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elneos® five

experience the touch

The new device series by *erfi*.

reddot design award winner 2013

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German Design Award WINNER

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As manufacturers 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 a 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

elneos® five

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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 7 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.

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.

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

Clean and sturdy

experience the touch

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, ESG 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.

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.

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.

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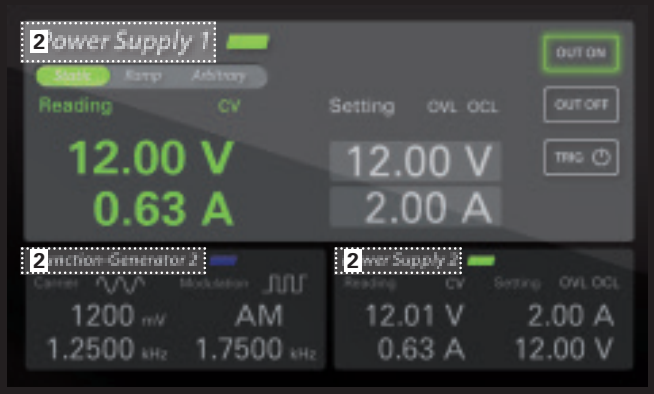
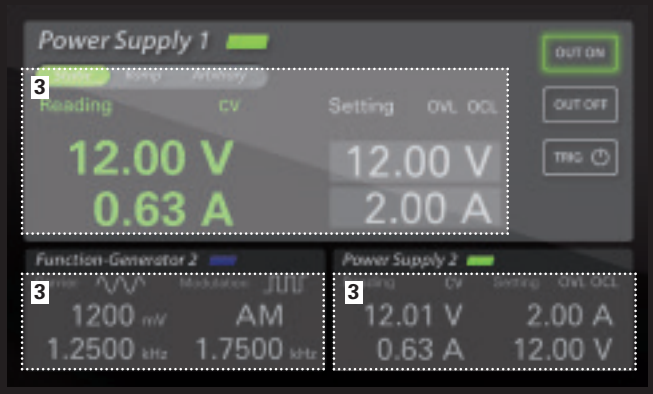
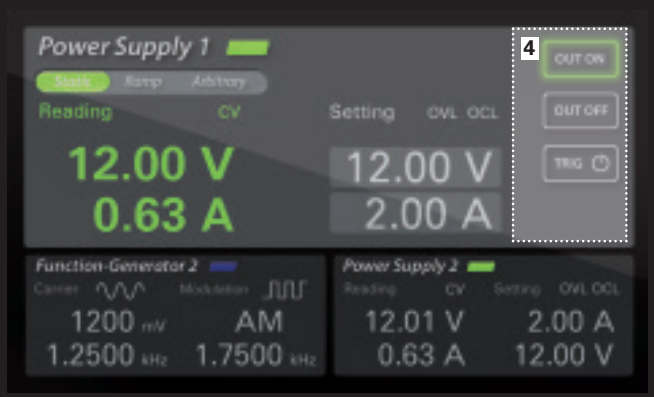
1. Division



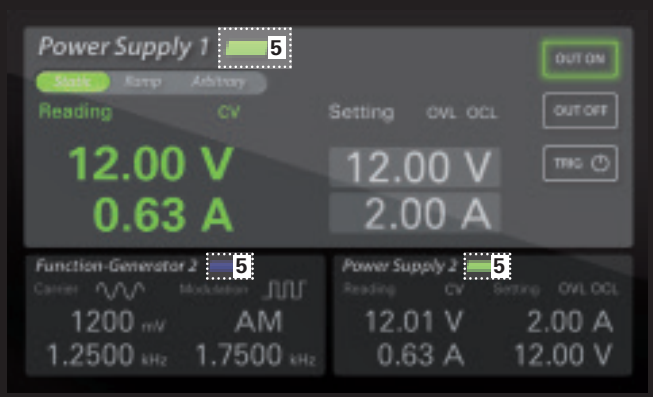
2. Device designation



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 ESG 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.

