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elneos® five

experience the touch

The new device series by *erfi*.

reddot design award winner 2013

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As manufacturer and marketfounders of technical working place systems and as market-founders in the special fields of electrotechnology and electronics, the company *erfi* developed already in the early 60s 19"plug-in device systems such as regulating power supply units, AC power supplies, multimeters, oscilloscopes and many more. Nowadays *erfi* offers the most comprehensive product range in the field of plug-in device technology. Due to an excellent in-house production depth in the factory in Freudenstadt, we guarantee a consistent quality. On a production area of more than 8.600 sq.m. we produce on our own all electronic devices and laboratory furniture systems.

Due to extensive research we are able to herewith introduce our new device series *elneos five*. Not only the technical, but also the strength of the new design has been distinguished by several design awards.

reddot design award
winner 2013

product design award
2014

German Design Award
WINNER 2014

Focus Open 2013
Silver

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Comprehensive innovations characterise the new device series *elneos five.* Operated by contact with up to 5 fingers and 5 electronic supplies stand for *five* within the brand name – regulating power supply units, digital multimeters, energy meters, functional generators and arbitrary waveform generators.

The control center of *elneos five* controls up to 6 devices simultaneously and another 8 plug-in units with maximum 4 devices can be connected at the left and right-hand side. This means that up to totally 32 devices can be controlled.

The end-to-end glass front of *elneos five* is completely equipped with capacitive technology. Very solid and vandal-safe.

The 7" large multitouch display of *elneos five* is operated by contact with up to 5 fingers and ensures an enormous ease of operation.

The visionary capacitive technology together with combined devices and the modularity of *elneos five* are the future in the trade.

Capacitive and reliable

experience the touch

The new device series *elneos five* use the so-called protective capacitive touch technology and *erfi* are pioneers in using this new technology in electronic laboratory systems.

The capacitive technology allows the use of an end-to-end glass front panel which works as sensor across the whole surface. The turning of knobs is replaced by touching the glass sensor – it can be operated across the whole surface and is controlled by multitouch contact.

Clean and sturdy

experience the touch

The new device series *elneos five* is equipped with a heat-strengthened and break-proof glass across the whole width of the device. The glass withstands even caning and crusing impacts with pointed items. The strong solidity distictly cares for improved safety in the laboratories.

The capacitive sensors to navigate the device such as *wheel*, *OK*, *On-Off* and *menu* operate wearless and thereby are mechanically indestructible.

Scratch-proof and brilliant
An additional shatter protection places *elneos five* in a superior safety class. The precaution measures clearly defines that this strengthened glass is vandal-safe, scratch-safe and superior to front panels made of aluminium. The premium prints on the back of the glass panel stay untouched and deliver a high abrasion resistance. The high-end design of the modern glass front offer extraordinary brilliance.

elneos five is extendible and adaptable to your individual needs. The control center of *elneos five* as well as the 19" additional plug-in units as modular extension can be integrated in existing *erfi* laboratory table series as well as in the new table series *elneos connect*.

Compact and individual

experience the touch

The new laboratory table series *elneos connect* go well together with the device series *elneos five* in every respect. Both products have been developed and adapted to one another, thus allowing the integration of *elneos five* in the *elneos connect* 19" table attachments as well as in device cockpits.

By miniaturizing the background technique as well as by combining the devices on a very small space, other forms of device holding fixtures requiring a clearly smaller installation depth are possible.

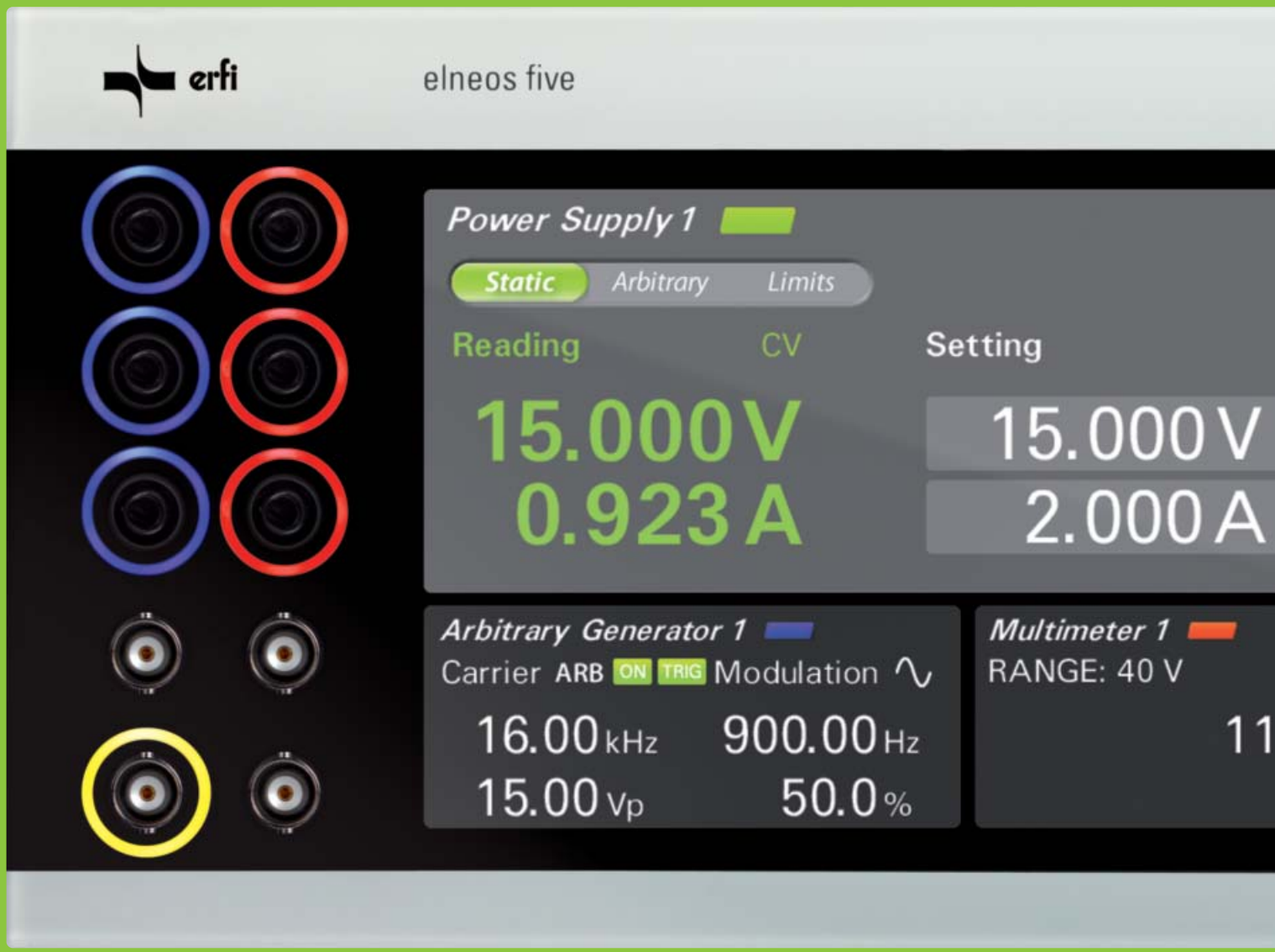
What the elneos connect furniture system can do:

- The aluminium L-profile offers various functions (adjustment of height, channeling of media etc.)
- A bridge leading over the table offers the placement of devices vertically and horizontally
- The connector enables continuous channeling of media
- The RGB-LED lamp provides a pleasant indoor light
- The *erfi* indication light signalizes the condition of the table
- The working height is simply adjusted by touch
- The control of the table functions through *elneos five*
- The signalling of an EMERGECNY STOP is standard
- Extention profiles hold additional devices
- The unblocking of the devices is now assumed by *elneos five*

Please also see our new product catalog *elneos connect.*

Large 7" multitouch glass display

The *elneos five* is equipped with a capacitive touch sensor which is operated by a 5-finger contact control. The screen is divided in three areas and, therefore, three devices can simultaneously and efficiently be controlled. The display is behind the glass sensor and is not touched any more! This modern technology allows a closed end-to-end front panel without joints.



Intelligent connector panel

The connector panel of *elneos five* with its colour-coded RGB ring lighting is equipped with a disappearing effect. When the rings are not on, they disappear and are invisible. The RGB ring lighting leads the user to the correct connection and thus, a faulty contact is avoided. Due to different colours all conditions are signalized in addition.

Lively and intelligent

experience the touch

Scratch resistant surface
The surface of this new device system *elneos five* consists of indestructible material, toughened safety glass and is vandal-safe.

Three-dimensional wheel
The capacitive three-dimensional wheel is the intuitive input unit of *elneos five*. Due to the polished wheel, the device can be operated blindly.

OK Sensor
The OK sensor is centrally arranged on the three-dimensional wheel. On input request and acknowledgement, the sensor lights up white. It functions also with the progressive capacitive technology and responds to contact.

ON/OFF sensor
elneos five communicates with the user by pulsing. When the sensor pulses for instance in blue, *elneos five* is in the course of a permanent measurement, all front sensors are locked. When the sensor is green, *elneos five* is in standard mode.

Menu sensor
The menu sensor of *elneos five* is also selected by the contact-controlled operation and serves for calling up the device groups and the submenus. When being activated, the menu sensor also lights up in white.

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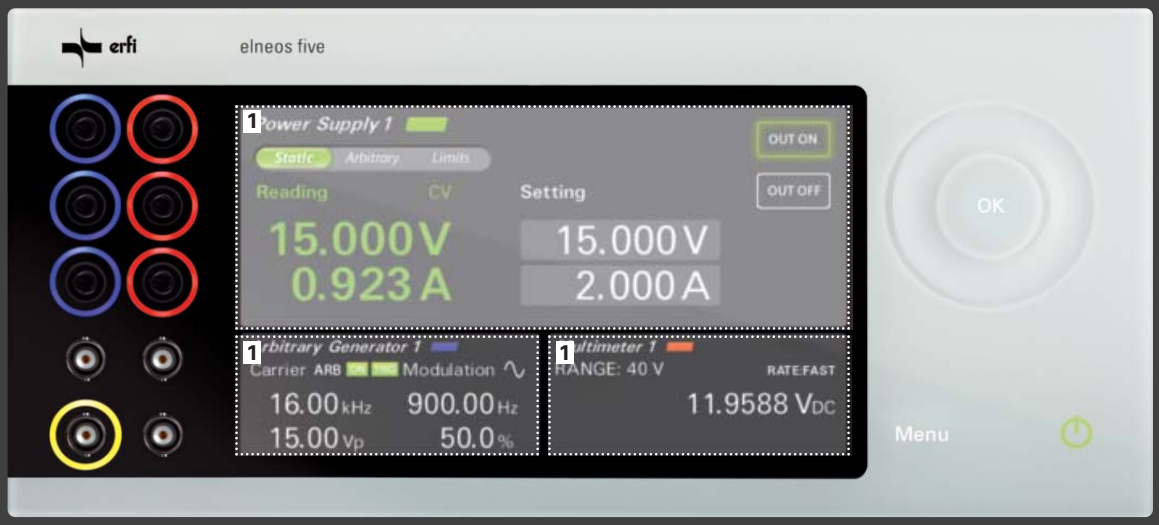
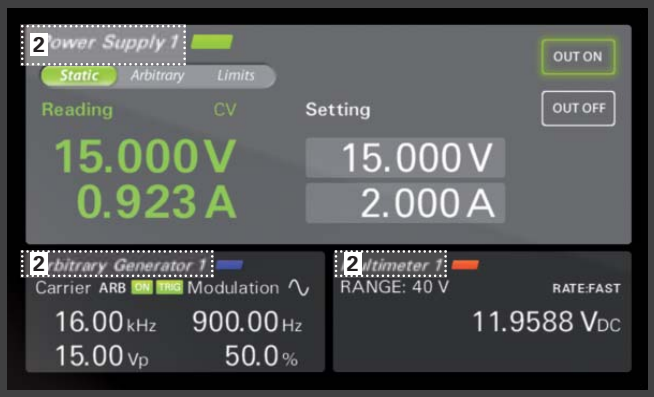
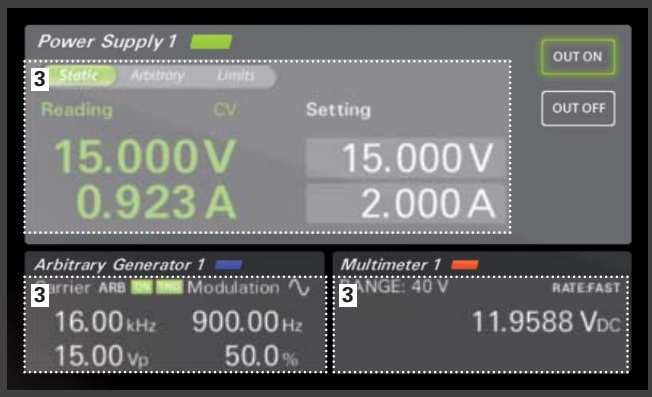


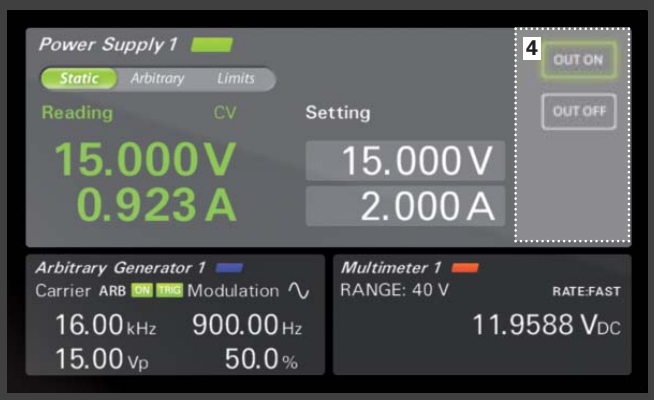
1. Division



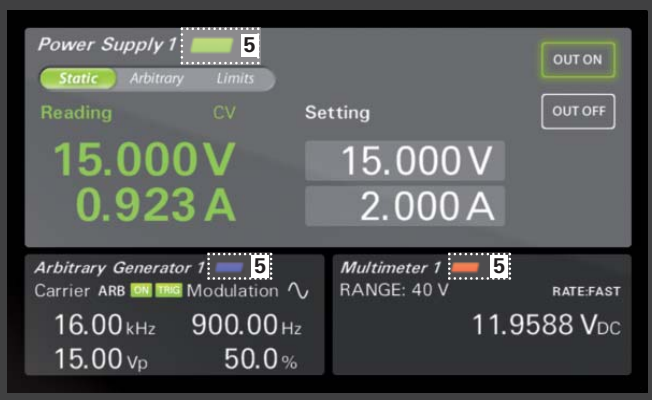
2. Device designation



3. Measured values



4. Selection areas



5. Colour indication

7" multitouch display

Capacitive 7" multitouch display
According to the state-of-the-art in the 19" device world a multitouch compatible display is in use. This is possible thanks to the Projective Capacitive Touch Technology (PCT). The touch sensors of the display have a very high mechanical stability and first-class characteristics.

