PRÜFTECHNIK

Operation Manual

UH36

High Voltage Tester

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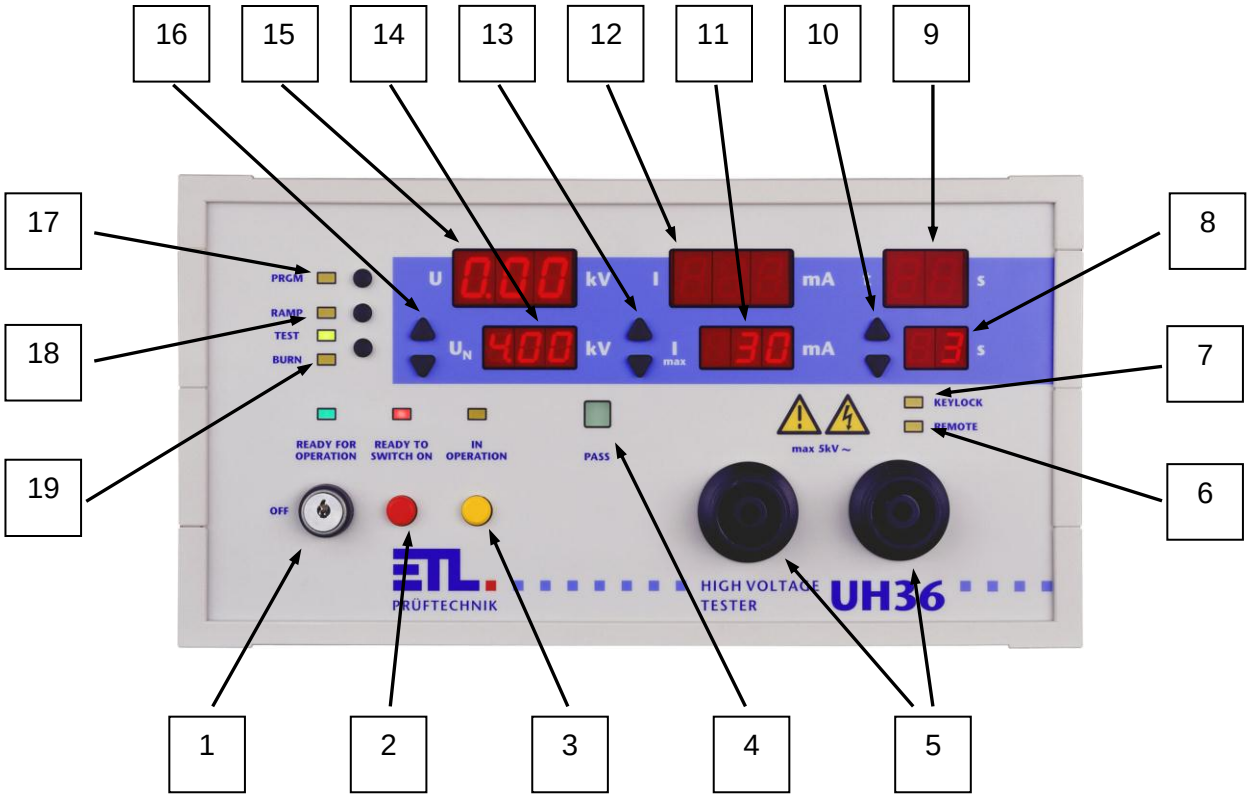


1 Keyswitch mains
2 Button "Ready" (READY TO SWITCH ON)
3 Button "HV on" (IN OPERATION)
4 Signal lamp: test time finished – result OK (PASS)
5 High voltage connector HVS06C
6 Signal lamp "Remote Control is active" (REMOTE)
7 Signal lamp "Keylock active" (KEYLOCK)
8 Set value of the test time
9 Actual value of the test time
10 Buttons ▲ resp. ▼ to set the test time setting
11 Default value of the tripping current
12 Actual value of the current
13 Buttons ▲ resp. ▼ to set the tripping current
14 Default value of the test voltage
15 Actual value of the test voltage
16 Buttons ▲ resp. ▼ to set the test voltage
17 Button "Test programmes" (PRGM; not available at the basis type)
18 Button to connect the ramp function (RAMP; not available at the basis type)
19 Shift key Test / Burn (TEST / BURN) with signal lamps

Warning notice :
This sign means that the corresponding instruction has to be regarded to guarantee a safe operation. Disregard may lead to damages at the device or to an injury of the user.

Preliminary Notes :

Please check the scope of delivery for completeness. Also take care of possibly smaller packages. Check the delivery for possible transport damages that are visible outwardly, but also for hidden damages. In case of a transport damage please immediately inform the forwarder (factual report).

1. General Information

The existing testing device is built according to EN 61010-1, tested and has left the factory in a perfect safety-related state. To maintain this state and to guarantee an operation without any danger, the user has to regard the information and warning notations contained in this operation manual and in EN 50 191 (DIN VDE 0104).

The UH36 is built to be used in the interior and must only be used as a test device to test the quality of the insulation (High voltage test).
When installed in a special device suitcase of the series 36 (GK36S/Art.-Nr. 202612) , the device can also be used outdoors, but it has to be protected from splashing water.

2. Technical Data

Mains supply	230 V / 50 ... 60 Hz
Current consumption	max. 8 A
Mains cable	contained in the scope of delivery

For the mains supply a safety socket 230 V, 50 Hz shall be provided.