Imprint-free
The micro-etched and anti-reflecting ESG 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.

On request, this technology allows also the usability with gloves and the generous 7”display ensures the simultaneous control and surveillance of several devices at a glance.

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 cannot 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. When wiping from the primary area into the secondary area, the devices change as well.

Device change by double taping:
By quickly inching twice on one of the two lower secondary areas, the relevant device changes to the primary area – this is an alternative operation to wiping.

From the icon bar into the ***primary area:***
When pressing the menu key or when carrying out the 3 finger contact, 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.

From the icon bar into the ***secondary area****:*
When pressing the menu key or when carrying out the 3 finger contact, the icon bar appears. If a device is to be operated in one of the two secondary areas, it must be touched with one finger and it must be drawn either down to the left or down to the right. The device which was in the relevant secondary area before, goes back to the icon bar. This allows to change very quickly from one device to another and to visualize the requested information within seconds.

Drawing a device from the primary into the secondary area

2-Finger contact

Stepwise 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.

Wiping to the left and right by the icon bar:
Since the icon bar appears either through the menu key or through the 3 finger contact, the same can be displaced either to the left or to the right by wiping with 2 fingers and thus, all devices (maximum 32) are quickly accessible.

Scrolling the ramp functions or arbitrary function:
When the ramp or arbitrary function has been selected, the values can easily move downwards from the primary area. By wiping with 2 fingers either to the top or bottom, the chart is scrolled.

Scrolling the ramp function

Device selection via icon bar

... Amazement

3-Finger contact
By simply wiping down with 3 fingers, the icon bar is activated and all connected devices are visible. The same happens by pressing the menu sensor.

4-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. Wiping downwards with 4 fingers signalizes *elneos five* that all integrated devices are to be put in a default status. 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.

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 pulling together 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.

Slave 14 DU, 3 HU

Master 56 DU

Slave 28 DU

Slave 42 DU

Slave 56 DU

Slave 70 DU

e-Bus

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 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.

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 inkl. blocking

... and for you !

In educational institutions

- Vandal-safe device front panel offers all-round safety for training
- Front panel cannot be removed without special knowledge of the same
- Tele-control allowing adjustments for training and tests
- Elaborated values do not get lost even after pauses
- Graphical representation of measured values and scaling clarify the results
- Safe-Guard function avoids dangerous situations in the environment of the trainee
- Ring connector lighting avoids definitely faulty contacting
- High acceptance by the target group due to up to date contact control
- 8 digital I/O's as PLC replacement for exercises in automation engineering
- Password protection for access to the devices

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"multitouch coloured display is exclusively controlled by contact with up to 5 fingers.

1-Finger contact: Device change wiping and inching
2-Finger contact: Zoom X-Y charts/operate icon bar/ scroll tables
3-Finger contact: Display of all devices at a glance
4-Finger contact: Activation of Safe-Guard function
5-Finger-contact: Activation of locking function

- 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 ESG 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 (160 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: 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

Design of the control center
In the control center up to 7 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
Holding capacity: up to 7 different devices
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.

8 digital I/Os – 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

Integrated web server (optional)
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

Remote control, 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:

Remote control 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.

Remote control 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

Important note: The interface rests always on an earthed potential. The internal remote control 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 optionally be tele-controlled by means of the comprehensive control software *highlink Power*, alternatively by means of *LabVIEW* device drivers. Due to the applied language of the devices SCPI, the use as OEM-product is possible.




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.

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.

Measured value storage
elneos five has an internal device storage for up to 2000 measured values. An additional integrated time stamp ensures a professional evaluation of the measured values.

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.

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.

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.

Precision regulating power supply unit (incl. universal metering)

Fig.:
Reference No EL5.32

Special features

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.