The display is arranged behind the heat-strengthened scratch resistance glass front panel of *elneos five*, across the whole front. In contrast to the resistively controlled touch display, the display itself is not touched any more but only the outer glass sensor.

Arrangement of display and operating panels
1. Division: The screen is divided in 3 areas, a brighter primary area and two darker secondary areas. The primary area allows active access to the device. By a wipe-off touch or double click on information in the secondary area, the screen changes over to the primary area.

2. Device designation: The designation of the three momentarily displayed devices is in the top left corner.

3. Measured values: Each device display has a defined area for showing the measured values.

4. Selection areas: The totally 8 areas serve for selecting the device-specific adjustment possibilities.

5. Colour indication: Each device group is marked by the coloured bar next to the device designation. Regulating power supply units, digital multimeters, power and energy meters, functional and arbitrary generators are different in colour.

Highly resistant glass surface

Lifelong scratch resistance
The toughened safety glass is heat-strengthened and therefore, break-proof. The vandal-safe front panel has no projecting operating elements any more and the rounded-off corners give the border areas a high stability.

Break-proof surface
Due to its heat-strengthened surface the break-proof toughened safety glass also corresponds to DIN. An integrated shatter protection places the product in a superior safety class. The vandal-safe glass front does not carry any overlaying controls, and rounded edges care for highest stability within the border areas.

Imprint-free and abrasion-proof
The micro-etched and anti-reflecting toughened safety glass has a non-sparkling effect to avoid disturbing light reflections. Due to the micro-etching a very high image sharpness has been achieved and this supports an excellent image reproduction. In addition, annoying finger imprints are precluded and the high-quality print image on the back of the glass remains untouched. An abrasion resistance and chemical resistance compared to acids and lyes are additional features of *elneos five*.

Capacitive technology
The PCT technology (Projective Capacitive Touch Technology) allows the intuitive multitouch operation with up to 5 fingers. The contact control such as wiping or zooming with 2 fingers makes operation easy and quick. The multitouch functions do not only allow the contact control but also the capture of possible malfunctions such as unintended contact of the display by an additional finger or the ball of the thumb. This adds to an enhanced operating safety.

The further sensors such as the menu sensor or the ON/OFF sensor are also operated by means of the PCT technology. The advantages resulting herefrom such as the indirect contact or the indestructibility become effective in the same way.

BNC Connectors

Safety Laboratory Connectors

Intelligent connector panel

Connectors with RGB ring lighting
Ring-lighted safety laboratory and BNC connectors for an optimal user guidance. Due to the use of RGB LEDs, contacting has become a child's play. The RGB LEDs light up in the colours red, blue or white, depending on their function.

By the colour-coding of the connectors the user is unerringly guided to the correct connection. This ensures a high contacting safety and connection errors are avoided. In the industry as well as in training centers, the securing of an error-free contacting is a decisive safety feature. Depending on the connector, the rings light up either white, red or blue when contacting is requested. The connectors are permanently lit when current flows. This characteristic indication is an attractive contribution to safety.

Disappearing effect
If the ring around the laboratory connector is not illuminated, it disappears invisibly from the surface. The indication of the active and inactive status by the disappearing effect guides the user and supports optimally an intuitive operation.

Equipment of the connector panel
6 pcs. 4 mm safety laboratory connectors for the optional use of regulating power supply units, power arbitrary generators, digital multimeters and power meters (depending on equipment). The laboratory connectors are flush with the glass surface and can, therefore, not be damaged.

4 pcs. BNC connectors for functional generators and quick arbitrary signal generators close safely the glass surface.
BNC connector 1 for all output signals
BNC connector 2 for TTL output
BNC connector 3 for trigger input
BNC connector 4 for counter input

Adjustment

Three-dimensional wheel – capacitive input unit
The polished three-dimensional wheel ensures, besides the display, the input of values and the control. Due to the three-dimensional deepening in the glass, the finger can be guided blindly to any point of time. In contrast to conventional rotary potentiometers or rotary pulse encoders, this operating element can not be broken, removed or destroyed. Thanks to the capacitive technology the sensor is not subject to any mechanical wear and tear.

The quicker the sensor is guided in the circle, the higher the adjustment steps are and the values increase by leaps and bounds. When you guide your finger slowly in the wheel, the adjustment is fine and the values change in detail in the smallest steps.

OK sensor – capacitive sensor
The okay sensor acknowledges all inputs. Due to the evaluating electronic system behind the glass pane, the sensor is indestructible. A special pushing allows background lighting and the visual feedback to the user enhances the operator convenience. By pulsing the sensor requests contact intuitively.

Menu sensor – capacitive sensor
The menu sensor calls up further device groups and calls for activating the submenus. Here as well, the activation is signalized to the user by means of the background lighting.

ON/OFF sensor – capacitive sensor
This sensor revives *elneos five*. Through coloured LEDs the sensor signalizes its condition to the user. For example the sensor signalizes to the user by red pulsing that *elneos five* is locked and when the sensor lights up green, this signalizes the active status.


OK
Menu

Wiping, taping and ...

One-Finger contacts

Device change by wiping

By wiping with the finger from the two secondary areas to the primary area, the desired device changes there. The device in the primary area then changes in one of the two secondary areas.

From the icon bar into the primary area

When pressing the menu key an icon device bar appears. Each icon of the icon bar represents one device. When a device in the primary area is to be operated, the corresponding icon must be touched with the finger and must be drawn upwards in the primary area. The device being before in the primary area changes. If the secondary area is free, it goes there. If the same is not free, the device goes into the icon bar. The icon bar disappears automatically after 5 seconds when being inactive.

Changing of the secondary areas

By simply drawing the finger in the secondary area from the left-hand to the right-hand side or from the right-hand to the left-hand side, the desired devices is always positioned in the optimal window.

Changing the devices from the secondary to the primary area by 1-finger gesture.

Displacement of graphs
By simple swiping movements the graphs of the data logger can be displaced at will. Thus, the measured values are well visible also with a high resolution.

The connection panel
By a simple swiping movement from the left-hand- to the right-handside the connection panel opens. All connections at the device are visualised to the user by a graph and allows an optimal security. The connection panel is configured completely automatically, depending on the installed hardware. In setup mode it is possible to adjust whether it is to be displayed or not at the beginning of each activation operation. Certainly a very useful feature in the field of training. The user recognises immediately the allocation of the various laboratory and BNC sockets. The assignment of sockets of the external additional racks can easily be obtained by a double arrow in the connection panel. For example, all connections of a digital multimeter in the additional rack are displayed.

Opening of the connection panel by 1-finger gesture.

2-Finger contact

Zooming of the X-Y charts with thumb and index finger

For various device functions the measured values are represented in X-Y charts. The chart can be drawn in any X and Y direction with two fingers. When spreading the two fingers, the chart is enlarged, when pulling them together, the chart gets smaller.

3-Finger contact – active protection at the working place!

Activating the Safe-Guard function

There are situations which require an immediate reaction, amongst others when people are in danger or circuits may get overloaded. By a simple touch with 3 fingers a signal is sent to *elneos five* that all integrated devices are to be set to default. All output tensions and frequencies are to be zeroized immediately. All keys are blocked and the status Safe Guard is indicated in the display. In addition, the complete front panel of the device is locked and by the red pulsing of the ON/OFF sensor the activated safety function is displayed. This function protects the user actively against dangers and ensures a high level of security at the working place.

Device selection by icon device bar by 1-finger gesture.

... amazement

Release of the Safe-Guard function
By pressing the ON/OFF sensor for 5 seconds,
the Safe-Guard is deactivated again.

5-Finger contact
Locking function for permanent measurement and for cleaning
By touching with all 5 fingers the display and all input elements are locked. The operating panel is locked but in the background, the device continues to work. The locking function is displayed by a symbol. In addition, the ON/OFF sensor is indicated by blue pulsing.

Release of the locking function
By pressing the ON/OFF sensor for 5 seconds,
the locking function is deactivated.

Zooming of graphs
by 2-finger gesture.

Twin operating mode

Split screen for several operators
(optional, Ref. No. EL5.TW)
The innovative twin operating mode allows that two operators simultaneously and completely independent of one another, can enter and change the respective device parameters at one device. For instance the double power control unit can simultaneously be operated by two operators. The two output channels with respective tension and current adjustment can be operated simultaneously and completely independently of one another. The twin operating mode can be ordered as option and separately.

The capacitive operation philosophy allows it!
The big 7"display offers sufficient space and due to innovative input elements ensures optimal ergonomics and excellent ease of operation. The twin operating mode comprises an optimised partitioning (split screen) for 2 operators and is ideally suited for training centres of all kind.

The capacitive operation technology PCT ensures an excellent ease of operation which is superior by far to the conventional technique of controllers and rotary encoders. No operating elements can be destroyed and this stops any act of vandalisme. When supplying the device already equipped with the twin operating mode, it is possible to change over between the conventional operating mode (display of single devices) and the twin operating mode (split screen display).

Twin operating mode with double power control units: Both sources can be operated simultaneously and independently of one another.

The split screen in the top area: By means of the split screen two operators can input values in the primary screen simultaneously and independently of one another.

Twin operating mode in connection with the comfort equipment for ease of operation (Ref. No. EL5.C): Both options can ideally be combined and allow a high ease of use with a double power control unit.

With the data logger 4 different measurements can be selected. The measuring rate and the memory depth can also be defined.

Display of measured values and measuring device: The data logger allows the snychronisation of measured data of different devices as well as different hardware.

Zoom function: By means of 2 fingers the measuring curve can be spread so that details are recognisable more easily.

Data logger

Data logger with graphical recording function
The data logger with graphical curve visualisation is supplied as standard with each power control unit, arbitrary power generator, digital multimeter and power sensor and can be used by all integrated devices. With the data logger up to 4 measuring curves can simultaneously be stored and graphically visualised. For example both values of tension and current of one double power control unit can be stored simultaneously and can graphically be displayed in real time. Particularly in the field of training, the graphical display of the current and tension curves demonstrates complex correlations which are difficult to be explained.

Zooming and shifting function
The graphs are shiftable and expandable by simple gestures with one finger so that all details of the curves can be recognised more easily. By the simple 2-finger gesture the graph can be extended apart at the desired position. With one finger the graph can be shifted at will to the left and right-hand side.

Synchronous real time measurement
Fully automatic and simultaneous recording of up to 4 measured values by an integrated real time measuring module allows the storage of up to 2000 measured values.

Recording: Working off of one ramp or endlessly resp.
Trigger: Manually or by an external trigger signal at the digital input
Logging rate: Adjustable 0,1s up to 60 seconds

Time display:
- of the available record time
- of the used record time
- of the still available record time

Slave 14 DU, 3 HU

Master 56 DU

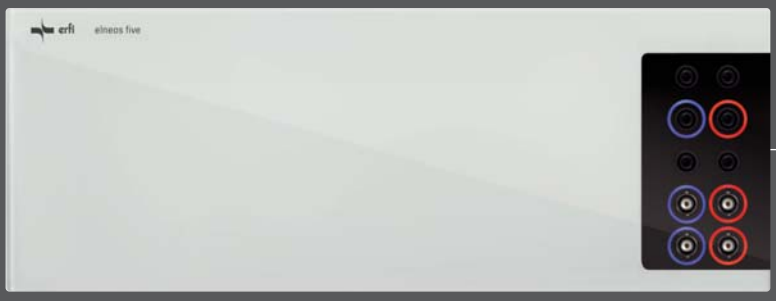
(Ref. No. EL5.Z)

Slave 28 DU

Slave 42 DU

Slave 56 DU

Slave 70 DU



e-Bus

Typical use of an additional slave
With the following device combination an additional slave is used:

1 Double control power unit or 1 double arbitrary generator (integrated in the control center)
1 Signal arbitrary generator or 1 function generator (integrated in the control center)
1 Power sensor or 1 digital multimeter (integrated in the additional slave 14 DU/3 HU, with an own power supply and an own lighting of the ring socket)

Note: If only one power control unit is required, there is no need for the additional rack since the control centre has a sufficient number of illuminated ring sockets and plug-in positions. The power control unit itself is suitable for housing a maximum of 6 devices at the same time such as:

1 x Power arbitrary generator with power control unit
1 x Power sensor with digital multimeter
1 x Signal arbitrary generator with function generator

Notice:
1 HU = 1 height unit = 44.45 mm
3 HU = 128.5 mm
1 DU = 1 depths unit = 5.08 mm

19"additional plug-in units

Extensibility
elneos five is extensible and can be adapted to individual needs. In case that not all the planned devices can be integrated in the control center, further 19"additional plug-in units will be positioned next to the control center by means of an e-bus. These additional plug-in units are so-called slaves and communicate with the control center (Ref. No. EL5.1) by in-house e-bus.