Test voltage	Output voltage:	100 - 5 000 V AC
	Setting range:	0,10 – 5,00 kV AC
	Resolution, Digit:	10 V
	Measuring uncertainty:	1 % of the measured value +/- 2 Digits
	Frequency of the voltage:	50 Hz / 60 Hz, depending on the electrical network
	Curve shape:	Sinus, depending on the electrical network
	Voltage stability:	Output voltage regulated, PI-regulator
	Actual value display:	LED-Display 13 mm, red
	Default value display:	LED-Display 10 mm, red
Test current	Output current:	0 - 100 mA
	Measurement range:	0 - 120 mA
	Setting range:	0,5 - 100 mA
	Resolution:	0,1 mA
	Measuring uncertainty:	1 % of the measured value +/- 3 Digits
	Short circuit current:	> 200 mA / > ca. 1 100 V
	Actual value display:	LED-Display 13 mm, red
	Default value display:	LED-Display 10 mm, red
Test time	Setting range:	0 - 99 s / 0 - 99 min, unlimited
	Resolution:	0,1 s - 1 s / 0,1 min - 1 min
	Actual value display:	LED-Display 13 mm, red
	Default value display:	LED-Display 10 mm, red

General output data	Transformer power:	> 500 VA
Special functions	Ramp function:	The voltage is run up ramp-wise to the selected test voltage, only then the test time begins, freely programmable.
	Contacting control:	Control of the contact making to the test object at a proper contacting device (4-pole)
	Series fault control:	Controlling the test leads for series fault
	Burn out function:	Burning out the faulty passage
	Minimum current control:	Controlling a preset minimum current during the test
	Automatic choke: Start and stop signal via test pistol	The ETL test pistol HTP06C recognises the correct contacting to the test object (patent) via a special hardware construction.
	Zero voltage switch:	The device is only turned on or off during the zero voltage continuity of the test voltage.
General	Mains supply:	230 V, 50 Hz / 60 Hz
	Current consumption:	Max. 8 A
	Display:	LED-Display 13 mm and 10 mm, permanent display of the default and actual values
	Setting the test parameters:	Manually or fully automatically via interface
	Programming:	15 sets of test parameters, freely programmable
	Error signalization:	Acoustically, optically or via interface
	Dimensions (W x H x D):	308 x 164 x 273 mm
	Weight:	Ca. 15,8 kg
	Housing:	Synthetic material, RAL 7035
	Temperature range:	5 - 45 °C
	Basic equipment:	Operation manual, mains cable, safety circuit plug
	Calibration:	Factory calibration certificate inclusive
Interfaces	Control / digital IO:	Start, Stop, Result Good / Error and Test in Process
	Remote control interface RS232:	For the connection to the PC and for direct connection to a terminal programme or a log printer
	CAN:	For the expansion of the test system, for additional features and further expansion stages
Connections	High voltage outputs:	The contacting of the test object is executed via 2 potential-free high voltage outputs, each double-pole with connection jack for an HVP06C plug (A Ø 6 mm und I Ø 2 mm).
	Safety circuit:	For the implementation of the suitable safety circuit according to EN 50191
	Warning light connection:	For the connection of a warning light combination according to EN 50191

Starting the test	Start and stop signal by a test pistol:	Via a special automatic choke and 4-pole technology
	Start button on the device:	Starting the test with a button at the front of the device
	Start and stop signal via interface:	Starting the test via PLC or PC-interface
	Start button via an external switch:	Starting the test via digital IO, e.g. via foot switch
Setup	Keylock:	Individually configurable
	Output options:	Individual configuration of the result outputs
	Buzzer options:	Individual configuration of the acoustic signals
	LED display:	Brightness of the display elements
	Start options:	Individual setting of the start mode
	Special functions:	Setting the automatic choke, the series fault and contacting control
	Language and mode selection for an external printer:	English, German, Swedish, Italian, Spanish, Dutch / Mode: Printout in case of OK, not OK or all the times
	Ramp options:	Ramp time and kind of the ramp decrease
	Test time:	Test time scaling

Fuses:

At the back side of the device 1 microfuse (5 x 20 mm) 8 AT (in the IEC connector)
2 microfuse (5 x 20 mm) 0,5 AT (round fuse holder)

Only use equivalent fuses in exchange!
Do not repair defect fuses!

Ambient atmosphere

Temperature	5 to 45 °C,
Relative Humidity	max. 80% non-condensing
Height	max. 2000 m absolute altitude

3. Instructions for safe Operation

3.1 General Instructions

The test device delivers high voltage of high power. The safety measures demanded in VDE 0104 (EN 50 191) must be observed.

The proper status of the main cable and the test object connection cables is to observe via visual every day before starting the testing work.
Damaged parts must be replaced or put out of operation.
No start-up when there are obvious defects!
Only workshops that have been authorised be ETL are allowed to open the device and overhaul it! There are no parts in the interior of the device that can be replaced by the operator.
The UH36 is a device of protection class I.
The protective earth conductor connection of the used main cable and the power socket must be proper. Every interruption of the protective earth conductor can lead to the fact that the device might become dangerous. Therefore an interruption of the protective earth conductor is illegal.

3.2 UH36 with High Voltage Test Pistol HTP06C

3.2.1 Fusing the Workplace

When using two high voltage test pistols, the test station must be organised according to EN 50191 (DIN VDE 0104) (Electric Test Stations), paragraph for
„ Test Stations without obligatory protection against contact“.

3.2.1.1 Protection of Outsiders

Outsiders must be protected from accidently touching the test object (and so from touching the high voltage) by:

> Cordoning off the test area
> Warning signs WS1 ⚠ and ZS 1 "High Voltage, danger of life"
> Warning lamp WK36

3.2.1.2 Protection of the Test Person

The test person is protected by:

> Using two test pistols, one in each hand
(It is not allowed to use only one test pistol or to carry both test pistols in one hand.)
> Potential-free high voltage (principle isolating transformer)
(Therefore install the test object isolated against the earth potential, otherwise this protection is ineffective!)
> Emergency shutdown, installed outside of the cordon

3.2.2 Positioning and Connecting

- Insert the high voltage lines of the test pistols TP06C into the HS-connection jacks at the front of the UH36. Fuse the HS-plugs with the provided screws!

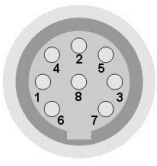
- Insert the warning lamps into the socket “WK36” at the back side of the UH36.