Technical regulating data	
Adjusting precision:	14 Bit D/A-converter (1 mV, 1 mA)
Measuring precision:	16 Bit A/D-converter (1 mV, 1 mA)
Voltage range:	0-100 V (as per model)
Current range:	0-50 A (as per model)
Control deviation 1:	voltage: 300 µV/A, current: 150 µA/V (with load change 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
Transient time:	12 µs load step 0-100 %

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.

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.

Safe-Start function (safety start)
Through a digital interface to the control center, outputs can be connected either at a defined point of time or by a trigger signal through a previous digital input.

Programmable OVL and UVL function
(OVL= Overvoltage limit, UVL=Undervoltage limit)
When exceeding a maximal voltage (OVL) or falling below a minimum voltage (UVL), the output is switched off.

Data logger
An integrated data logger allows the storing of up to 2000 measured values. The graphical visualisation of the stored values (X-Y chart) is alternatively possible in tabular form. On request, the measured values can be transferred directly to the interface.

Precision regulating power supply unit (incl. universal metering)

Further technical features

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.

Functions of multiple devices of *elneos five*

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.

Tracking funcion (optional)
This function serves for the simultaneous taking of negative and positive voltage. The regulating power supply unit 2 follows the setpoint setting of Regulating power supply unit 2 in reverse polarity.

Regulating power supply unit 1 = positive voltage
Regulating power supply unit 2 = negative voltage

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.

Graphical arbitrary waveform generator

Fig.:
Reference No EL5.31A

Special features

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.

Outstanding technical feature of the graphical arbitrary wavefrom 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. KFZ voltage pulses can be nicely simulated in the laboratory. The sequencer is an important tool for training and the industry.

Technical data

Stored standard signal shapes: sine wave, rectangle, triangle;
Duty cycle: variable
Frequency: Sine wave up to **1 kHz**, rectangle 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;

elneos five – experience the touch

Precision digital multimeter and universal tester

Fig.:
Reference No EL5.D

Precise – Excellent measurement precision !
Due to the use of ground-breaking TRMS converter modules of considerably improved linearity and band width, an excellent measurement precision with the outstanding crest factor 5 is possible.

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 of elneos five.

Strong – high currents and voltages !
elneos five allows the acquisition of currents of up to 40 A and voltages of up to 1000 V.

Versatile – additional functions !
Due to intelligent additional functions such as capacity and inductance measurements, RLC 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.

Compact – no waste of space !
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. Therefore, more additional devices can be integrated, requiring a minimum of space.

Indispensible – safe storing of measured values !
The integrated data logger stores up to 2000 measured values and keeps records of all measurement results with a time stamp. The results can be called up at any time, they are representable in an X-Y graph and can be read out through the interface.

Amazing – graphical display of measured values !
The digital multimeter facilitates the graphical display of the present and stored measured values by means of X-Y graphs.

Safe – detect limits and react appropriately !
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.

Fig.: Example for graphic representation (sine wave AC voltage)

Technical data	
Voltage measurement DC:	up to 1000 V; 1 µV; ± 0.08 % + 10 dgt.
Voltage measurement AC:	up to 750 V (peak 1060 V); 1 µV; ± 0,5 % + 10 dgt.
Current measurement DC:	up to 32 A continuous current (temporarily up to 40 A), 100 nA; ± 0.2 % + 10 dgt.
Current measurement AC:	up to 32 A continuous current (temporarily up to 40 A), 100 nA; ± 0.8 % + 10 dgt.
Resistance measurement:	up to 40 MΩ, 1 mΩ; ± 0.8 % + 5 dgt.
Capacity measurement:	up to 400 nF/4/40/400/4000 µF; 1 pF; ± 2.0 % + 10 dgt
Inductance measurement:	400 mH; 10 µH; ± 1.0 %, +10 dgt.
Temperature measurement:	- 200 bis + 600 °C, 0.1°C; ± 3.0 % + 2 °C (Pt -100 sensor with 100 Ohm nominal resistance with 20 °C)
Frequency measurement:	up to 100 kHz, 1 Hz; ± 0.1 %; + 5 dgt
True-RMS function:	real effective value measurement;
Crest factor:	**5 with non-sinusoidal signals;** **New TRMS converter with improved linearity and band width.**
• Diode test	
• Continuity test	
Limit values:	Limits of all measured values are programmable.
Digital output:	When exceeding or falling below the measured values, a digital output is triggered.
Digital input:	Start of measurement by trigger pulse of the input (flank control)
Data logger:	Storing of 2000 measured values by time stamp; values graphically available (X-Y graph/tabular form) or read-out through interface.
Measured value representation:	X-Y graph available and scaleable by 2-finger contact; ideal for the quick acquisition of changes (long-term measurements).