It is possible to connect 8 physical 19"plug-in units to the e-bus. Each plug-in unit can again house 4 devices in any order (power pack, digital multimeter, functional generator etc.) and thus, up to 32 devices per control center can be managed.

Equipment of the slaves
The control center is the master and controls the additional plug-in units, the so-called slaves and these follow the orders of the master. The data exchange of the commands and the measured values are controlled by the in-house e-bus. The slaves are provided with the necessary connectors on the front panel, they do not need an own operating unit any more and are equipped with all variants of the ring lighting with the disappearing effect.

e-Bus
The e-bus is an intelligent and quick bus which connects the various slaves with the control center. A special feature of the same is its interference resistance and its speed. These characteristics allow the recording of real time data between control center and each slave. A modern communication protocol guarantees the faultless transfer in each environment.

Integrated web server

Web server
(optional, Ref. No. EL5.W)
Without any additional software, the web server allows the direct access to the device groups: power control units, digital multimeters, power sensors and function generators. A very powerful interface module inside of *elneos five* offers the possibility of transferring this modern graphical surface onto the PC. Due to this technology *elneos five* has a leading position on the market in the ranking of telecontrollable devices. The web server can be ordered as option and separately.

Industry 4.0
The way to Industry 4.0 is well achievable due to the web server. Thus, *elneos five* can easily be connected with other network participants and the idea of the Smart Factory is already realisable in an optimal way.

The processing of information and the self-organisation of production lines are possible to a large extent due to the use of cyber-physical systems, visualizing the data infrastructure of the internet. Each *elneos five* has an IP address. By inputting this IP address in any browser, the user interface with the device configured by *elneos five* is displayed.

As soon as the device is connected with the *connect button*, the list of devices from which the respective device can be selected, appears on the left-hand side of the screen. Thus, each device can be telecontrolled immediately without a software installation. This additional powerful tool covers the basic functionalities. For the telecontrol of all device functions, the software for the device telecontrol *highlink Power elneos* (Ref. No. HPE 1.200) and the room control software *highlink Power* (Ref. No. HP 1.100) have to be ordered.

Telecontrol power control units:
The surface displays immediately the nominal values and the actual values.

Telecontrol digital multimeter: The web server allows the complete telecontrol and the display of measured values of all functions.

Telecontrol function generator and quick signal arbitrary generator: All parameters of the function and signal arbitrary generatores are telecontrollable.

Modulation by web server: The web serves allows also the telecontrol of AM, FM and PWM modulation.

Integrated counter functions are easy to control!

elneos® five is for you ...

In industrial laboratories

- Sturdy device front panel, allowing its use in a rough working environmet
- Highest precision due to 16 Bit A/D transformer
- Easy and flexible extension of the devices at a later date
- All-side access by a web server
- Automatic and tele-controllable measuring and testing systems
- Professional measuring device as stand-alone or of 19" technology
- Highest availability by simply replacing modules in case of repair
- Elaborated test and measurement values do not get lost
- Quick and low-cost calibration by integrated calibrating routines
- 5-Finger contact operation for long time measures incl. blocking

... and for you !

In educational institutions

- Vandal-safe and capacitive device front panel offers all-round safety for training
- Safe-Guard function avoids dangerous situations in the environment of the trainee
- Front panel cannot be removed without special knowledge of the same
- Tele-control allowing adjustments for training and tests
- Graphical representation of measured values and scaling clarify the results
- Ring connector lighting avoids definitely faulty contacting
- 8 digital I/O's as PLC replacement for exercises in automation engineering
- Password protection for access to the devices
- The data logger visualises measured data and renders complexes comprehensible
- A limiter controls the situation and in case of danger, activates the indication light

What elneos® five can do.

experience the touch

Unique operating panel
Three essential advantages speak in favour of this new operating philosophy. The entire device front panel is designed as capacitive glass touch sensor. The connectors with an innovative ring lighting ensure the optimal user guidance. And the brilliant 7" multi-touch coloured display is exclusively controlled by contact with up to 5 fingers.

1-Finger gesture: Change of device by swiping, call-up of the connection panel
2-Finger gesture: Zooming of X-Y-graphs
3-Finger gesture: Safeguard function
5-Finger gesture: Locking for long-term tests

- Malfunctions are avoided because the unintended contact for instance with the ball of the thumb is interpreted as faulty input.
- The three-dimensional wheel cut into the glass allows also a blind operation.
- Coloured, illuminated, capacitive sensor keys such as the menu key and the ON/OFF key ensure an optimal user guidance.

Vandal-safe, anti finger print front panel
- Heat-strengthened, break-proof glass
- Absolutely planar surface
- 7" multitouch display, controlled by contact
- Rounded off corners and chamfered edges
- Full abrasion-proof due to reverse glass printing
- Non-reflecting glass with non-sparkling effect
- Highest image sharpness by micro etching
- No finger prints on the device front panel

Design conforming to standards 19" technology
The device system *elneos five* follows the 19" standard DIN 41494 section 5 and is ideally combinable with all 19" partial plug-in systems.

Miniaturisation
Due to the use of the most modern circuit technology it was possible to minimize the installation size of the new device family to such an extent that the devices can be integrated in compact table attachments and table cockpits of a low installation depth (185 mm).

Control center
Function: The control center is the centerpiece and consequently the master of the device series *elneos five*. It houses also all five device types.
Installation size: 19" partial plug-in unit 3 HU / 56 DU

19" additional plug-in units
Function: Due to the 19" additional plug-in units further devices can be connected. They are required when there is physically no space in the control center for the selected devices.

Communication
The communication between the control center and the additional plug-in units takes place through the integrated e-bus. Principally the control center is the master and the 19" additional plug-in units follow the control commands.
Installation size: 19" additional plug-in units 3 HU
Width due to equipment: 14, 28, 42, 56, 70, 84 DU

Plug-and-play function
All devices have an intelligent plug-and-play function and automatically recognize additionally connected devices. A time-consuming installation is, therefore, not required any more. The respective device card starts immediately after installation.

Design of the control center *(Ref. No. EL5.1)*
In the control center up to 6 devices can be integrated. The individual devices are plugged as plug-in circuit board in a modern backplane. The control center is equipped with an intelligent software which recognizes immediately all devices. Thus, any device extension can be realized within a short time and in case of repair, the basic system remains always ready for operation. By simply replacing the circuit board, the availability is always ensured.
Installation size: 3 HU/56 DU
Physical control capacity: up to 32 devices

Modular 19" additional plug-in units
In case that for physical reasons not all planned devices can be integrated in the control center, further 19" additional plug-in units can be used and can directly be positioned at the left and right-hand side of the control center.

Maximum 8 physical 19" additional plug-in units can be connected to the e-bus and can be controlled by the control center. The 19" additional plug-in units can accommodate up to 4 devices of any kind which are plugged in the corresponding backplane. This means that up to 32 devices can be managed per control center. The control center is the master and the slaves follow the commands of the master. The data exchange of the commands and the measured data takes place through the in-house e-bus in real time!

The 19" additional plug-in units are equipped with connectors on the front panel and are operated by means of the control center. Each additional plug-in unit has a backplane which communicates with the control center through the e-bus. Each 19" additional plug-in unit has the innovative ring connector lighting with disappearing effect so that an intuitive user guidance is ensured.
Installation size: 3 HU/14, 28, 42, 56, 70, 84 DU

Modular extension
This intelligence permits an extension with additional device groups at any time. By simply plugging-in the respective circuit boards (devices) in the backplane of the control center or the 19" additional plug-in units, *elneos five* can be extended modularly. The in-house software recognizes automatically each bus participant and all device groups can be retrofitted modularly.

The intelligent e-Bus
The intelligent e-bus connects the control center with the 19" additional plug-in units. A modern protocol makes sure that the master and the 19" additional plug-in unit recognize each other and that all command sequences and measurement results are exchanged within a very short time.

The e-bus is a bidirectional, isolated, full-duplex bus of a high interference resistance as regards EMV (electromagnetic tolerance). Due to the isolation the devices rest on a different potential. Only this allows the control of all devices by the central control center. A high degree of functional reliability is guaranteed. The bus system allows measurements in real time and ensures the all-over acquisition of all measured values without any delay.

Password protection
Intelligent devices store sensitive data. *elneos five* has a modern password protective function and provides a high functional safety. The access to stored measured values and device functions is strictly reserved to authorized persons.




Telecontrol, interfaces and software
All device functions can be tele-controlled by SCPI standard (Standard Commands for Programmable Instruments). There are two basic tele-control modes:

Telecontrol mode 1
In this mode the device responds exclusively to commands which have been sent through the interface. The device operation on the front panel is deactivated.

Telecontrol mode 2 with pre-specified limit
In this mode the operation of the device at the front panel is admitted. Limit values can be transferred by means of the interface. The transferred values cannot be exceeded at the device. This protects sensitive circuits and avoids damage to test items.

The up-to-date values are continuously read and transferred through the interface. The *erfi* software *highlink Power* and the *LabVIEW* device driver visualize the arriving data. This allows the surveillance of all devices at any place and time.

Interfaces (standard)
- USB 2.0
- Ethernet

Other interfaces on request

Note: The interface rests always on an earthed potential. The internal telecontrol interfaces of the e-bus do not rest on the potential of the function module. This guarantees a high functional safety.

Software
elneos five can be telecontrolled by means of the device control software *highlink Power elneos*, the room control software *highlink Power*, the *LabVIEW* device driver or the modern web server. Due to the device language SCPI being used, the application as OEM product is easily possible.

Data logger/ Measured value storage
elneos five has an internal device storage for up to 2000 measured values. An additionally integrated time stamp ensures a professional measured value acquisition as well as a time-synchronised acquisition of 4 different measured values!

Graphical representation of measured values
The stored measured values as well as all up-to-date measured values can be fast visualized in X-Y charts on the large 7" multitouch display. With the modern contact control, charts can be enlarged.

Calibration
Also with respect to calibration *elneos five* sets new standards. Internal calibrating routines allow the easy calibration of the devices. Mechanical interventions are precluded and there is no need any more to open the devices for calibration. The calibrating parameters can be transferred to the device through an interface.

The new circuit technology allows the fully automatic calibration. The tolerances due to construction parts are neutralized by integrated automatic calibrating routines and respective hardware provisions.

The result is a considerable cost reduction thanks to a fast and easy calibration either at customer's site or in the factory. In addition, we offer you an all-over calibrating service. The scope of supply includes a cost-free factory calibrating certificate.




Auto-Restart function
elneos five stores all relevant configurations. When switching on *elneos five*, these configurations are automatically reloaded. Thus, limit values and system parameters can easily be changed.

High serviceability
elneos five offers an outstanding serviceability due to its modular design. In case of trouble the concerned circuit board of the device can be replaced immediately and its function is restored within a very short time. The costly and time-consuming despatch of the devices and waiting times for repair belong now to the past.

If a repair is needed, a spare circuit board will be sent to you immediately, allowing you to continue work without delay. A priceless advantage which is only possible thanks to the modular design of *elneos five*. We gladly offer you this service within a maintenance contract.

8 digital I/O's – compact control (optional)
All devices have digital inputs and outputs which can be energized in any order. With this functionality complete compact controls can be replaced (PLC).

Control of various table functions
- Up-down control of height adjustable tables
- Up-down control of 19" swivel attachments
- Signalisation of the EMERGENCY STOP function
- Connection of var. devices in the laboratory table
- Replacement of PLC
- Light control
- and many other things

Outputs: 8 digital outputs, single-ended
Inputs: 8 digital inputs, potential-free
Contacting: through an integrated plug

Comfort equipment
(optional, Ref. No. EL5.C)
With this added function the double power control units can internally be connected in an intelligent way.

The following functions are possible:
- Master/slave function
- Ratio function
- Serial/parallel function
- Tracking function

Twin operating mode
(optional, Ref. No. EL5.TW)
The twin operating mode allows that two operators simultaneously and completely independent of one another operate several devices with one single control centre. Ideal for double workplaces of all kinds.