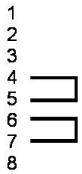
- Insert the mains cable (contained in the scope of delivery) at the back side of the device. Regard the mains voltage: 230 V, 50 ... 60 Hz

- Insert the dummy plug into the connection jack “Safety Circuit” at the back side of the UH36.

Notation:
Since the high voltage tester UH36 is equipped with a safety circuit which enables the operation of the device in test stations with obligatory protection against contact, the dummy plug has to contain two bridges. Otherwise the high voltage can not be turned on.

Configuration of the dummy socket:
(ex factory)





3.3 UH36 with Safety Test Cage SICAB or DOCAB

3.3.1 Fusing the Workplace
If the safety test cage SICAB or DOCAB is used, the test station is called a test station with obligatory protection against contact. Further steps are not necessary.

3.3.2 Positioning and Connecting

- Insert the high voltage lines of the test cage into the HS-connection jacks at the front of the UH36. Fuse the HS-lines with the screws provided at the plug!

- Insert the warning lamps into the socket “WK36” at the back side of the UH36.

- Insert the mains cable (contained in the scope of delivery) at the back side of the device. Regard the mains voltage: 230 V, 50 ... 60 Hz

- Insert the safety circuit of the test cage into the connection jack “Safety Circuit” at the back side of the UH36.

A dummy plug must **NOT** be used at test stations with obligatory protection against contact (test cage) !

Install control lines and test cords of the test cage so that damages and earth fault can be excluded !

4. Maintenance

Scheduled maintenance improves the availability and maintains the safety of your test station (Furthermore it is demanded in EN 50 191). We recommend a documentation of the maintenance to you. Please take all maintenance jobs and intervals out of the following table.

No commissioning in case of obvious defects !

Maintenance	**Maintenance interval**	**Execution**
Perfect status of the mains cable and the test object connection lines	Before the beginning of the test works	Visual inspection

Maintenance	**Maintenance interval**	**Execution**
Function of the warning lamp red - green	At least annually	Visual inspection
Function of the emergency stop	At least annually	Testing by operation
Function of the two-hand operation	At least annually	Even when just one switch is released, the high voltage has to turn off and the warning lamp hast to change from red to green. When one switch is kept held and the one that has been released bevor is pushed again, the high voltage must not turn on. These tests have to be executed for both switchs.
Function safety test cage	At least annually	When the test cage is opened the high voltage has to turn off and the warning lamp has to change from red to green.
Function error detection	Recommended daily	The perfect function can be controlled with a so-called defect model (test object with inbuilt error).
Calibration	Recommended annually	Wenden Sie sich hierzu bitte an den Hersteller.
Safety briefing of the test personnel	Annually	According to EN 50191 (DIN VDE 0104)
Cleaning	If necessary	For cleaning please disconnect the mains plug. Clean the device with a damp cloth which is not too wet. Take care that no water or other cleaning supplies get into the interior of the device! Danger of an electric shock by mains or high voltage! Never use a scouring agent, solvent or cleaning fluid which could scratch or damage the plastic surface!

Table Maintenance Notations

5. Testing with the UH36

Important notation:
If one or several buttons do not show any function, make sure whether the keylock is possibly active. You can recognize this by the LED (7) “KEYLOCK” being on. In this case please contact the administrator of your test device resp. read chapter 12.2.3 “Removing the Keylock”.

The test station has to comply with the requirements in EN 50 191 (DIN VDE 0104).

Turn on the keyswitch mains (1).
The test parameters that haven been set at last appear in the displays after the display of the firmware version.

5.1 Setting the Voltage

You set the voltages with the buttons (16) ▲ resp. ▼.

5.2 Setting the Tripping Current

You set the tripping current with the buttons (13) ▲ resp. ▼.

5.3 High Voltage Test with Test Time Setting

Set the voltage and tripping current as described and additionally set the test time with the buttons (10) ▲ resp. ▼.

5.3.1 Testing with High Voltage Test Pistol HTP06C and Dummy Connector

Press the red button (2), the green signal and warning lamp go off, the red one will light up. Put both high voltage test pistols against the test object. As soon as they are positioned against the test object with slight pressure, the high voltage turns on automatically and the test time starts running out. The display (9) shows the lapse of the test time. The contacting and series fault control are active (start mode 0; t ≥ 1 s), and the adherence of the test time is controlled:
If one of the test pistols is removed from the test object before the end of the test time, the UH36 will signal a time error (display 9 blinks).

5.3.2 Testing with Test Cage resp. Two-Hand Operation

Close the test cage resp. actuate the two-hand operation: by closing the test cage resp. the actuation of the two-hand operation the high voltage turns on automatically and the test time starts running out (start mode 0; t ≥ 1 s). The display (9) shows the lapse of the test time.
The contacting and series fault control are active.
The adherence of the test time is controlled:
If the test is interrupted before the end of the test time, the UH36 will signal a time error (display 9 blinks).

5.4 High Voltage Test without Test Time Setting

- Press the red button (2). The green signal and warning lamps go off, the red signal and warning lamps will light up.

- Press the yellow button (3). The red signal and warning lamps will keep lighting, the yellow signal lamp will light up and you can hear a short acoustical signal.

- The high voltage is turned on!

- The voltage display (15) and the current display (12) show the current values.
  The display of the test time (9) shows " - - " (endlessly).

- By pressing the red button (2) the high voltage can be turned off at all times. Thereby you can hear a short acoustical signal as well.

If the output current exceeds the set tripping current, the high voltage will be turned off, the voltage shown on the display (15) will show 0 V, the current display (12) will blink and the internal buzzer will sound until the current error is confirmed or a new test is started.

The confirming and deleting of this error signal is executed by pressing the button (2) (without turning on the high voltage) or the button (3) (with turning the high voltage on again).

Notation about the current display:
After the end of the test (either executed by the test person or by the end of the test time) the maximum test current is shown in the current display (12). The display can be deleted by pressing the red butten (2).

5.5 Ramp Function

With the button (18) the ramp function can be switched on. When the ramp function is active, the corresponding signal lamp (18) is on.