Power and energy measurement device monophase

Fig.:
Reference No EL5.P

Special features
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.

Precise – excellent measurement precision !
Due to the use of ground-breaking TRMS converter modules of considerably improved linearity and band width, an excellent measurement precision. The new power measuring device achieves an unequalled precision due to the correct measurement of non-sinusoidal signals.

Strong – extraordinarily high capacity !
elneos five allows the acquisition of high power and energy for monophase consumers of up to 24 kW.

Compact – no waste of space !
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.

Indispensible – safe storing of measured values !
The integrated data logger stores up to 2000 measured values and keeps records of all measurement results with a time stamp. The results can be called up at any time and are graphically displayed in an X-Y graph. Of course, the measured values can also be read out through the interface.

Amazing – graphical display of measured values !
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.

Safe – detect limits and react appropriately !
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.

Fig.: Example for graphic representation (power phase control)

Technical features	
Real power:	- 24 kW to + 24 kW with 750 V AC - 7.5 kW to + 7.5 kW with 230 V AC, (temporarily 9.2 kW) precision: ± 0.2 % + 10 dgt
Apparent power:	0 to 24 kVA with 750 kV AC -7.5 kVA to + 7.5 kVA with 230 V AC, (temporarily 9.2 VA) precision: ± 0.4 % + 10 dgt
Idle power:	- 24 kvar to + 24 kvar with 750 V AC -7.5 kvar to + 7.5 kvar with 230 V AC, (temporarily 9.2 kvar) precision: ± 0.2 % + 10 dgt
Active energy:	- 24 kWh to + 24 kWh with 750 V AC - 7.5 kWh to + 7.5 kWh with 230 V AC, (temporarily 9.2 kWh) precision: ± 0.2 % + 10 dgt
Apparent energy:	0 to 24 kVAh with 750 V AC 0 to 7.5 kVAh with 230 V AC, (temporarily 9.2 VAh) precision: ± 0.4 % + 10 dgt
Reactive energy:	- 24 kvarh to + 24 kvarh with 750 V - 7.5 kvarh to + 7.5 kvarh with 230 V AC, (temporarily 9.2 kvarh) precision: ± 0.2 % + 10 dgt
Power factor:	cos phi from 0 to 1
Max. current (AC/DC):	32 A, temporarily 40 A
Max. voltage (AC):	750 V
Max. voltage (DC):	1000 V

2 function generators in one incl. counter

Fig.:
Reference No EL5.F

Special features

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 with 50 Ohm.

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 150 MHz 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.