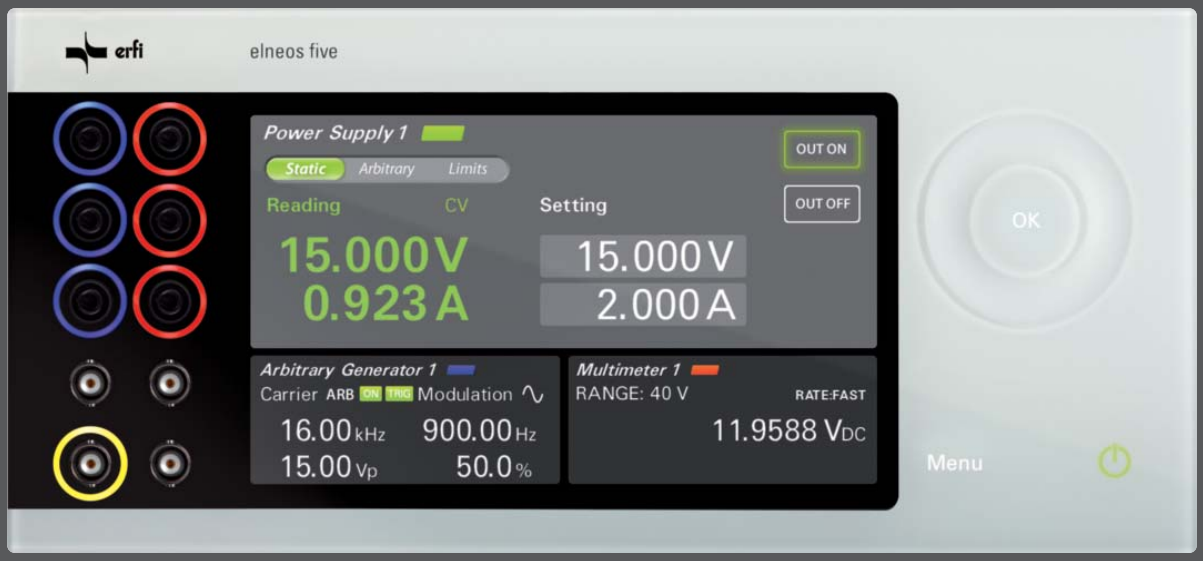
Web server
(optional, Ref. No. EL5.W)
elneos five has a modern web server for the remote-control of all devices via web browser. Display on a web browser through static web pages.

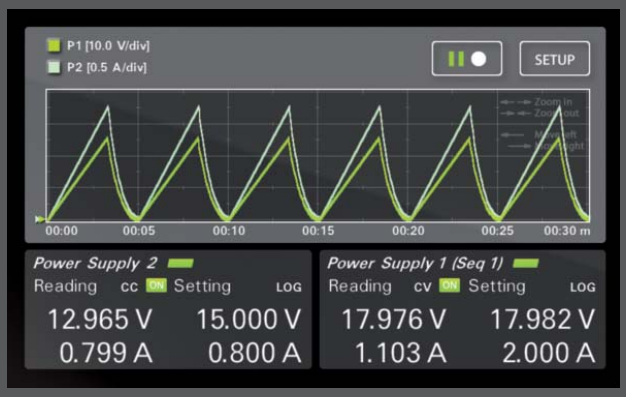
Functionality regulating power supply units
Voltage/current presetting and output OFF/ON

Functionality multimeter
Triggering of basic functions and display of up-to-date measured values

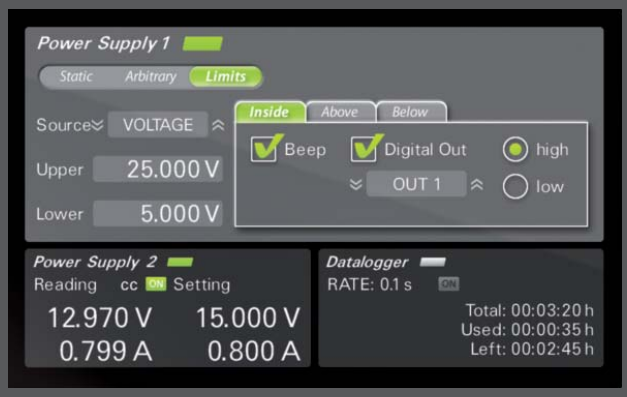
Functionality functional generators
Triggering of basic functions, display of parameters, output ON/OFF

Precision regulating power supply unit





Data logger and graphical display of measured values: Graphical visualisation and real-time recording of freely programmable ramp functions allow an optimal tracking of all voltage and current profiles.



Limiter: The limiter allows the free control of all voltage and current areas in connection with limited. Each state can be coupled with an audible signal and a freely selectable digital output.

Optional comfort equipment (Ref. No. EL5.C): Internal serial/parallel connections of power control units with residual current indication.

Optional added equipment (Ref. No. EL5.C): The master/slave function allows to couple two control power units. A slave control unit follows the master control unit with current and voltage.

Precision regulating power supply unit
incl. square-wave generator
Ref. No. EL5.32 til Ref. No. EL5.61
(0-30 V/0-2 A til 0-60 V/0-10 A, see p. 58)

The regulating power supply units are a comprehensive device family with different voltages and currents. *elneos five* offers variable DC power supplies inclusive a universal measuring device of high precision. An essential feature is the development of a control card which can be used for all models. This control card is equipped with respective cooling elements and power transistors and is completed in different ways depending on the model. Likewise each device is equipped with a transformer of different strength.

Dynamic arbitrary signals up to 1 kHz defines this class of instruments as the superior class. Besides this improvement a clear miniaturization is involved due to the SMD technology. This miniaturization allows the integration of power packs up to a size of approx. 300 W in the control center. Power packs can also be integrated in more compact casings.

Decisive for *elneos five* is the packing density. This has been made possible by the SMD technology and the fully automatic calibrating function where the internal winding changeovers are controlled fully automatically by means of firmware. An additional new highlight is the integrated square-wave generator up to 250 Hz in load.

Technical data and features of standard equipment	
Visualisation of the ramp functions Freely programmable ramps in tabular form. After starting the ramp, the voltage and the flow of the current are automatically visualized in a X-Y chart. *Ramp input voltage and current:* 1) Voltage ramps with current limitation 2) Current ramps with voltage limitation	**Preset function (output OFF/ON)** Function for switching off and on the output. When the output is deactivated, the maximal current can be changed. Only when connecting the output the new maximal current value is activated. There is no need any more to isolate the circuit manually from the power pack.
Read-out of all device conditions All device conditions can be read out by means of the interfaces. The conditions are directly displayed in the control software *highlink Power*. This scanning possibility can also be used in a sensible way for test systems.	**Source of constant voltage and constant current** Automatic change of the operating modes CV and CC – On the one hand *elneos five* is a voltage source and on the other hand a current source. These characteristics allow to generate voltage ramps as well as current ramps.
Adjusting precision: 14 Bit D/A-converter (1 mV, 1 mA) *Measuring precision:* 16 Bit A/D-converter (1 mV, 1 mA)	*Voltage range:* 0-60 V (depending on model) *Current range:* 0-10 A (depending on model)
Control deviation 1: voltage: 300 µV/A, current: 150 µA/V (with change of power line 0-100 %);	*Control deviation 2:* voltage and current: < 0.01 % (with change of power line 10 %)
Temperature coefficient: voltage: 0.002 %/K, current: 0.008 %/K	*Stepwise pre-regulation:* Integrated, software-controlled winding converter
Ripple: voltage: 100 mVeff, current: 200 mAeff *Integrated square-wave generator:* up to 250 Hz in load	*Transient time:* 12 µs load step 0-100 %

Precision regulating power supply unit

Outstanding technical features of the precision of *elneos five*

Precise pre-specified set point of current and voltage by a high-quality 14 Bit D/A-Converter

Resolution: I_{set} approx. 1 mA with current range 5A
U_{set} approx. 1 mV with voltage range 30V

Precision measuring device of current and voltage by a high-quality 16 Bit D/A-Converter

Resolution: $I_{nominal}$ approx. 1 mA with current range 5A
$U_{nominal}$ approx. 1 mV with voltage range 30V

Quick and efficient stepwise pre-regulation
Due to the new software-based winding converter, the power loss is considerably reduced. The multi-stage pre-regulation works independently of the output voltage and reduces the voltage through the series pass transistor. With this new development, the advantages of a power regulating power pack can be used with high precision and without the previous disadvantage of heat development. Thus, the devices have a compact design and excellent temperature coefficients. The service connect is increased and the environment is not influenced. Therefore, it is possible to integrate more functions and further devices in a small space.
Great dynamic – arbitrary signals up to 1 kHz:
By activating the output and already defined demand, the output within 12 µs is controlled stable. Thus the prerequisite for high loaded arbitrary signals up to 1 kHz is created.

Measured values by real-time measurement
Ramp functions as well as arbitrary functions are time-critical and complex processes. Due to its circuit technology *elneos five* is able to implement these processes autarkically within the control card so that the transfer rate of the interface has no influence on these processes.
The new measuring and control card has a high independent intelligence and allows real-time measurement of current and voltage.
Maximum measuring rate:
depending on device configuration approx. 10 to 20 measurements per second with a high resolution.

Safe-Condition function (safety cutout)
This function is released by 4-finger contact. By simply wiping with 4 fingers from top to bottom, the device immediately switches off all output and the nominal values are zeroized. Thus, dangerous situations at the working place can be avoided in due time.

Programmable OVL and OCL function
OVL = Over voltage limit
OCL = Over current limit
With the telecontrol the values can be prespecified. The user can then operate only within the prespecified limits.

Safe-Start function (safety start)
Due to a digital interface outputs can be connected at a desired point of time.

Data logger
An integrated data logger allows the storage of up to 2000 measured values per channel. The 4 channels can simultaneously visualise 4 different measured values. The measured values can be read out by means of an interface.

Limiter
The limiter offers programmable limits of the current and voltage ranges for 8 digital outputs. The limiter allows programming below, within and above the area. Thus, 3 user-defined outputs for 3 conditions can be programmed and can, for instance, control the indication light.

Zoom function of the ramp functions
By the capacitive 7" multitouch display the X-Y chart can be zoomed viz. enlarged or scaled down at the desired place with 2-finger contact. In addition, *elneos five* has a repeat function of the programmed ramps from 1 to unlimited.

Power supply unit comfort equipment

Technical data and features of the optional comfort equipment *(optional, Ref. No. EL5.C)*

Master/Slave function (optional)

Optional interlinking of two regulating power supply units, e.g. 1 master regulating power supply unit and 1 slave regulating power supply unit. The slave regulating power supply unit follows the nominal values of the master regulating power supply unit and supplies the same voltage at the output. Both channels are galvanically isolated from one another.

Characteristic

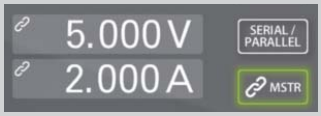
Due to the newly developed bidirectional master-slave function it is of no importance which power control unit is for the master and which one for the slave. As soon as a parameter (either U or I) is changed in a control unit, the parameter of the second control unit follows the first control unit and vice versa. This is a bidirectional function of a high degree of flexibility.

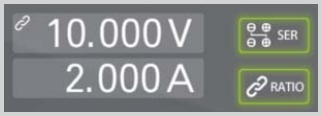
Ratio function

The ratio function links the voltage channel of the power control unit 1 with the one of power control unit 2 and vice versa. This helps in particular to simulate asymmetric loads.

Example:
Power control unit 1 is adjusted to +10 V.
Power control unit 2 is adjusted to +1 V.
(10 % of the value of control unit 1)

When changing the voltage of power control unit 1 to 20 V, the ratio function being activated, the power control unit 2 changes to 2 V. With the ratio function the voltage value of the second power control unit follows percentaged the voltage value of the first power control unit and vice versa (ratio).





Serial/parallel function (optional)

Due to the internal relay interconnection, the two outputs are switched in series or in parallel. This allows the taking of either the double amount of voltage or the double amount of current.

Characteristics of serial interconnection

- Possibility when withdrawing any positive and negative voltage.
- Coloured indexing of cumulative voltage by 2 diagonally arranged and illuminated sockets in red and blue. The two other diagonal sockets are illuminated in turquoise.
- The individual voltage of the normal laboratory sockets are measurable in parallel anyhow.

Characteristics of parallel interconnection

- Coloured indexing of the two masses by illuminated sockets in light blue.
- Display of the cumulative current of power control unit 1 and power control unit 2.
- Linking of both parameters of current and voltage (simultaneous change).

Symmetrical/asymmetrical tracking function

The tracking function serves for the simultaneous withdrawal of a negative and a positive voltage which are linked. This function is activated by simultaneously switching on the function *serial* and *ratio*.

Classical tracking function – symmetrical voltages with reverse sign

With a symmetrical withdrawal of the negative and positive voltage, both voltages are adjusted at the beginning to an identical value.

Example:
Power control unit 1 is adjusted to +10 V.
Power control unit 2 is adjusted to +10 V.
When changing the voltage value, the other voltage value follows the same way, however, with a reverse sign.

Extended tracking function – asymmetrical voltage with reverse sign

The ratio function allows also asymmetrical adjustments.

Example:
Power control unit 1 is adjusted to +10 V.
Power control unit 2 is adjusted to -5 V.
When changing the values as follows: power control unit 1 is adjusted to +20 V (doubling), power control unit 2 follows and adjusts itself to -10 V.

Graphical arbitrary waveform generator

Input of the different curve parameters in tabular form. For this the AC and DC parameters must be input.

Generation of any curve forms with the full power of the power control unit. (Stepless treatment of the curve form)

Both the double power arbitrary generators can be programmed independently of ona another. The signals are visualised by the data logger.

Graphical arbitrary waveform generator
Ref. No. EL5.32A til Ref. No. EL5.61A
(0-30 V/0-2 A til 0-60 V/0-10 A, see p. 58)

elneos five has an efficient arbitrary waveform generator which combines the advantages of a precision regulating power supply unit with the advantages of a functional generator. With the arbitrary waveform generator any curve shapes and standard signal shapes can be reproduced such as sine waves, rectangle, triangle, saw tooth. Outstanding technical feature of the graphical arbitrary waveform generator.

Sequencer function

Due to a modern sequencer the free signal programming is easily possible. 100 support points are transferable in the internal memory by means of the interface. Each segment has a waveform and a repeat counter. The device processes the support points directly from the internal memory and thus permits the functions of an arbitrary waveform generator with a high electric output power.

