains bus in the module rack, ensures flexibility for the mounting of the devices. At all 14 TE one DIN-plug is positioned.

### Selection chart mains bus for complete 19" table attachments and 19" cockpits:

For width	1200 mm	1600 mm	1800 mm	2000 mm
Reference No.	NB 1200	NB 1600	NB 1800	NB 2000
NB = nominal width				

### Rack plug-in unit for 19" table attachments and cockpits

Reference No. System highlab	Reference No. System basic	Design size	Design plug-in unit
N 03.050	C 03.050	19" / 3 HE	without intermediate shelf
N 06.050	C 06.050	19" / 6 HE	without intermediate shelf
N 06.051	C 06.055	19" / 6 HE	without intermediate shelf



## Extension parts for module racks

### Extension parts for module racks

Reference No.	Technical Data / Design
N 03.02 A*	installation kit with dip-soldering pins 1 multiple contact strip DIN 41612 design size H 15 with dip-soldering pins 2 fastening screws DIN 85 M 2,5 x 6 mm 2 guide rails 203 mm long for European cards 100 x 220 mm
N 03.02 B*	installation kit with 6,3 mm flat-pin plug 1 multiple contact strip DIN 41612 design size H 15 with 6,3 mm flat-pin plug 2 fastening screws DIN 85 M 2,5 x 6 mm 2 guide rails 203 mm long for European cards 100 x 220 mm
N 03.02 C*	15 pole socket 1 multiple contact strip DIN 41612 design size H 15 with 6,3 mm flat-pin plug 15 pole with coding possibility 2 fastening screws DIN 85 M 2,5 x 6 mm
N 03.02 D*	mains adapter socket 3 pole 1 mains adapter socket 3 pole L1, N and advanced PE, nominal current 16 A with screw-type connection, pull relief and locking
N 03.02 E*	mains adapter socket 3 pole 1 mains adapter socket 3 pole L1, N and advanced PE, nominal current 16 A with screw-type connection, pull relief and locking
N 03.02 F*	mains adapter socket 5 pole 1 mains adapter socket 5 pole L1, L2, L3, N and advanced PE, nominal current 16 A with screw-type connection, pull relief and locking
N 03.02 G*	mains adapter socket 5 pole 1 mains adapter socket 3 pole L1, L2, L3, N and advanced PE, nominal current 16 A with screw-type connection, pull relief and locking

\*Minimum order size: 10 pcs.



Fig.: N 03.02 A



Fig.: N 03.02 B

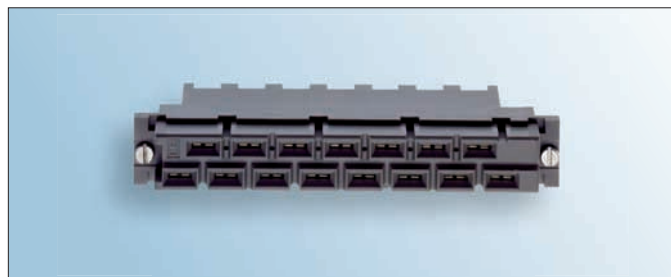


Fig.: N 03.02 C

For the wiring of module racks without mains bus, the extension parts with the reference numbers N03.02A to N03.02G are available to the user.

The mains adapter plugs serve also for connection of module racks in 19 inch attachment frames of other makes for which no mating plugs are available for the supplied connection cable.



N 03.02 D



N 03.02 E

## 19" Casings / Portables

### Stand-alone Casing



### Flexible use – Thought out functionality – The 19inch portables

For the mobile use the 19inch plug-in units can also be integrated in portables.

For almost all plug-in sizes the adequate table casing can be supplied. Special features of these casings are their robustness and stability. Air ventilation is ensured by ventilation slots at the back.

### Technical Data:

Material:	aluminium
Paint finish:	steel blue RAL 5011; powder coated
Scope of delivery:	inclusive mains connection cable 2 m, 19" attachment ergonomic handle (black) with the models PA03.19, PA06.42 and PA06.19.

### Selection chart

Reference No.	Size	Outside dimensions (width x depth x height) mm	Handle
PA 03.28	3 HE / 28 TE	150 x 265 x 145	-
PA 03.56	3 HE / 56 TE	295 x 265 x 145	-
PA 03.19	3 HE / 19"	490 x 310 x 145	yes
PA 06.42	6 HE / 42 TE	225 x 310 x 277	yes
PA 06.19	6 HE / 19"	490 x 310 x 281	yes

## List of keywords for device series acto

Keyword	Page
19" casings / portables	217
19" technology	58
19" technology	86 ff.
	206 ff.
A / DC sensitive FI	89, 93
AC / DC sensitive FI	60
AC constant sources, single-phase	121 ff.
AC constant sources, three-phase	129 ff.
AC constant, single-phase	121 ff.
AC constant, three-phase	129 ff.
AC current supplies	98 ff.
AC power supplies	65 ff.
AC sources	65 ff.
AC sources	98 ff.
AC voltage module	98 ff.
AC voltage supplies	98 ff.
AC voltage supplies	63 ff.
Accessories for rack modules	216
Accessory set for high voltage testers	205
Accessory set for insulation testers	205
Accessory set for protective conductor testers	205
Adapter 3 HE	212
All-rounder AC/DC current supply	123
Analog-digital multi-meter	162
Antenna sockets	100
Basic unit for Hameg devices	168
Cable test system	203
Cable tester	203
Calibrating sources	146
Candy testing software	206 ff.
C-decade	189
Central compressed air supply	174
Complete training and laboratory equipment	27 ff.
Compressed air output adjustable	177 ff.
Compressed air output, not adjustable	175 ff.
Compressed air supply units	174 ff.
Compressed air supply	174 ff.
Compressed air supply	79
Continuity tester	182 ff.
Continuity tester	81
Control module for retractable and swivel tables	97
Current and voltage sources	146
Dahlander pole changing switch	135
Data sockets RJ 45	194
Data sockets RJ 45	82
DC constant	147 ff.
DC constant	71 ff.
DC current supplies	141 ff.
DC power supplies	71 ff.
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H 76.014	178	H 96.564	116	N 03.02 B	216	N 96.532	122	V 24.9.116	43		
H 76.511	180	H 96.565	116	N 03.02 C	216	N 96.612	110	V 24.9.118	43		
H 76.512	179	H 96.566	116	N 03.02 D	216	N 96.951	140	V 24.9.120	43		
H 76.513	179	H 96.613	125	N 03.02 E	216	NB 1200	215	V 24.9.212	43		
H 76.521	177	H 96.614	125	N 03.02 F	216	NB 1600	215	V 24.9.216	43		
								V 24.9.218	43		

## Notes

Graphic Design:  
Complett Werbung GmbH, 72178 Waldachtal

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