When the ramp function is activated the high voltage is not connected to the test object at once, but it is run up from 0 V to the set test voltage within 2 seconds (factory-preset value, changeable / system setting *Standard Ramp Time*, chapter 12.9). When the test voltage is achieved the set test time starts running. At the end of the test time the high voltage is brought down to 0 V again or it is shut down immediately. This factory setting can also be changed in the system setting *Standard Ramp Time*, chapter 12.9.
When the tripping current is exceeded (resp. disrupted) during the ramp of the high voltage, the test is cancelled with a current error. The disruptive discharge voltage during the ramp is retained in the display of the actual test voltage (15). The display goes out as soon as a new test is started or the error is confirmed with the red button (2).

Individual ramp times can be stored in the freely settable test programmes (chapter 5.7) or set as you like in connection with the PC data management programme DataView.

5.6 Burning out faulty Locations - TEST / BURN

To locate a faulty location the function “Burn” is available: The button (19) “TEST/BURN” switches between the functions test and burn.
The corresponding signal lamp “TEST” will be on when test is selected (which means the high voltage is turned off as fast as possible in case of a disruptive breakdown).
The signal lamp “BURN” will be on when burn is selected, which means that the shutdown of the high voltage will be delayed one second. During the burning process the buzzer is selected intermittently.

Notation :
The setting BURN is not saved when the device is turned off and has to be reselected consciously when the device is turned on again.

5.7 Test programmes, pre-definite Sets of Parameters

5.7.1 Selecting a stored Test Programme

The UH36 is able to store up to 15 test programmes. A stored test programme can be selected by pressing the button (17) “PRGM”:
By pressing the button the first stored programme is selected, every further pushing of the button will select the next stored programme (e.g. P01 → P03 → P09).
The programme number is shown on display 15 and the corresponding test parameters are shown on the displays 8, 11 and 14. If the function “RAMP” (see point 5.5) has been selected for the programme, the display 12 will show “r” and the display 9 will show the ramp time. If the programme has been saved without a ramp, display 9 will show “- -“.

5.7.2 Exiting a Test Programme

With the modification of <u>one</u> test parameter (Buttons ▲ resp. ▼ , RAMP, TEST/BURN) you exit the test programme. However, the saved settings of the programmes remain unchanged.

The UH36 can store up to 15 test programmes. Therefore a quick shift between different sets of test parameters is possible.

Notation :
If no button is pressed for ca. 8 seconds in the programming mode, this mode is exited automatically and settings that have not been saved will be lost. Therefore it is avoided to store files unconsciously.

5.7.3 Adding a new Test Programme

Keep the button (17) "PRGM" pressed forca. 3 seconds until the display "P" blinks.

By pressing the button (17) several times you can select the desired programme number (P1 to P15).

- Setting the test voltage with the buttons (16) ▲ resp. ▼.
- Setting the tripping current with the buttons (13) ▲ resp. ▼.
- Setting the test time with the buttons (10) ▲ resp. ▼.
- If necessary turn on the ramp function (see point 5.5)

- Storing the programme (see point 5.7.5 or 12) .

5.7.4 Editing an existing Test Programme

Select the programme that you want to edit with the button (17).

Then press the button (17) "PRGM" for ca. 3 seconds. When the display "PR?" blinks, the device is in the programming mode.

Setting the test parameters (see 10.1) .

Storing the programme (see Punkt 5.7.5 or 12) .

5.7.5 Storing a programme

Keep the button (17) “PRGM” pressed for ca. 3 seconds again, the settings for this programme number will be stored. During the storing process the display (14) blinks. When the storing process has been successful, “P” does not blink anymore and the programming is confirmed acoustically.

5.7.6 Deleting a Test Programme

Select the programme you want to delete with “PRGM”, then press this button for ca. 3 seconds.

Set the test voltage to less than 0,5 kV using the button (16), on the display “del” will appear.

Keep the button “PRGM” pressed for ca. 3 seconds to delete the settings of this programme number.

Notation :
The programme numbers of possibly further programmes remain unchanged.
Example: You have stored test parameters as programme no. 1, 2, 3 and 4. If you now delete programme two, the programmes no. 1, 3 and 4 will remain.

5.7.7 Setting and Storage of the Ramp Time

For the input of the ramp time you already have to be situated in the programming mode (Pxx needs to blink).

Keep the button (18) “RAMP” pressed for ca. 3 seconds, the ramp time will be shown in display (9) and “r” will blink in display (12). Set the ramp time with the buttons (10) ▲ resp. ▼.
To turn off the ramp function a ramp time of less than 0,5 seconds needs to be selected. “- -“ will appear in display (9).

The ramp time is stored with the button “RAMP” (press for 3s). During the storage process the display (12) blinks. After a successful storage process “r” will not blink anymore and the programming will be confirmed acoustically.

Notation:
When a test programme with ramp time is selected, the programmed ramp time is valid. The standard ramp time does not have an influence in the test programme mode (see chapter 12.8) anymore.
When the test programme is exited, the standard ramp time can be redone by turning the ramp off and on.

5.7.8 Setting and Storage of the Minimum Current

For the input of the minimum current you already have to be situated in the programming mode (Pxx has to blink).

The minimum current is the current that at least has to flow during the test time. Otherwise the tester will decide on an error.

Keep the button (18) “RAMP” pressed for ca. 3 seconds, the ramp time will be shown in display (9) and “r” will blink in display (12). By pressing the button “RAMP” you can now switch between the input of the ramp time and the input of the minimum current.

After having pressed the button once, the threshold value of the minimum current will be shown in display (11). When the button is pressed once, the threshold value of the minimum current is shown in display (11). An “i” in display (12) blinks. The threshold value can now be set with the buttons (13) ▲ resp. ▼.

To turn off the control of the minimum current the value 0 needs to be selected.

With the button “RAMP” (press for 3 seconds) the setting is stored. During the storage process the display (12) blinks. After a successful storage process “i” will not blink anymore and the programming will be confirmed acoustically.