The sequencer allows also to cascade in succession signal shapes of different frequency. Thus, the signals can be sequenced and all signal shapes are representable. The excellent dynamics of the new measuring board makes it possible to represent all signal shapes. Motor vehicle voltage pulses can be nicely simulated in the laboratory. The sequencer is an important tool for training and the industry.

Field of application

- Simulation of a voltage drop of the DC supply (brown-out) for testing the reset connection of a processor.
- Several supply voltages which when switching on rise one after the other and when switching off drop again one after the other (power sequencing).
- Overlap of an artificial supply reaction of the DC supply of a test item to measure the PSRR (power supply rejection ratio). The term gives information at which degree the output voltage of an amplifier changes when its supply voltage changes. In case of operation amplifiers the terms PSRR is used in the technical data sheets.
- Simulation of the wiring system drop of a motor car when starting it. The standard signal form available for this can be programmed by the user or on request, will be made available by our company.

Technical data and characteristics

Stand. signal shapes: sine wave, rectangle, triangle;
Duty cycle: variable

Frequency: all signal shapes up to 250 Hz;
Sequenzer: enables various signal shapes with different frequencies for serial cascation;
Therefore almost all signal shapes can be simulated.

Segments: 100 pcs. transmittable to divice.
Per segment: wave shape, time, amplitude (U/I) and frequency;

Limit values:
Limits of all measured values programmable;

Digital output: in case of overstepping/undercut of the measured values, a digital output will be triggered;
Digital input: Start of measurement by a trigger impulse of the input (flank control)

Data logger: The 4-channel operation allows the storage of 2000 measured values per channel. The values can be called up graphically and can be read out by an interface.

Display of measured values: X-Y graph are recallable and scalable by a 2-finger gesture. Ideal for long-term measurements.

Precision digital multimeter

Limiter: Definable limits can be supervised by sounds and digital outputs. The behaviour can be controlled for different conditions.

Data logger: The possibilities of recording are particularly valuable in connection with the digital multimeter. Up to 4 measuring curves can be recorded simultaneously.

Example:
DMM 1: AC voltage
DMM 1: Crest factor of the AC voltage
DMM 2: Temperature
DMM 3: Capacity

Optional dual measurement: Allows the simultaneous acquisition of current and voltage in the AC and DC area (optional, Ref. No. EL5.DUI).

Precision digital multimeter, 5¾ digit
Ref. No. EL5.D *(further order information see p. 58)*

elneos five allows the acquisition of currents of up to 40 A and voltages of up to 1000 V. Due to intelligent additional functions such as capacity measurements, RC meters can be replaced.

With an integrated diode test and with temperature and frequency measurements, the multimeter of *elneos five* is an absolute all-rounder. Due to the use of TRMS converter modules of considerably improved linearity and band width, an excellent measurement precision with the outstanding crest factor 5 is possible.

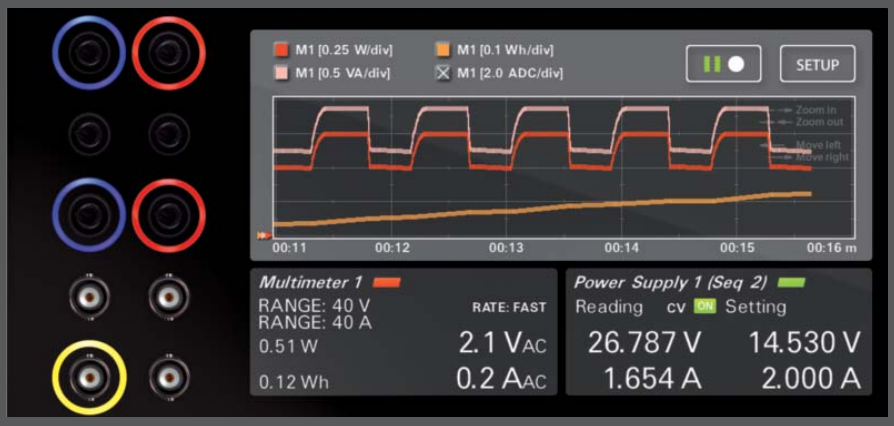
The digital multimeter facilitates the graphical display of the present and stored measured values by means of X-Y graphs. When exceeding limit values, a digital output can be set. An external circuit can react to dangerous situations, if need be, and can deactivate the corresponding peripheral equipment. The multimeter is integrated directly behind the laboratory connectors which saves space and does not require a separate plug-in position for the internal backplane.

The new digital multimeter facilitates the acquisition of non-sinusoidal signals of an unequalled precision. Voltage measurements of a precision of ± 0.08 % and a resolution of 1 µV are proof of the outstanding accuracy.

Technical data and characteristics	
Display:	5 ¾ digit, display range 40.000 points
Voltage measurement DC: *Voltage measurement AC:*	up to 1000 V; 1 µV; ± 0.08 % + 5 dgt. up to 750 V (peak 1060 V); 1 µV; ± 0,5 % +10 dgt., band 20 Hz up to 2 kHz
Current measurement DC: *Current measurement AC:*	up to 32 A cont. current (temporarily til 40 A), 100 nA; ± 0.15 % + 5 dgt. up to 32 A cont. current (temp. til 40 A), 100 nA; ± 0.8 % + 10 dgt., band 20 Hz til 2 kHz
Resistance measurement: *Capacity measurement:* *Inductance measurement:*	up to 40 MΩ, 1mΩ; ± 0.5 % + 10 dgt. up to 400 nF / 4 / 40 / 400 / 4000 µF; 1 pF; ± 1.0 % + 10 dgt 400 mH; 10 µH; ± 2.0 % +10 dgt.
Temp. measurement:	-200 up to +600 °C, dependent on sensor, resolution 0,1 °C Precision: class B to EN 60751 Pt 100 sensor or Pt 1000 sensor suitable for connection (automatic detection)
For all measurements:	AUTO-RANGE
Frequency measurement:	up to 40 kHz, 1 Hz; ± 0,05 % + 5 dgt; high resolution: small metering speed
True-RMS function:	real effective value measurement;
Crest factor:	**5 with non-sinusoidal signals.**
Further characteristics:	Diode test, Continuity test
Limit values:	Limits of all measured values are programmable.
Digital output: *Digital input:*	When exceeding or falling below the measured values, a digital output is triggered. Start of measurement by trigger pulse of the input (flank control)
Data logger:	The 4-channel operation allows the storage of 2000 measured values per channel. The values are recallable graphically and can be read out by means of an interface.
Measured value representation:	X-Y graph available and scaleable by 2-finger contact; ideal for the quick acquisition of changes (long-term measurements).
Simultaneous acquisition of current and voltage (AC/DC) ***(optional, Ref. No. EL5.DUI)***	

Power and energy measurement device

Scope of recording: Active power, apparent power and reactive power as well as active energy, apparent energy and reactive energy are displayed simultaneously. COS PHI, frequency and crest factors for current and voltage.



Example of the graphical measured value acquisition: Simultaneous visualisation of power, energy and part of direct current is possible by means of the data logger. In addition, all measured values can be read out by USB 2.0 and RJ45.

Power & energy measurement device monophase
Ref. No. EL5.P *(further order information see p. 58)*

elneos five allows excellent performance data also in the field of performance measurement. The modern measurement device facilitates the acquisition of high electric power and energy values of extraordinary precision. The acquisition of power is achieved by the laboratory connectors on the front panel of the digital meter. Therefore, no additional connections are required. The integrated measurement instrumentation ensures the enormous band width.

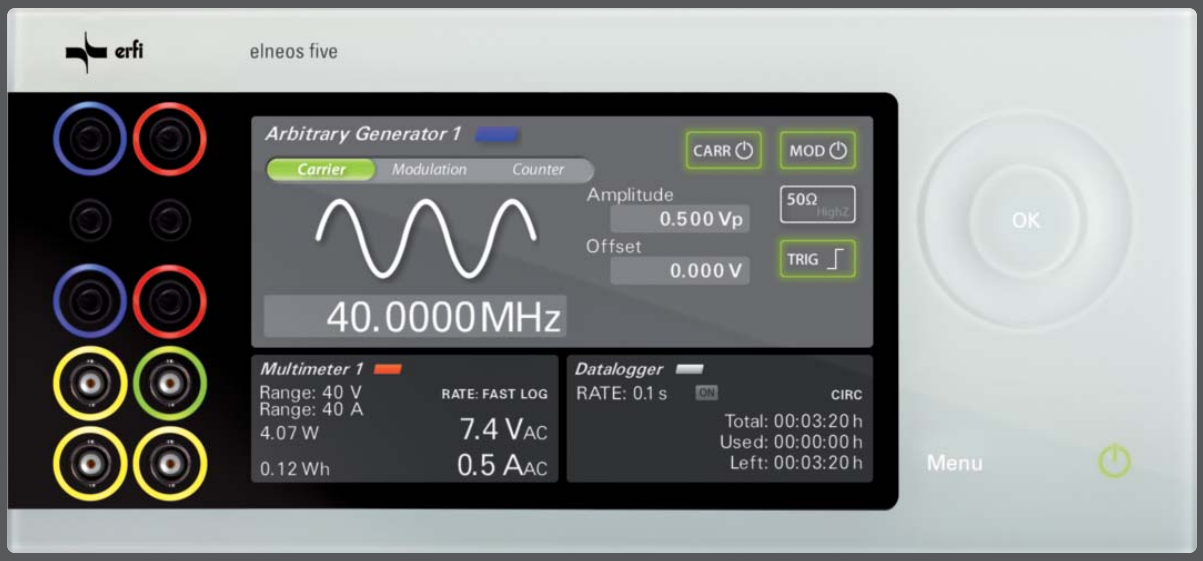
elneos five allows the acquisition of high power and energy for monophase consumers of up to 24 kW.

When exceeding limit values, a digital output can be set. An external circuit can react to dangerous situations, if need be, and can deactivate the corresponding peripheral equipment. The power measuring device is integrated directly behind the laboratory connectors which saves space and does not require a separate plug-in position for the internal backplane. Therefore, more additional devices can be integrated, requiring a minimum of space.

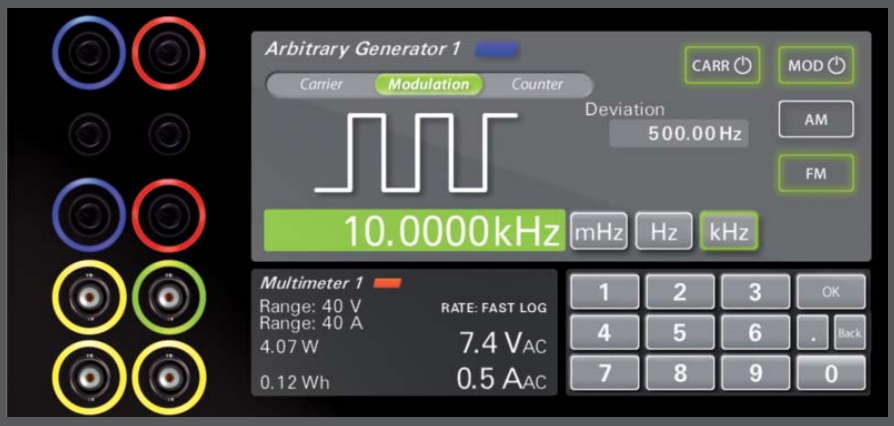
Special importance has been attached to the display of measured values. The digital multimeter facilitates the graphical display of the present and stored measured values by means of X-Y graphs and with each measurement, ensures a quick and safe acquisition.

Technical data and characteristics	
Display: Simultaneous display of U and I *For current and voltage:* AUTO RANGE *Simultaneous display on a screen:* all power and energy values *Crest factor:* for voltage and current	*Power factor:* cos phi from -1 to +1 **and recording of angles!** *Max. current (AC/DC):* 32 A, temporarily 40 A *Max. voltage (AC):* 750 V *Max. voltage (DC):* 1000 V
Real power: - 24 kW to +24 kW with 750 V AC - 7.5 kW to +7.5 kW with 230 V AC, (temp. 9.2 kW) precision: ± 0.2 % +10 dgt *Idle power:* - 24 kvar to +24 kvar with 750 V AC -7.5 kvar to +7.5 kvar with 230 V AC, (temp. 9.2 kvar) precision: ± 0.2 % +10 dgt *Apparent energy:* 0 to 24 kVAh with 750 V AC 0 to 7.5 kVAh with 230 V AC, (temp. 9.2 VAh) precision: ± 0.4 % +10 dgt	*Apparent power:* 0 to 24 kVA with 750 kV AC -7.5 kVA to +7.5 kVA with 230 V AC, (temp. 9.2 VA) precision: ± 0.4 % +10 dgt *Active energy:* - 24 kWh to +24 kWh with 750 V AC - 7.5 kWh to +7.5 kWh with 230 V AC, (temp. 9.2 kWh) precision: ± 0.2 % +10 dgt *Reactive energy:* - 24 kvarh to +24 kvarh with 750 V - 7.5 kvarh to +7.5 kvarh with 230 VAC, (temp. 9.2 kvarh) precision: ± 0.2 % +10 dgt
Limit values: Limits of all measured values programmable; *Digital output:* in case of overstepping/undercut of the measured values, a digital output will be triggered; *Digital input:* Start of measurement by a trigger impulse of the input (flank control)	*Data logger:* The 4-channel operation allows the storage of 2000 measured values per channel. The values can be called up graphically and can be read out by an interface. *Display of measured values:* X-Y graph are recallable and scalable by a 2-finger gesture. Ideal for long-term measurements.