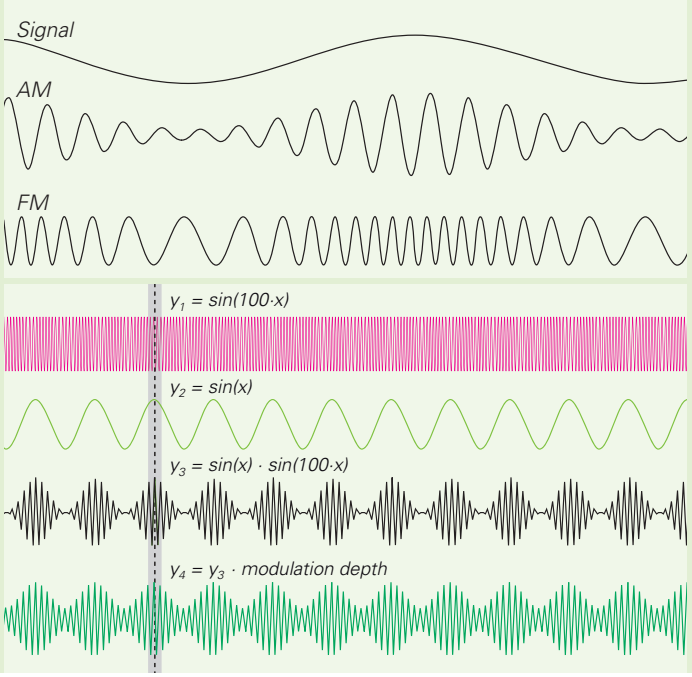
For both function generators the device controls the frequency modulation (FM), the amplitude modulation (AM), the pulse width modulation (PWM), the burst and sweep function (special kind of frequency modulation).

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 %



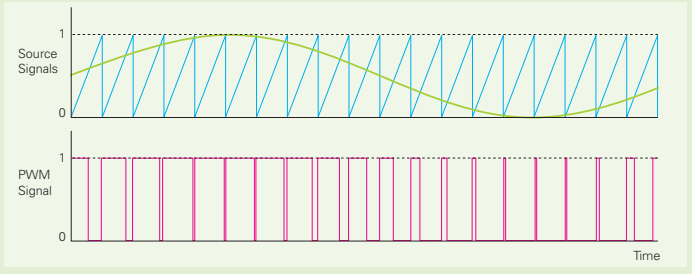
Pulse width modulation (PWM)

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.

2 function generators in one incl. counter

Technical data function generator and counter

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

Amplitude

Amplitude resolution for all signal shapes: 14 Bit (16.384)
Output amplitude: 30 Vss at 50 from 0 to 20 MHz, 1.8 mV resolution
Output amplitude: 20 Vss at 50 from 0 to 40 MHz, 1.8 mV resolution

Pulses

Single pulse: 200 ns to 999 s / multiple pulse: 200 ns to 999 s
Burst operation programmable at will through parameters:
Pulse and pause times: 200 ns to 999 s
Number of repetitions: 1 to ∞

Trigger pulse

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

Outputs

BNC laboratory connectors with innovative ring lighting inclusive disappearing effect;
Output: up to 30 Vss at 50
Output: 5 V TTL compatible

Inputs

BNC laboratory connectors with innovative ring lighting inclusive disappearing effect;
Input: Counter input for external input signals up to 150 MHz;
Input: Trigger input for defined signal start;
Input sensitivity: 100 mVeff

Technical data function generator and counter

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 modulated signal is reduced on a percentage basis.

4 Modulation types per generator (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 %

Frequency counter

Measuring range: 1 µHz to 150 MHz

Input voltage: 100 mVeff to 5 Veff

Fast signal arbitrary generator (incl. 2 function generators and counter)