Notation:
A minimum current control can only take place in connection with test programmes (stand alone operation) or in case of a selection from the PC by the data management programme DataView.

6. Keylock

The system administrator can lock the input buttons completely or party to avoid accidental changes. To reverse the keylock see attachment point 12.2.3 resp. ask the system administrator.

7. Warranty and Service

The warranty lasts 24 months from the date of delivery. Within the period of warranty parts that verifiably have become unusable because of bad material or faulty fabrication are gratuitously overhauled or replaced with free transmittal to us or to a service center named by us.
Avoid self-intervention that might delete your entitlement.

Of course the service center and the manufacturer are at your disposal after the period of warranty as well, so that you are always equipped with faultless test devices.

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Attachment : Instructions for the System Administator

The functions that are necessary for the workaday operation are described in the chapters before. Moreover the UH36 has further functions that are usually only necessary when the test station is installed. Therefore this paragraph applies to the persons who install and supervise the test station.

8. Function Interfaces

8.1 Safety Circuit

The high voltage tester UH36 is equipped with a safety circuit which enables the operation of the device in automatic test stations with obligatory protection against contact.

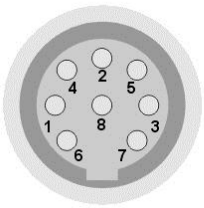
When the high voltage tester UH36 is used in automatic test stations the safety of the operating staff and outsiders has to be regarded. For the control of guards (test cage, guard door) the safety circuit is available via the connector “Safety Circuit”:

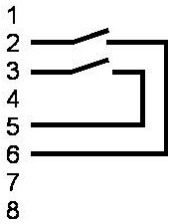
The limit switch used at the guard has to be one with personal protection function (obligatory opening contacts). A simple limit switch or a microswitch are not permitted.

Use a limit switch that turns off double-pole (both contacts open in case of an open guard, both contacts closed in case of a closed guard) :

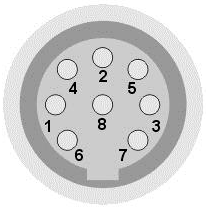
<u>Configuration of the Socket "Safety Circuit"</u>

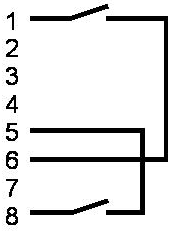
Standard configuration (recommended):
Application with test cage or two-hand operation in which the test object is changed by hand.
After the start-up of the UH36 the test cage has to be open(ed) to be able to lock the safety circuit





Configuration Auto-Function:
Application in fully automatic test systems. The test station is completely encapsulated and the guard is only opened in case of service.
The safety circuit closes automatically when the guard Is closed after the start-up of the UH36.





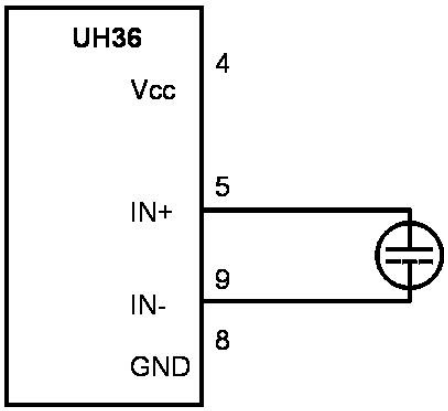
Notation:
In the delivery state the UH36 is configurated so that the high voltage test is started immediately after the safety circuit has been locked.
This configuration can be changed, see “Attachment for System Administrators”, chapter 12.5 “Start modes”.

8.2 Connector "Control"

The Uh36 can be operated by an external control. Therefore the connector “Control” is available as a 9-pole Sub-D plug at the back side of the tester. 3 output signals and 1 input signal are conducted over this connector:

8.2.1 Starting the Test Cycle with "Control-Start"

8.2.1.1 Controlling with an external Control Voltage

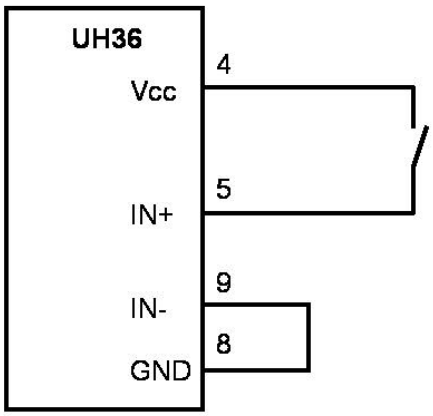


LOW = 0V … 1,5V
HIGH = 3V … 24V

Apply an external control voltage, + 5 ... 24 V DC, at Pin 5 (+) and Pin 9 (-). The input current is maximum 30 mA.

When a sufficient (> 3 V up to max. 24 V) control voltage is applied, this is the start signal.
When the control voltage falls below 1,5 V, this is the stop signal.

8.2.1.2 Controlling with an external potential-free Relay Contact



External potential-free relay contact between Pin 4 and Pin 5
Contact load 5 V, min. 20 mA

Bridge from Pin 8 to Pin 9 is necessary

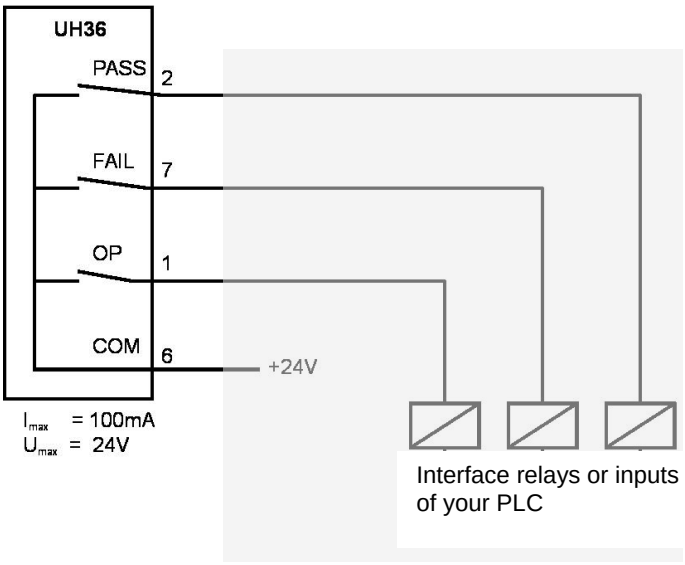
A start of the test is only possible when the safety circuit is locked and the starting conditions of the particular start modes (see 12.5) are complied.