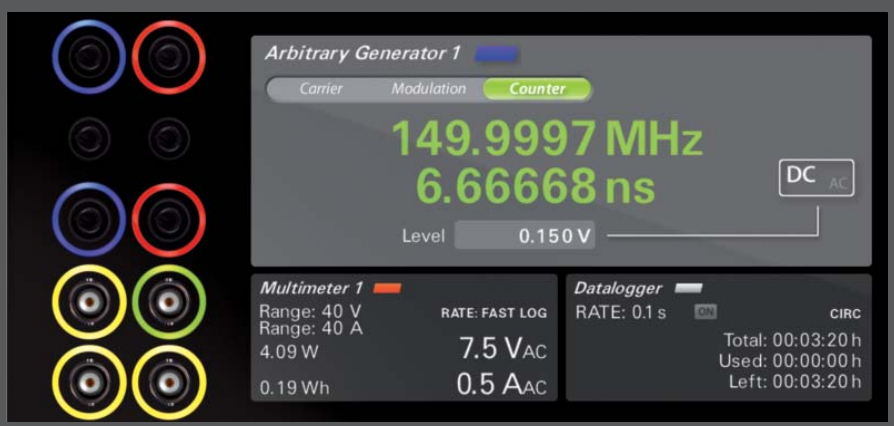
Function generators incl. counter



Data display: The curve forms are generously and graphically displayed.



Modulation types: By means of the two internal function generators, high-frequency carrier signals depending on the low-frequency wanted signals to be transferred can be modulated in AM, FM and PWM.



Integrated counter: Allows the acquisition of AC and DC signals as well as the adjustment of the trigger level in the DC area which is as standard up to 150 MHz. Optional increase of the measuring range to 1,5 GHz (Ref. No. EL5.F1G)

2 function generators in one and incl. counter
Ref. No. EL5.F *(further order information see p. 58)*

The modern device includes 2 function generators and uses the functional principle of the direct digital synthesis (DDS) and the associated advantages of the frequency-stable signal generation of low distortion. The maximum output frequency per generator up to 40 MHz is excellent as well as the amplitude height of 30 Vss idle.

Combined with an adjustable duty factor of 0.1 to 99.9 %, *elneos five* is ready for all tasks. This new function generator is an all-rounder due to its many useful functions such as sweep, external and internal trigger for defined starting conditions, programmable single and multiple pulses and many more.

A counter input up to 1,5 GHz ensures the acquisition of fast signals and all device conditions can be read out at any time.

Due to the freely programmable modulation by means of 2 integrated function generators
elneos five provides a special functionality as regards modulation. The carrier signals and wanted signals (modulation signals) can be parameterized separately and completely independently of one another due to the two function generators.

The modulated signal is delivered at the output. Therefore, a separate second external source or a second function generator is not required any more. The efficiency for training and industry is high because any modulation can be realized quickly and without any additional external hardware. The carrier signal and wanted signal can be generated easily in the device according to requirements. The result of modulation is immediately visible and the parameters of the signals can be quickly adapted in order to obtain the desired result.

All parameters of the carrier signals and the wanted signals (modulation signal) such as signal shapes (sine wave, rectangle, triangle etc.), amplitude, frequency, duty factor, are separately stored and modulated at the output. The modulation depth is adjustable from 0-100 %. With the freely programmable modulation *elneos five* is a productive tool for training and industry with immediate effect in practical operation.

For both function generators the device controls the frequency modulation (FM), the amplitude modulation (AM), the pulse width modulation (PWM), the burst and sweep function (special kind of frequency modulation).

Function generators incl. counter

Technical data and characteristics

Frequency sources
2 function generators which are programmable independently of one another; the technical data apply to each function generator.

Frequency characteristics
Sine wave: 1 µHz to 40 MHz **!** *Trapeze:* 1 µHz to 5 MHz
Rectangle: 1 µHz to 5 MHz *Triangle:* 1 µHz to 5 MHz
Saw tooth: 1 µHz to 5 MHz *Ramp:* 1 µHz to 5 MHz

Amplitude
Amplitude resolution for all shapes: 14 Bit (16.384)
Output: 30 Vss, 50 Ω of 0-20 MHz, 1.8mV resolution
Input: 20 Vss, 50 Ω of 0-40 MHz, 1.8mV resolution

Pulses
Single pulse: single and multiple pulse up to 999 s
Burst operation at will through parameters:
Pulse and pause times: up to 999 s
Number of repetitions: 1 to ∞

Trigger pulse
Externally through BNC connector;
Internally through menu for defined signal start;

Frequency counter
Measuring range: up to 1 GHz
optional up to 1,5 GHz (Ref. No. EL5.F1G)
Input voltage: 100 mVeff to 5 Veff

Adjustment range
Frequency: 100 mHz up to 40 MHz!, resolution 1 µHz
Amplitude: 0 to 30 Vss ±0,5 dB +1mV of the adj. value
Pulse duty factor rectangle: 0 to 100 % in steps of 0,1 %
Offset: 0 to ±15.000 V

Distortion factor
Sinus: 0 MHz to 1 MHz < 1 %
Sinus: 1 MHz to 20 MHz < 5 %
Sinus: 20 MHz to 40 MHz < 6 %

Outputs
BNC laboratory connectors with disappearing effect;
Output: up to 30 Vss idle
Output: 5 V TTL compatible

Inputs
BNC laboratory connectors with disappearing effect;
Input: Counter input for external input signals up to 1,5 GHz (Ref. No. EL5.F1G);
Input: Trigger input for defined signal start;
Input sensitivity: 100 mVeff

Modulation
- Freely programmable modulation due to 2 integrated function generators;
- Freely programmable carrier signal (carrier) – generator 1;
- Freely programmable wanted signal (modulation) – generator 2;
- All signal shapes, frequencies, amplitudes, etc. are available;

Modulation depth: 0 to 100 %

0 % modulation depth means: At AM the modulated signal reaches with the maximal point the amplitude of the carrier signal. The amplitude height of the carrier signal is changed according to the wanted signal. At FM the modulated signal reaches with the maximal point the frequency of the carrier signal.

The frequency range of the carrier signal is changed according to the wanted signal. With PWM the modulated signal reaches with the maximal point the duty factor 1. The duty factor is changed from 0 to 1 according to the wanted signal.

x % modulation depth means: At AM the amplitude of the modulated signal is reduced on a percentage basis. At FM the frequency of the modulated signal is reduced on a percentage basis. At PWM the duty factor of the signal is reduced on a percentage basis.

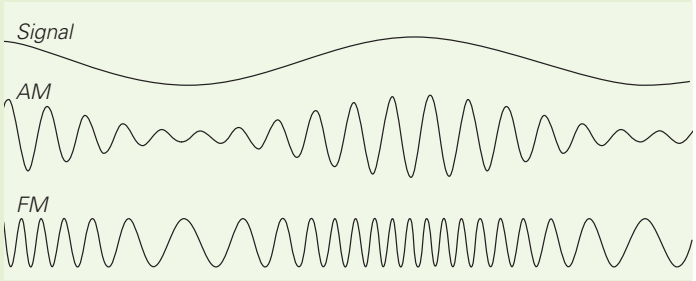
4 Modulation types *(carrier and wanted signal)*:
- Amplitude modulation (AM)
- Frequency modulation (FM)
- Pulse width modulation (PWM)
- Sweep modulation (special kind of FM)

Duty factor: 0.1 to 99.9 %

Amplitude and frequency modulation

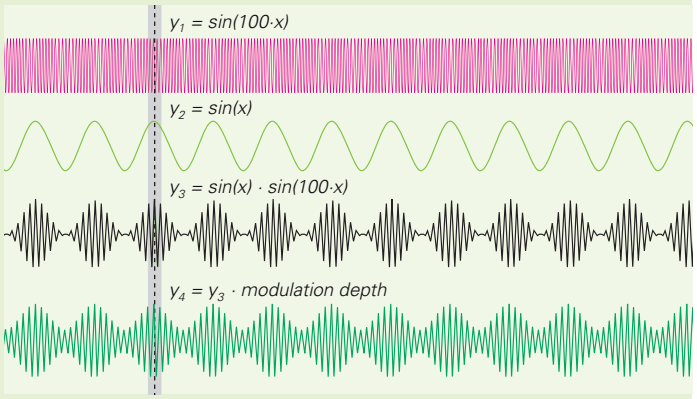
Amplitude modulation (AM)
With the amplitude modulation, the amplitude of a high-frequency carrier is modulated depending on the low-frequency wanted signal which is to be transferred.

Frequency modulation (FM)
With the frequency modulation, the frequency of a high-frequency carrier is modulated depending on the low-frequency wanted signal.



Example of an amplitude modulation with a modulation depth of 50 %

- Carrier signal (high-frequency)
- Wanted signal (modulating)
- Modulated signal with a modulation depth of 100 %
- Modulated signal with a modulation depth of 50 %



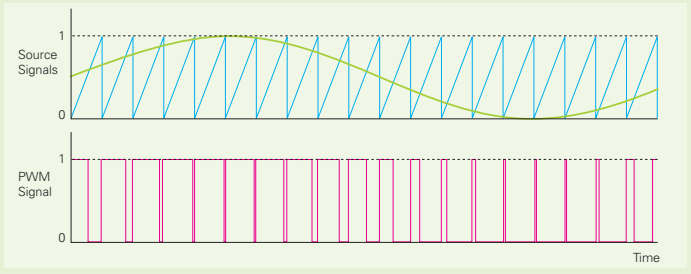
Pulse width modulation (PWM)

With the pulse width modulation a technical dimension (e.g. current) changes between two values. The pulse duty factor of a rectangle pulse is modulated at a constant frequency. Consequently, the width (extent) of the pulse is influenced.

A pulse width modulation is realized by the comparison between a continuously ascending and descending signal (triangle or saw tooth) with the analogue input signal. The ascending or descending signal is above or below the input signal for a certain time. At the intersection point the digital output signal is changed over and this results in the PWM signal.

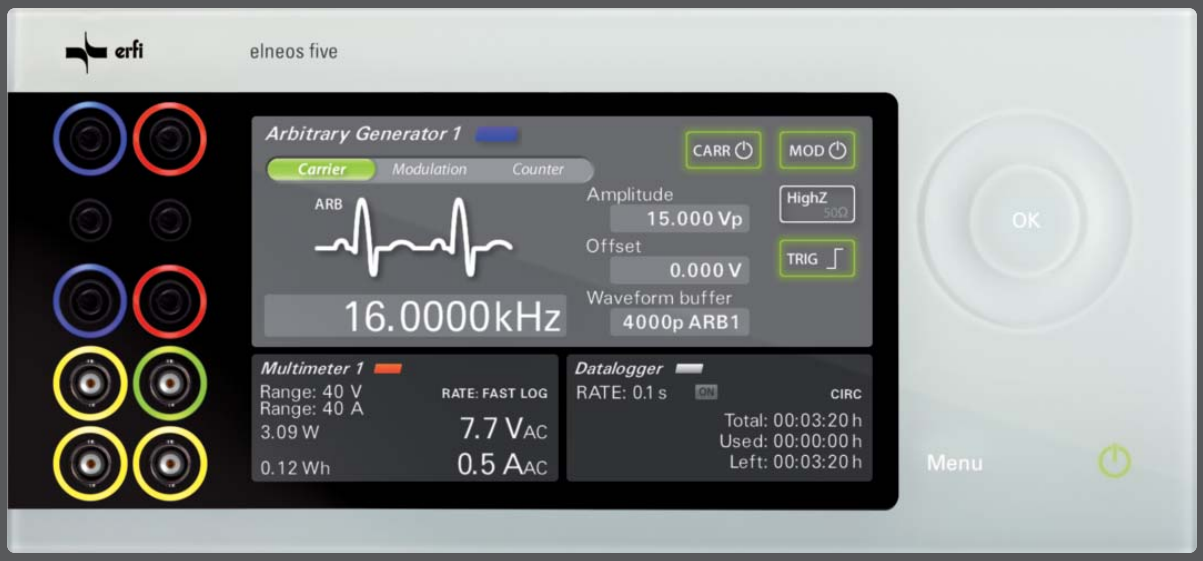
This signal can be transported without much energy input across a long distance and the PWM voltage process acts on inert consumers like a sinusoidal voltage.

Field of application
Communications engineering: Transfer of analogue measured values of sensors over long cables or by radio communication, for the use with big radio transmitters and many more.
Power electronics: Low lost energy with power switches, DC regulators, electric motors, heating elements, dimmers, switching power supplies and many more are controlled by PWM signals.

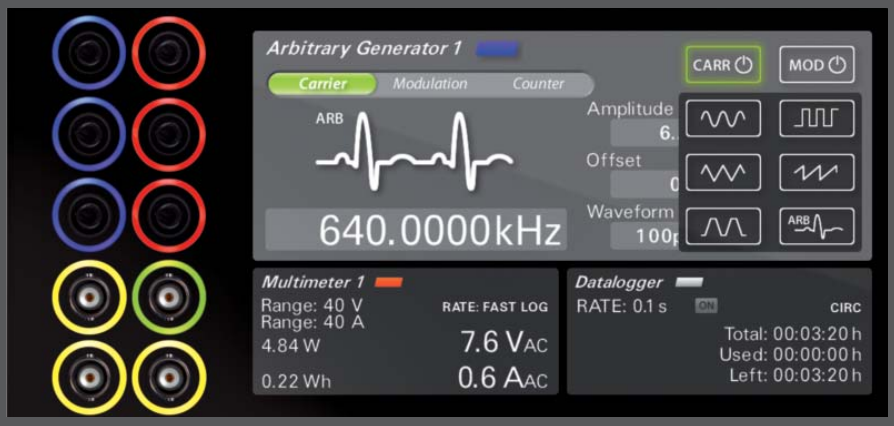


A sinusoidal process (■) can, for example, be converted in a PWM signal (■) by the comparison with a saw tooth-shaped signal (■). For each PWM pulse, the saw tooth ramp passes trough the entire value range. This means that the PWM voltage process acts on inert consumers such as motors like a sinusoidal voltage.