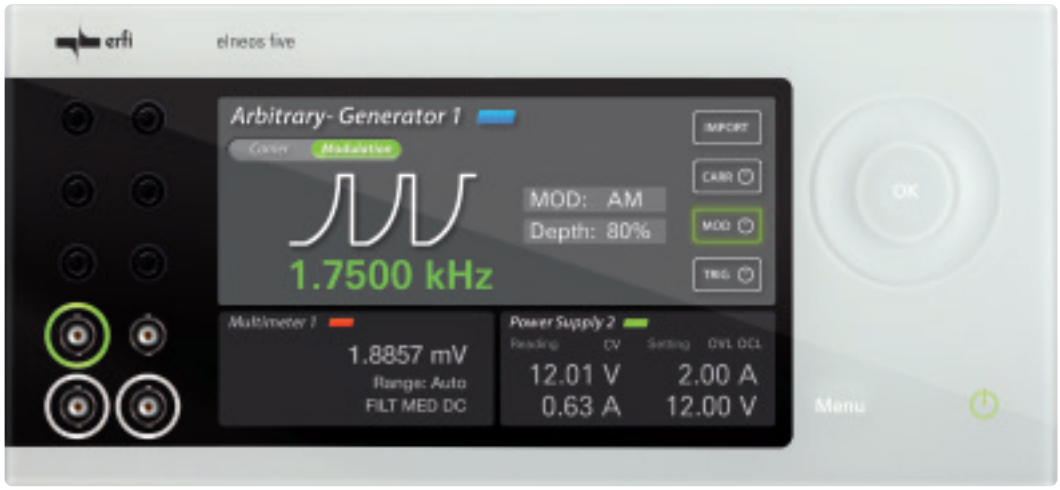


Fig.:
Reference No EL5.S

Special features
This device represents the up-to-date technology in the field of arbitrary technology and comprises all functions of the function generator and counter.

Design and control

Due to the additional arbitrary functions, any curve shape can be generated besides the standard signal shapes. For generating arbitrary signals, there are 524.288 scanning spots (512 kwords = 1024 kByte) available with a resolution of 14 Bit. Thus, an excellent reproduction of natural and complex signals is possible. Two signal shapes can be stored in the device and can be called up. By means of the modern remote-control software *highlink Power*, any curve shapes can be generated on the PC in graphical or tabular form and can be transferred to the device.

With the software *highlink Power* even complex signals of the KFZ electrical system or communications engineering can be reproduced easily and quickly. *highlink Power* allows also to read in a signal detected with the oscilloscope and to convert it so that the obtained support points can be transferred directly to *elneos five*. Consequently, measured signal shapes can quickly be reproduced in the device. The afore described freely programmable modulation allows an even higher degree of freedom with the additional arbitrary function.

Arbitrary functions

Any signal shapes are transferable into the internal memory by tele-control. Signal shapes detected with the oscilloscope can be transferred to the software of *highlink Power* and from there, after transformation, directly to the arbitrary generator.

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 KFZ 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 fast signal arbitrary generator incl. 2 function generators and counter
2 Function generators
All technical parameters as per the previous function generator inclusive counter;
Frequency sources
2 Function generators which are programmable independently of one another;
Memory depth: 524.288 scanning points (512 kwords) / memory cells: 2 pcs. for 2 curves
Frequency characteristics
Sine wave: 1 µHz to 40 MHz, all other shapes: 1 µHz to 5 MHz (arbitrary signals)
Rectangle: 1 µHz to 5 MHz, saw tooth: 1 µHz to 5 MHz, triangle: 1 µHz to 5 MHz,
Trapeze: 1 µHz to 5 MHz, ramp: 1 µHz to 5 MHz;
Amplitude
Amplitude resolution for all signal shapes: 14 Bit (16.384)
Output amplitude: 30 Vss with 50 Ω from 0 to 20 MHz, 1.8 mV resolution
Output amplitude: 20 Vss with 50 Ω from 0 to 40 MHz, 1.8 mV resolution
Pulses
Single pulse: 200 ns to 999 s / multiple pulse: 200 ns to 999 s
Burst operation programmable at will by parameters:
Pulse and pause times: 200 ns to 999 s
Number of repetitions: 1 to ∞
Trigger pulse
Externally by BNC connectors / Internally by menu for defined signal start;
Outputs
BNC laboratory connectors with innovative ring lighting inclusive disappearing effect;
Output: up to 30 Vss with 50 Ω
Output: 5 V TTL compatible
Inputs
BNC laboratory connectors with innovative ring lighting inclusive disappearing effect;
Input: Counter input for external input signals up to 150 MHz;
Input: Trigger input for defined signal start;
Input sensitivity: 100 mVeff
Duty factor: 0.1 to 99.9 %
Frequency counter
Measuring range: 1 µHz to 150 MHz
Input voltage: 100 mVeff to 5 Veff