8.2.2 Result Output

The result output requirements are different and depend on whether an external control or “only” a simple external __ (relays, signal lamps, …) is connected. There are 3 potential-free relay contacts available as signal outputs.

The output “OP” is always active when the high voltage is on (analogue to the signal lamp 3 at the front). However, the outputs “PASS” and “FAIL” depend on the settings that can be made in the system menu “EF” (EndFail) and “EP” (EndPass), see point 12.7 (System settings).

But generally the following is valid:
- After having started the device and pressed the red button (2) no output is active.
- The beginning of a new test deetes the result of the last test and so resets the outputs.



Signal “PASS" (test end OK)
Contact closed after the end of the test when the test result is OK.

Signal “FAIL" (test end not OK)
Contact closed after the end of the test when the test result is not OK.

Signal "OP" (Prüfung ist aktiv)
Contact closed during the test.

! depending on the system settings !

The signal output is realized via the contacts of reed relays. The maximum input voltage is 24 V at a current of maximum 100 mA.

9. Log Printer

9.1 Printer Connection

At the back side of the tester the serial interface “RS 232” (SUB-D connection jack, 9-pole) is situated for the connection of a serial log printer, e.g. the wire printer type CBM-910 with 24 characters per line. With this printer the test files of every single test are documented.

Notation:
There is no printout in case of a high voltage test without test time setting!

Special types:
An internal log printer is selected via the same interface. To alternatively enable a selection via PC as well the interface is always led through backwards. Therefore a connection cable needs to be plugged between the RS232 output and the printer interface when working with an internal log printer. Both interfaces are situated at the back side of the test system and are executed as 9-pole SUB-D connection jacks.

9.2 Language Setting

The language of the printout can be set, see point 12.4 (system settings).

9.3 Output Setting

You can select when a printout is executed (never, all the times, only in case of the test result “PASS” resp. “FAIL”), see point 12.4 (system settings).

10 General Safety Instructions

10.1 Qualification of Staff

The operations described in this document are only allowed to be realized by persons who have the qualified technical formation or have been trained appropriately by the operator.

10.2 Responsibility and Warranty

ETL Prüftechnik does not accept responsibility and warranty if the operator or a third party:

- Disregard this document
- Do not use the product according to regulations
- Make any kind of intervention (alteration, modification, etc.) at the product
- Use the product with supplies which are not listed in the corresponding product documentation

10.3 Norms and Prescriptions

All works are only allowed under consideration of the corresponding prescriptions and adherence to the safety measures. Furthermore regard the safety instructions given in this document.

Pass the safety instructions to all other users.

11. Serial Interfaces

11.1 RS232 Interface

The serial interface can not only be used for the connection to a log printer, but also for a connection to a commercially available PC. The PC can receive the test files instead of a log printer.

Furthermore this interface makes it possible to store sets of test parameters on the PC and to execute a download to the UH36 if necessary.

To guarantee a particularly safe and error-free file transfer the Keyword Protocol 2000 (KWP 2000) is used. Matching drivers (LabView, Active-X-Automation, DLL) are deliverable and described in their manuals as well as the complete data management system ETL-DataView.

11.1.1 Connection to a log printer

A serial log printer, e.g. the wire printer type CBM-910 with 24 characters per line, can be connected via the serial interface “RS232” as well. The test files of every single test are documented with this printer.

You can set the language of the protocol, further information under point 12.4 (system settings).

11.1.2 Connection to a PC

Connector	Sub-D	9-pole, connection jack
	RxD	Pin 2
	Txd	Pin 3
	Ground	Pin 5
Protocol	Baud rate	9600
	Parity	no
	Data bit	8
	Stop bit	1
	Handshake	no
Files	pure ASCII	

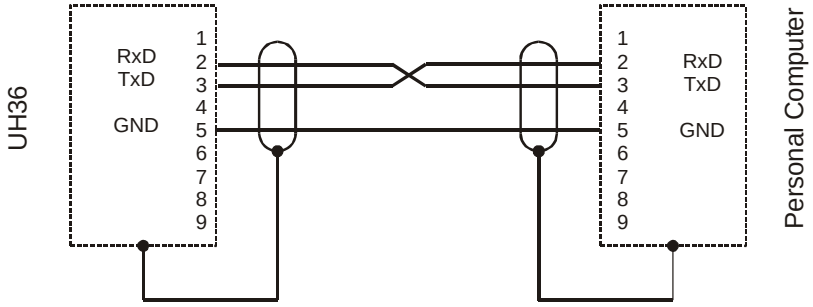
11.1.3 ETL-DataView Data Management System

The PC programme ETL-DataView enables the storage of any number of sets of parameters, with several test steps and consequently different test parameters and programming e.g. of a visual test with test instructions for the user.

Furthermore all test results are documented automatically, specifying the date, time, test station and test person. Ask for further documents.