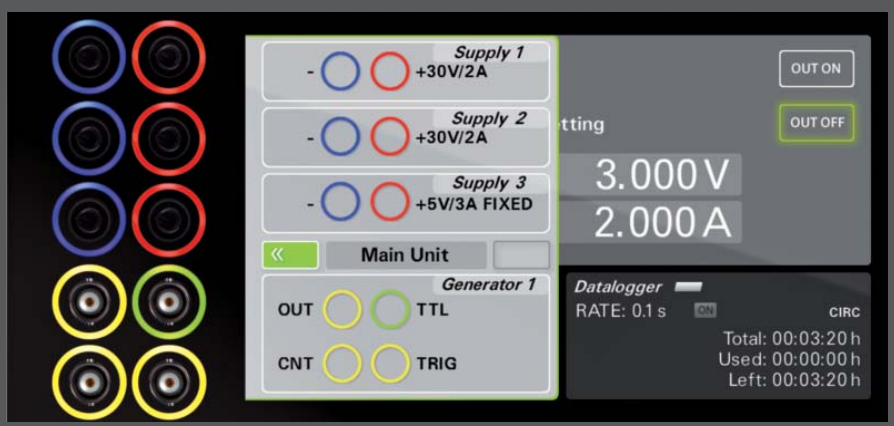
Fast signal arbitrary generator



Arbitrary functionality: Two user-defined curve forms can be transferred by an interface.



Signal types: The user selects between standard and arbitrary signals!



Connection panel: It gives information about possible connections and which devices are built-in.

Fast signal arbitrary generator
(incl. 2 function generators and counter)
Ref. No. EL5.S *(further order information see p. 58)*

Due to the additional arbitrary function any curve forms can be generated besides the standard signal forms. For generating the signals there are 2 curves of 4096 scanning spots. Two signal forms can be stored and called up. Through the telecontrol software *highlink Power* curve forms can be generated at the PC in graphical or tabular form and can be transferred to the device. With the software *highlink Power* complex signals of the vehicle electrical system or the telecommunication engineering can be easily copied. *highlink Power* allows to read-in and to convert a signal which was acquired by the oscilloscope so that the support points can be transferred to *elneos five* directly.

Innovative connection panel

The panel is called up by a swiping movement. It gives information about possible connections and which devices are built-in. In setup mode it is possible to select whether the panel should be overlaid at each switching-in operation.

Freely programmable modulation

By using the arbitrary function as wanted signal and the freely programmable carrier signal, further degrees of freedom are achieved. With this solution all signal shapes can be modulated and the carrier signal can, for example, be modulated with the arbitrary signal. All modulation kinds and characteristics conform to the afore described function generator. In the field of motor vehicle electronics and other electronic sectors, this functionality guarantees the reproduction of the desired signal shape.

Unrivalled achievement potential

When combining this quick arbitrary function generator with the power arbitrary generator for high electrical output signals of the regulating power supply units, all imaginable simulations, tests and measurements of power electronics and the fast signal electronics can be carried out with one single device. If in addition the efficient digital multimeter with power meter has been chosen, a complete measuring station can be replaced by one single measuring device. All these functionalities are essential modules for training and the industry.

Technical data and characteristics

Frequency characteristics

Sine wave: 1 µHz to 40 MHz !
Rectangle: 1 µHz to 5 MHz
Saw tooth: 1 µHz to 5 MHz
Trapeze: 1 µHz to 5 MHz
Triangle: 1 µHz to 5 MHz
Ramp: 1 µHz to 5 MHz

Frequency sources

2 Function generators independently programmable;
Memory depth: 524.288 scanning points (512 kwords)
Memory cells: 2 pcs. for 2 curves

Frequency counter

Measuring range: up to 1 GHz
optional up to 1,5 GHz (Ref. No. EL5.F1G)
Input voltage: 100 mVeff to 5 Veff

Pulses

Single pulse: single and multiple pulse up to 999 s
Burst operation at will through parameters:
Pulse and pause times: up to 999 s
Number of repetitions: 1 to ∞

Trigger pulse

Externally by BNC connectors;
Internally by menu for defined signal start;

Amplitude

Amplitude resolution for all shapes: 14 Bit (16.384)
Output amplitude: 30 Vss idle, 1.8 mV resolution

Outputs

BNC laboratory connectors with disappearing effect;
Output: up to 30 Vss idle
Output: 5 V TTL compatible

Inputs

BNC laboratory connectors with disappearing effect;
Input: Counter input for external input signals up to 1,5 GHz (Ref. No. EL5.F1G);
Input: Trigger input for defined signal start;
Input sensitivity: 100 mVeff
Pulse-duty factor: 0,1 bis 99,9 %

Operating modes

Example for Single-Mode
(control center with one device fuction)

Control center
regulating power supply unit
or functional generator
or digital multimeter ect.

Example for Multi-Mode
(control center with various device fuctions)

Control center
+ regulating power supply units
+ digital multimeter
+ functional generators

Example for Multi-Expand-Mode
(control center with 19"additional plug-ins units as well as with various device fuctions)

e-Bus

Control center
+ 2 regulating power supply units 0-30 V/2 A
+ 2 functional generators
+ digital multimeter

Control center
+ 2 regulating power supply unit 0-30 V/5 A
+ arbitrary waveform generator
+ digital multimeter

The *elneos five* devices can be operated in 3 different modes. The single-mode as stand-alone device, the multi-mode and the multi-expand-mode with 19"additional plug-in units. Thereby, we offer the highest flexibility for operating a modern laboratory.

Control center
+ regulating power supply unit
+ digital multimeter
+ power and energy meter
+ functional generator

Control center
+ 2 regulating power supply units
+ functional generator

Control center
+ 3 regulating power supply units
+ functional generator

Control center
+ 2 arbitrary waveform generators incl. regulating power supply unit 0-30 V/5 A
+ functional generator
+ power and energy meter incl. digital multimeter

Single-Mode operation
The new devices can be operated as self-contained devices, stand-alone devices. Each device group can be used on its own and independently at different places. The ultramodern control center coordinates either the communication between all devices or controls only one. The device groups power packs, function generators, digital multimeters etc. can be integrated in the control center. There is for instance 1 control unit with digital multimeter, 1 control unit with function generator and 1 control unit with power pack.

Multi-Mode operation
The technology facilitates the simultaneous integration of several device groups in one single control center. For example, 1 digital multimeter, 1 function generator and 1 power pack can be integrated in this control center. The compact unit in combination with the modern operation philosophy is unbeatable and allows the highest degree of operating flexibility. *elneos five* conceals several devices and is space and energy saving.

Multi-Expand-Mode operation
The control center allows the connection of totally 8 extra 19"additional plug-in units. Each unit enables the simultaneous integration of 4 devices of any kind (power pack, function generator, digital multimeter, etc.) and is connected with the control center through the e-bus. The plug-in unit has a bus connection which is able to activate 4 internal plug-in positions by means of adressing. In this case, the control center is the master and all other devices are the so-called slaves.

The difference between master and slave is that the master controls the slave by means of corresponding commands. The slaves have small processors which convert the commands to be executed and which supply the desired measured values on the e-bus to the master. With this technology, compact measuring systems can be built-up which execute several functions simultaneously. No other system is able to supply these performance data with one single control center in such compact space and to provide automatic measuring and test systems.

Order form device series elneos® five

Ref. No.	Device function	Page
EL5.1	**Control center** 3 HU / 56 DU with 7" multi touch display, splitting function & capacitive interface	p. 12,13,37
EL5.32	**Precision regulating power supply unit** 0-30 V/0-2 A	p. 40-42
EL5.33	**Precision regulating power supply unit** 0-30 V/0-3 A	p. 40-42
EL5.35	**Precision regulating power supply unit** 0-30 V/0-5 A	p. 40-42
EL5.31*	**Precision regulating power supply unit** 0-30 V/0-10 A	p. 40-42
EL5.62	**Precision regulating power supply unit** 0-60 V/0-2 A	p. 40-42
EL5.63	**Precision regulating power supply unit** 0-60 V/0-3 A	p. 40-42
EL5.65*	**Precision regulating power supply unit** 0-60 V/0-5 A	p. 40-42
EL5.61*	**Precision regulating power supply unit** 0-60 V/0-10 A	p. 40-42
EL5.32A	**Graphical arbitrary generator (A)** incl. regulating power supply unit 0-30 V/0-2 A	p. 44-45
EL5.33A	**Graphical arbitrary generator (A)** incl. regulating power supply unit 0-30 V/0-3 A	p. 44-45
EL5.35A	**Graphical arbitrary generator (A)** incl. regulating power supply unit 0-30 V/0-5 A	p. 44-45
EL5.31A*	**Graphical arbitrary generator (A)** incl. regulating power supply unit 0-30 V/0-10 A	p. 44-45
EL5.62A	**Graphical arbitrary generator (A)** incl. regulating power supply unit 0-60 V/0-2 A	p. 44-45
EL5.63A	**Graphical arbitrary generator (A)** incl. regulating power supply unit 0-60 V/0-3 A	p. 44-45
EL5.65A*	**Graphical arbitrary generator (A)** incl. regulating power supply unit 0-60 V/0-5 A	p. 44-45
EL5.61A*	**Graphical arbitrary generator (A)** incl. regulating power supply unit 0-60 V/0-10 A	p. 44-45
EL5.C	Comfort equipment for double regulating power supply unit and double arbitrary generator contains: serial/parallel function, master/slave function, ratio function, Tracking function	p. 40,43
EL5.D	**Precision digital multimeter (D)**	p. 46-47
EL5.DUI	Additional equipment digital multimeter: (AC/DC)	p. 46-47
EL5.P	**Power a. energy measurement device monophase** incl. digital multimeter	p. 48-49
EL5.F	**Function generator incl. counter (F)**	p. 50-53
EL5.F1G	Additional equipment function generator: extension of input from 150 MHz to 1,5 GHz	p. 52
EL5.S	**Fast signal arbitrary generator (S)** incl. 2 functional generator and counter	p. 54-55
EL5.Z	**Additional plug-in units, 3 HU/14 DU** incl. ring lighting and disappearing effect for digital multimeter, power measurement device and function generators	p. 30-31
EL5.TW	Twin operation mode for simultaneously and independent operations of several devices	p. 26-27

Ref. No.	Applications for Remote Control	Page
EL5.W	Web server – Industy 4.0: comfortable remote control of devices via browser	p. 32-33
EL5.LT	*LabVIEW* device driver for *elneos five* spectrum of devices	p. 38
HPE 1.200	Remote control software *highlink Power elneos* for *elneos five*. All functions of the device series *elneos five* can be remotely controlled by this software package. (Installation as .EXE)	p. 32,38
HP 1.100	Room-/device control software *highlink Power*** student package 12 licences Besides the device functions of *elneos five*, all room functions are web-based controlled!	p. 32,38
HP 1.101	Room-/device control software *highlink Power*** trainer package 1er licence Besides the device functions of *elneos five*, all room functions are web-based controlled!	p. 32,38
HP 1.102	Room-/device control software *highlink Power*** industry package 1er licence Besides the device functions of *elneos five*, all room functions are web-based controlled!	p. 32,38

*Devices with higher construction depths; **Web based–Industry 4.0; More information about the control software *highlink Power*, see p. 48-54 catalogue *erfi instruments*

It is so easy!

Select your desired device function with the associated reference numbers. All device functions can be integrated at the same time in one control center (Ref. No. EL5.1). There ist one control center per working station. The control center of *elneos five* is able to manage up to 32 devices and therefore usually one control center is sufficient. Double working stations at educational centers use the splitting function of thetouch screen and use 3 device units at the same time.

You can combine regulating power supply units with any power arbitrary generators, digital multimeters, power and energy meters, function generators and signal arbitrary generators – *elneos five* recognizes all devices. In case the connections on the front panel of the control center are not sufficient, intelligent additional plug-in units are available. The optional twin operation mode (Ref. No. EL5.TW) offers a simultaneous and independent handling of all devices. Changing the devices is enabled by the icon bar, hence another control center is not necessary.