Operating modes

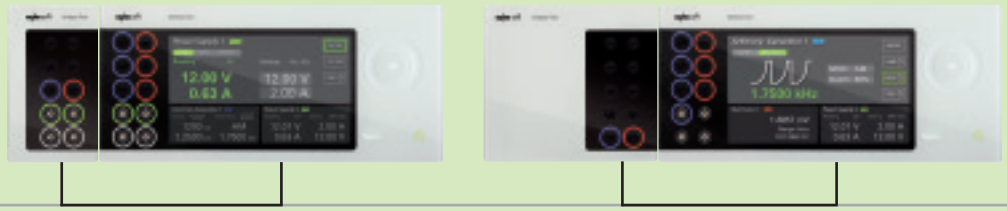
Example for Single-Mode
(control center with one device fuction)

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

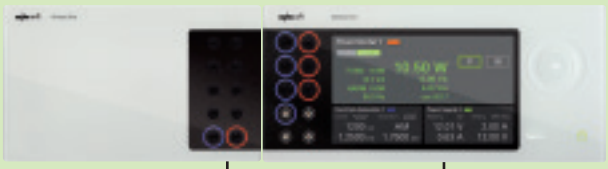
Control center
+ 2 regulating power supply unit 0-30 V/5 A
+ arbitrary waveform generator
+ digital multimeter

The *elneos five* devices can be operated in 3 different modes.
The single mode as stand-alone device, the multimode 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.

Multimode 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

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 single control center (order number EL5.1) of the installation size 3 HU/56 DU. There ist one control center per working station.

The powerful 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 the 7'' touch screen and use 3 device units at the same time.

Ref. No	Device function						
EL5.1	Control center 3 HU/56 DU with 7" multi touch display incl. splitting function and capacitive interface						
	Precision regulating power supply unit	**Graphical arbitrary generator (A)** incl. regulating power supply unit	**Precision digital multimeter (D)**	**Power a. energy measurement device monophase (P)** incl. digital multimeter	**Fast signal arbitrary generator incl. 2 function generators and counter (F)**	**Fast signal arbitrary generator (S)** incl. functional generator	**Add. plug-in units, 3 HU/14 DU** incl. ring lighting and disappearing effect
EL5.32	0-30 V/0-2 A						
EL5.33	0-30 V/0-3 A						
EL5.35	0-30 V/0-5 A						
EL5.31*	0-30 V/0-10 A						
EL5.62	0-60 V/0-2 A						
EL5.63	0-60 V/0-3 A						
EL5.65*	0-60 V/0-5 A						
EL5.61*	0-60 V/0-10 A						
EL5.32A		0-30 V/0-2 A					
EL5.33A		0-30 V/0-3 A					
EL5.35A		0-30 V/0-5 A					
EL5.31A*		0-30 V/0-10 A					
EL5.62A		0-60 V/0-2 A					
EL5.63A		0-60 V/0-3 A					
EL5.65A*		0-60 V/0-5 A					
EL5.61A*		0-60 V/0-10 A					
EL5.D			•				
EL5.P				•			
EL5.F					•		
EL5.S						•	
EL5.Z							•
HP 1.100	Room-/device control software *highlink Power*** student package 12 licences for 12 pupils/students						
HP 1.101	Room-/device control software *highlink Power*** trainer package for 1 teacher						
HP 1.102	Room-/device control software *highlink Power*** industry package 1 licence for 1 working station						
EL5.LT	*LabVIEW* device driver for *elneos five* spectrum of devices						

* Devices with higher construction depths

** Detailed information about room and device control software *highlink Power*, please see page 54 of our catalogue *erfi instruments*

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 automatically all devices.

In case that the connections on the front panel of the control center are not sufficient, intelligent additional plug-in units are available.

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 (P) 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 TE 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

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HD-0813-M02

reddot design award winner 2013

product design award 2014

German Design Award WINNER

Focus Open 2013 Silver

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