11.1.4 RS232- Connection cable

Null-modem cable with SUB-D plug 9-pole and SUB-D connection jack 9-pole

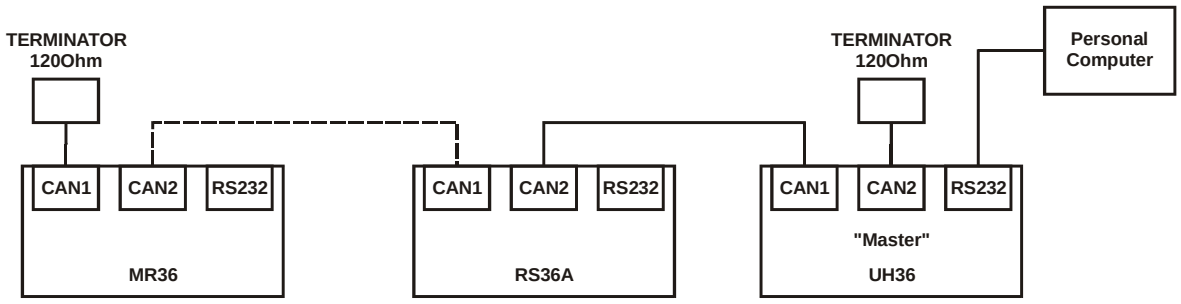


11.2 The ETL-CAN-Bus

This bus is used when you want to control several test devices of the series 36, e.g. a UH36 and a RS36A, at once. This can either happen via the PC programme ETL-DataView or in the stand-alone operation as well.

Thereto the devices (maximum 255) have to be connected with a special CAN-cable. This cable is available as a supply with the corresponding terminators. Thereby it is irrelevant in which CAN – connection jack at the back side of the device (CAN 1 and CAN 2) the cable resp. the terminator is plugged in.
When several equal testers (e.g three UH36) are connected via CAN, you have to relate one index to every device.

You can download a self-created test plan to the “Master” with the programme ETL-DataView. Consequently the test system is able to execute the test process without a connection to the PC.



12. System settings

System settings shoul only be made by the system administrator and are therefore only available via a hidden menu.

The responsibility for which group of persons the information is made available lies with you.

Storage of system settings and test programmes:
A blinking “P” in display (15) shows that your settings have not been stored yet. To store them you have to press this button for at least 3 seconds. As soon as you settings are stored, this is announced acoustically by the device and the display (15) shows the “p” statically.

12.1 Access to the System Menu

This is how you get access to the hidden menu for the system settings:

Turn off with the keyswitch (1), press both buttons (10) ▲ and ▼ at the same time and keep them pressed while you turn on the device with the keyswitch (1) again. Now let go both buttons (10).

Select the particular menu with the buttons (16) ▲ and ▼:

Loc System setting *Keylock* (see 12.2)
LEd System setting *Brightness of the Display Elements* (see 12.3)
LAn System setting *Language and Mode Selection* for external printer (see 12.4)
StA System setting *Start Mode* Kind of Operation (see 12.5)
BU System setting *Buzzer* (see 12.8)
EP System setting *EndPass* (see 12.7)
EF System setting *EndFail* (see 12.7)
CSt System setting *Control-Start-Mode* (see 12.5.6 resp. 12.5.7)
rA System setting *Standard Ramp Time* (see 12.9)
tP System setting *Test Time Scaling* (see 12.10)
loG System setting *Data logger* (see 12.11)
Not contained in type UH36:**FE** System setting *Spark Identification* (see 12.12)
ASC System setting *ASCII Protocol* (see 12.13)

If no button is pressed, the UH36 will leave the menu system settings automatically after ca. 8 seconds.

12.2 Keylock – Menu "Loc"

In terms of the process safety it makes sense to avoid an accidental change of the test parameters. This is achieved reliably by the selective keylock.

12.2.1 Activating the Keylock

Precondition: You are situated in the menu “System Settings – Loc”, see 12.1.

Select the desired keylock (keylock code 0 to 31) with the buttons (13) ▲ and ▼. Store this setting by pressing the button (17) “PRGM”.

Notation:
You can find an extensive table of the manifold possibilities under point 12.2.2.
When the keylock is activated the signal lamp (7) “Keylock” is on.
4 examples of keylocks that are often required are explained in the following.

Example 1: Keylock-Code 8
Testing with a preset test voltage.
The change of any parameter is disabled, but burning is possible.

Example 2: Keylock-Code 0
Like in example 1 and additionally burning is disabled as well (→ all buttons are disabled).

Example 3: Keylock-Code 10
Testing with a preset set of parameters (see 5.7 “Selecting a stored Test Programme” and 10. “Programming mode”). The selection of the preset sets of parameters via the button (17) “PRGM” is possible.
The change of any parameter is disabled, but burning is possible.

Example 4: Keylock-Code 2
Like in example 3 and additionally burning is disabled as well.

Notation:
To program sets of test parameters (see in chapter 10) buttons must not be locked, the enabling of all buttons is explained under point 12.2.3.

12.2.2 Table Keylock Codes

To enable the disabling of buttons as individually as possible, 5 different key panels resp. functions can be secured against accidental access independently from each other. These are:

- Function Ramp Button 18
- Function Test / Burn Button 19
- Key panel Set Value Setting Button 16,13,10
- Function Select Test programmes Button 17 (short hold)
- Function Programming Button 17 (long hold)

With the key panel 13 you select the desired keylock code. Thereto take the decimal resp. binary values from the following table.

Notation about the setting:
The keylock code as a decimal value is shown in dsisplay 11, the corresponding binary value is shown in the displays 9 and 12.

Keylock-Codes:

Setting Values		Key Panels resp. Functions				
Binary	**Dec.**	**Ramp**	**Burn**	**Set Value Setting**	**Programme Selection**	**Program-ming**
0000	0	**X**	**X**	**X**	**X**	**X**
0001	1	**X**	**X**	**X**	**X**	**active**
0010	2	**X**	**X**	**X**	**active**	**X**
0011	3	**X**	**X**	**X**	**active**	**active**
0100	4	**X**	**X**	**active**	**X**	**X**
0101	5	**X**	**X**	**active**	**X**	**active**
0110	6	**X**	**X**	**active**	**active**	**X**
0111	7	**X**	**X**	**active**	**active**	**active**
1000	8	**X**	**active**	**X**	**X**	**X**
1001	9	**X**	**active**	**X**	**X**	**active**
1010	10	**X**	**active**	**X**	**active**	**X**
1011	11	**X**	**active**	**X**	**active**	**active**
1100	12	**X**	**active**	**active**	**X**	**X**
1101	13	**X**	**active**	**active**	**X**	**active**
1110	14	**X**	**active**	**active**	**active**	**X**
1111	15	**X**	**active**	**active**	**active**	**active**
10000	16	**active**	**X**	**X**	**X**	**X**
10001	17	**active**	**X**	**X**	**X**	**active**
10010	18	**active**	**X**	**X**	**active**	**X**
10011	19	**active**	**X**	**X**	**active**	**active**
10100	20	**active**	**X**	**active**	**X**	**X**
10101	21	**active**	**X**	**active**	**X**	**active**
10110	22	**active**	**X**	**active**	**active**	**X**
10111	23	**active**	**X**	**active**	**active**	**active**
11000	24	**active**	**active**	**X**	**X**	**X**
11001	25	**active**	**active**	**X**	**X**	**active**
11010	26	**active**	**active**	**X**	**active**	**X**
11011	27	**active**	**active**	**X**	**active**	**active**
11100	28	**active**	**active**	**active**	**X**	**X**
11101	29	**active**	**active**	**active**	**X**	**active**
11110	30	**active**	**active**	**active**	**active**	**X**
11111	31	**active**	**active**	**active**	**active**	**active**