Order example 1

1 Regulating power supply unit 0-30 V/0-2 A,
1 Digital multimeter, 1 Function generator;

pcs.	Ref. No	Device function Multi-Mode
1	EL5.1	Control center 3 HU/56 DU with 7" touch display and capacitive interface
1	EL5.32	Regulating power supply unit 0-30 V/0-2 A
1	EL5.D	Digital multimeter
1	EL5.F	Function generator

Order example 2

2 Graphical arbitrary generator (0-30 V/0-5 A) incl. regulating power supply unit,
1 Power and energy measurement device monophase incl. digital multimeter,
1 Fast signal arbitrary generator incl. function generator, additional plug-in unit;

pcs.	Ref. No	Device function Multi-Expand-Mode
1	EL5.1	Control center 3 HU/56 DU with 7" touch display and capacitive interface
2	EL5.35A	Graphical arbitrary generator 0-30 V/0-5 A incl. regulating power supply unit
1	EL5.P	Power and energy measurement device monophase incl. digital multimeter
1	EL5.S	Fast signal arbitrary generator incl. function generator
1	EL5.Z	Additional plug-in unit (slave), 3 HU/14 DU incl. ring lighting and disappearing effect

Order example 3

1 Graphical arbitrary generator (0-30 V/0-5 A) incl. regulating power supply unit,
1 Precision regulating power supply unit (0-30 V/3 A),
1 Power and energy measurement device monophase incl. digital multimeter,
2 Fast signal arbitrary generators incl. function generator, additional plug-in unit;

pcs.	Ref. No	Device function Multi-Expand-Mode
1	EL5.1	Control center 3 HU/56 DU with 7" touch display and capacitive interface
1	EL5.35A	Graphical arbitrary generator 0-30 V/0-5 A incl. regulating power supply unit
1	EL5.33	Regulating power supply unit 0-30 V/0-3 A
1	EL5.P	Power and energy measurement device monophase incl. digital multimeter
2	EL5.S	Fast signal arbitrary generator incl. function generator
1	EL5.Z	Additional plug-in unit (slave), 3 HU/14 DU incl. ring lighting and disappearing effect

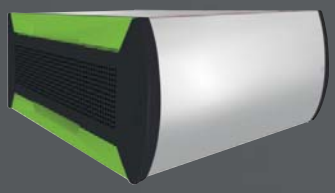
Stand-alone Casing

Installation depth 1, width 56 DU, functional handle in elneos green (RAL design system 1107070)

Installation depth 1, width 56 DU, functional handle in grey (RAL design system 5500)

Installation depth 2, width 56 DU, functional handle in elneos green (RAL design system 1107070)

Installation depth 2, width 56 DU, functional handle in grey (RAL design system 5500)



Rear view of the stand-alone casing

Functional handle in elneos green, RAL design system 1107070

Ventilation system (ideal for sequencing table attachments and cockpits)

Perforated side panel for perfect ventilation

Casing of a solid extruded aluminium profile

Indication light integrated in the top

Indication light integrated in the front panel

Ventilation system

Installation depth 2, width 70 DU, functional handle in elneos green (RAL design system 1107070)

Note:
Installation depth 1 = 185 mm depth
Installation depth 2 = 360 mm depth
Width 56 DU = 315 mm width
Width 70 DU = 386 mm width

Stand-alone tabletop units
Best.-Nr. EL5.SA1.28.1. til Best.-Nr. EL5.SA2.84.2
(further order information see p. 62)

The innovative devices *elneos five*, *basic* and *highlab* are ideal for operation as tabletop unit due to the newly developed casings.

Casing made of aluminium

For this purpose a range of self-contained new stand-alone casings has been developed which meets the high demands of the devices. The material being used guarantees an optimal protection of the built-in components. Due to the incorporation of professional 19" attachments, the 19"/3 HU partial racks can be optimally integrated. The body consists of anodised extruded aluminium profiles. This protects the built-in devices against mechanical stress, dirt and other influences.

Special features of the side elements

Lateral functional handles
Lateral cast parts with plastic coating and incorporated recesses allow a perfect handling and give a high-quality impression. The functional elements are available in two different colours (elneos green and grey).

Available colours of the functional handles
- elneos green RAL Design system 1107070 or
- grey RAL Design system 5500

Generous ventilation system
Due do a modern surface perforation in the graphite black coloured side elements made of plastics guarantees the fresh air supply at any time. In case of sequencing several casings, table attachments or cockpits guarantee the supply of fresh air from top and bottom due to special recesses. A well-thought-out system ensures the right flow of air! The plastic material allows a 100% protection against contact.

Indication light – limit value monitoring

(optional, further order information see p. 62)
In all models of stand-alone casings a LED-RGB indication light band can optionally be incorporated. The indication light is particularly important in connection with the devices of the series *elneos five*.

The devices of the series *elneos five* are equipped with an integrated limit value monitoring (limiter) for power control units, power arbitrary generators, digital multimeters and power sensors which are directly connected with 8 digital outputs. With these outputs the indication light is directly controlled.

Example:
green: within a specified range of values
red: above a specified range of values
blue: below a specified range of values

Thus, the indication light ensures a maximum of safety at the workplace and is, therefore, an option which makes sense. Whether in the laboratory for long-time tests or in the field of training facilities, the indication light increases considerably the safety in your work environment.

Modular concept – highly flexible

A completely new modular concept of casings based on the overbreakage technique permits the integration of the various casings due to 2 different installation depths and any widths. Due to the application of extruded profiles, the casing can additionally be used as direct device carrier in the laboratory world. Thereby the casings are either directly mounted on the tabletop across the entire width of the laboratory table or in the third level as self-supporting device cockpit.

Installation depth 1: 185 mm
Installation depth 2: 360 mm
Lengths: available up to max. 6 m length
As regards the width there is no limitation.
Almost every desired width is deliverable.

Order form stand-alone casing

Scope of supply per casing
- Power lead
- Attachment for 19" partial racks

Additional scope of supply for the series *elneos five*
Interfaces led through at the back: USB 2.0, RJ45, 8 digital I/O's, CD-ROM with manual, *LabVIEW* driver, SCPI instruction set, USB 2.0 cable type A/B
Note: The indication light requires 3 digital outputs (parallel wiring).

Stand-alone casing with installation depth 1 = 185 mm			
Ref. No.	**Handles sideways**	**Outer dimensions (W x D x H) mm**	**19" size**
EL5.SA1.28.1	green RAL DESIGN 1107070	172 x 185 x 161	3 HU / 28 DU
EL5.SA1.42.1	green RAL DESIGN 1107070	244 x 185 x 161	3 HU / 42 DU
EL5.SA1.56.1	green RAL DESIGN 1107070	315 x 185 x 161	3 HU / 56 DU
EL5.SA1.70.1	green RAL DESIGN 1107070	386 x 185 x 161	3 HU / 70 DU
EL5.SA1.84.1	green RAL DESIGN 1107070	457 x 185 x 161	3 HU / 84 DU
EL5.SA1.28.2	grey RAL DESIGN 5500	172 x 185 x 161	3 HU / 28 DU
EL5.SA1.42.2	grey RAL DESIGN 5500	244 x 185 x 161	3 HU / 42 DU
EL5.SA1.56.2	grey RAL DESIGN 5500	315 x 185 x 161	3 HU / 56 DU
EL5.SA1.70.2	grey RAL DESIGN 5500	386 x 185 x 161	3 HU / 70 DU
EL5.SA1.84.2	grey RAL DESIGN 5500	457 x 185 x 161	3 HU / 84 DU
Stand-alone casing with installation depth 2 = 360 mm			
EL5.SA2.28.1	green RAL DESIGN 1107070	172 x 360 x 161	3 HU / 28 DU
EL5.SA2.42.1	green RAL DESIGN 1107070	244 x 360 x 161	3 HU / 42 DU
EL5.SA2.56.1	green RAL DESIGN 1107070	315 x 360 x 161	3 HU / 56 DU
EL5.SA2.70.1	green RAL DESIGN 1107070	386 x 360 x 161	3 HU / 70 DU
EL5.SA2.84.1	green RAL DESIGN 1107070	457 x 360 x 161	3 HU / 84 DU
EL5.SA2.28.2	grey RAL DESIGN 5500	172 x 360 x 161	3 HU / 28 DU
EL5.SA2.42.2	grey RAL DESIGN 5500	244 x 360 x 161	3 HU / 42 DU
EL5.SA2.56.2	grey RAL DESIGN 5500	315 x 360 x 161	3 HU / 56 DU
EL5.SA2.70.2	grey RAL DESIGN 5500	386 x 360 x 161	3 HU / 70 DU
EL5.SA2.84.2	grey RAL DESIGN 5500	457 x 360 x 161	3 HU / 84 DU

blue = below limits	*green = within limits*	*red = above limits*

Indication lamp for stand-alone casing	**Top side**	**Front side**
• Independent control unit built into the stand-alone casing • 1 light band across the entire width of the stand-alone casing, optionally integrated in the top or in the front panel • 1 High-power RGB LED, invisibly integrated in the table casing and wired to the digital outputs of *elneos five*.	ELC.2.9.SAI1	ELC.2.9.SAI2

Order form 19" table set up/19" cockpit

Aluminium casing

The new aluminium casings are well suited as table attachments and cockpits and are suitable for the integration of all 3 HU devices of the series *elneos five*, highlab and basic. They are a useful alternative to the previous attachments and cockpits made of laminated material. The new function elements contain a ventilation system which ensure a sufficient flow of air even when installed in a sequence.

Lighting

The RGB-LED indication lights can optionally be integrated in the top or in the front panel of the aluminium casing. The modern and sensor-controlled RGB-LED workplace lamp of the series elneos connect is invisibly integrated in the underside of the cockpit. Information for ordering are on the following page.

Example:
19" table set up and installation depths 1

Example:
19" cockpit and installation depths 2

19" table set up / 19" cockpit with installation depth 1 = 185 mm			
Ref. No.	**Color sideways**	**Outer dimensions (W x D x H) mm**	**19" size**
ELC4.6.1.1200.1	green RAL DESIGN 1107070	1200 x 185 x 156	3 HU / 230 DU
ELC4.6.1.1600.1	green RAL DESIGN 1107070	1600 x 185 x 156	3 HU / 308 DU
ELC4.6.1.1800.1	green RAL DESIGN 1107070	1800 x 185 x 156	3 HU / 348 DU
ELC4.6.1.2000.1	green RAL DESIGN 1107070	2000 x 185 x 156	3 HU / 387 DU
ELC4.6.1.1200.2	grey RAL DESIGN 5500	1200 x 185 x 156	3 HU / 230 DU
ELC4.6.1.1600.2	grey RAL DESIGN 5500	1600 x 185 x 156	3 HU / 308 DU
ELC4.6.1.1800.2	grey RAL DESIGN 5500	1800 x 185 x 156	3 HU / 348 DU
ELC4.6.1.2000.2	grey RAL DESIGN 5500	2000 x 185 x 156	3 HU / 387 DU
19" table set up / 19" cockpit with installation depth 2 = 360 mm			
ELC4.6.2.1200.1	green RAL DESIGN 1107070	1200 x 360 x 156	3 HU / 230 DU
ELC4.6.2.1600.1	green RAL DESIGN 1107070	1600 x 360 x 156	3 HU / 308 DU
ELC4.6.2.1800.1	green RAL DESIGN 1107070	1800 x 360 x 156	3 HU / 348 DU
ELC4.6.2.2000.1	green RAL DESIGN 1107070	2000 x 360 x 156	3 HU / 387 DU
ELC4.6.2.1200.2	grey RAL DESIGN 5500	1200 x 360 x 156	3 HU / 230 DU
ELC4.6.2.1600.2	grey RAL DESIGN 5500	1600 x 360 x 156	3 HU / 308 DU
ELC4.6.2.1800.2	grey RAL DESIGN 5500	1800 x 360 x 156	3 HU / 348 DU
ELC4.6.2.2000.2	grey RAL DESIGN 5500	2000 x 360 x 156	3 HU / 387 DU

Order form lighting systems

Workspace lamp and indication light
The in-house development of the illumination of elneos connect is based onthe present LED technology. The modern and sensor-controlled RGB-LED workspace lamp of the furniture models elneos connect is invisibly integrated in the underside of the cockpit. The RGB-LED indication lights can optionally be integrated in the top or in the front panel of the aluminium casing.

LED workplace lighting
In the bottom profile of the cockpit the swivel RGB-LED lamp for the table is invisibly installed. This lamp is controlled by powerful RGB-LED's as well as by white high-performance LED's. The lamp can be swivelled in its fixture, it is dimmable and any light colour can be adjusted.

Another plus factor is that the colour of the light can be adapted to the present daylight and shadows can be avoided. The new lamp can also be used as individual lamp and as an alternative is available with white LED's only.

Indication light for table set up and cockpit
The indication light is a special LED light conductor which can alternatively be operated as signal indicator or ambient light. Smooth transitions of colour as well as flashlight functions are also possible.

Scope of supply of the indication light:

- Independent control unit built into the table set up or the cockpit
- 1 light band across the entire width of the table set upor cockpit, optionally integrated in the top or/and in front panel
- 2 High-power RGB LED's integrated in the table casing and wired to:

  1. the digital outputs of *elneos five* (limiter)

  alternatively

  2. the internal control for the various table conditions (extra low voltage and low voltage, mains, EMERGENCY STOP signalisation etc.)

  alternatively

  3. a separate front panel with sockets for individual control

  alternatively

  4. a separate front panel with rotary switch for the direct adjustment of the desired signal colour (e.g. red = table occupied with long-term test and may not be used).

Workspace lamp for 19"cockpit			
white High-power LED's		**white and RGB High-power LED's**	
Table lenght	**Ref. No.**	**Table lenght**	**Ref. No.**
1200 mm	ELC2.5.1200.WA1	1200 mm	ELC2.5.1200.FA1
1600 mm	ELC2.5.1600.WA1	1600 mm	ELC2.5.1600.FA1
1800 mm	ELC2.5.1800.WA1	1800 mm	ELC2.5.1800.FA1
2000 mm	ELC2.5.2000.WA1	2000 mm	ELC2.5.2000.FA1

Indication lamp for 19"table set up and 19"cockpit			
Top side		**Front side**	
Table lenght	**Ref. No.**	**Table lenght**	**Ref. No.**
1200 mm	ELC2.9.1200.IA.1	1200 mm	ELC2.9.1200.IA.2
1600 mm	ELC2.9.1600.IA.1	1600 mm	ELC2.9.1600.IA.2
1800 mm	ELC2.9.1800.IA.1	1800 mm	ELC2.9.1800.IA.2
2000 mm	ELC2.9.2000.IA.1	2000 mm	ELC2.9.2000.IA.2

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