X – the particular button / function is disabled
active – the particular button / function is enabled for the user

12.2.3 Removing the Keylock

Precondition: You are situated in the menu “System Settings – Loc”, see 12.1.

Keylock-Code 31 : All buttons / functions are enabled.

12.3 Brightness of the Display Elements

Precondition: You are situated in the menu “System Settings – LEd”, see 12.1.

With the buttons (13) ▲ and ▼ you select the desired brightness. You store this setting by pressing the button (17) "PRGM" (keep pressed for at least 3 seconds – until “P” does not blink anymore).

12.4 Language Selection for an external Printer

Precondition: You are situated in the menu “System Settings – LAn”, see 12.1.

With the buttons (13) ▲ and ▼ the desired language version and with the buttons (10) ▲ and ▼ the output mode is selected. Store this setting by pressing the button (17) "PRGM" (keep pressed for at least 3 seconds – until "P" does not blink anymore).

At the moment the following languages and output modes can be selected:

0	English
1	German
2	Italian
3	Spanish
4	French
5	Dutch
6	Portuguese
7	Swedish

0	No printout is executed
1	A printout is executed at all times
2	Printout in case of the test result "PASS"
3	Printout in case of the test result "FAIL"

12.5 Startmode – Menu "StA"

Different possible applications require that the reaction of the UH36 to the safety circuit, the control input and the contacting control (see 12.6) can be adapted to the particular case of application.

At the moment the startmodes 0, 1 and 2 are installed. The mode 0 is set ex factory.

12.5.1 Setting the Startmode

Precondition: You are situated in the menu "System Settings – StA" , see 12.1.

With the buttons (13) ▲ and ▼ you select the desired startmode and with the buttons (10) ▲ and ▼ the desired contacting control time. Store this setting by pressing the button (17) "PRGM" (keep pressed for at least 3 seconds – until "P" does not blink anymore).

Basically the following is valid:
A test can only be started when the safety circuit is locked. When the safety circuit is locked, this is shown by the red signal lamp (2) and thered warning lamp of the warning lamp combination “WK36”

12.5.2 Startmode 0

This mode is intended for all standard applications with test pistols, test cages or two-hand operations.

The start of a test is either executed by the closing of the contacting control (KÜ), e.g. by pressing both pistols against the test object, **or** by a High-Signal at “Control-Start” (see 8.2.1).

You can set the contacting control time (KÜ time) from 0,5 to 99 seconds. The contacting control display (Err 2) is turned off with the setting “- -“.

Notation:
Only the starting condition (KÜ closed resp. “Control-Start” active) that starts a test in this mode can also finish it. When a test is e.g. started with the test pistols (KÜ), it can not be finished by a Low-Signal at the “Control” plug. The test is either finished by the premature release of the test pistols, the end of the test time or a current error. The same is valid for the start of a test with “Control-Start”.

12.5.3 Startmode 1

When the automatic start-up of the high voltage after closing the safety circuit (e.g after closing the test cage) is not desired, this can be avoided in this mode.

The start of a test is only executed when both channels of the KÜ are closed **and** a High-Signal is applied at “Control-Start” (see 8.2.1).

The contacting control time is set on 0,5 seconds and can not be changed. The contacting control time starts with a closed KÜ (“HV” and “Contact” of the high voltage lines connected at one channel), a High-Signal at “Control-Start” **and** a locked safety circuit.

12.5.4 Startmode 2

When you test with test pistols and it is e.g. not always possible to close the test pistol contacts (KÜ), but a definite start signal with a definite test time is required, this can be realized in this mode.

The test is only started by the “Control-Start” (e.g. foot switch). The contacting control does not have any influence.

In this mode you can not set a contacting control time.

12.5.5 Table of different Use Cases

Notations about "Identification of the Series Fault" see under point 12.6

StA-Mode	Use Case	Start of the high voltage test by:	Identification of the Series Fault
0 (default)	**Testing with test pistols:** Dummy connector plugged in (safety circuit closed) The test object allows the touch contact of the test pistols and consequently the closing of the KÜ.	Safety circuit closed **AND** HV and Contact closed	**KÜ-time is set to a value between 1 and 99 seconds.** A series fault would be realized after the set time. The test is not executed in case of an error. **KÜ-is set to "- -"** The series fault display is deactivated, the test would not be executed in case of an error.
0 (default)	**Testing with test pistols:** Dummy connector plugged in (safety circuit closed). The test object does **not** allow the touch contact of the test pistols and consequently no closing of the KÜ.	Safety circuit closed **AND** Pressing the yellow button (Test time will automatically be endless)	When the yellow button is pressed the series fault control is automatically deactivated for this test.
0 (default)	**Testing with test cage:** By the contacting of the test object HV and Contact (both paths) are bridged, the start is executed as soon as the safety circuit is closed. **Notation**: The control interface is unwired in this example!	HV and Contact closed **AND** Safety circuit closed	**KÜ-time is set to a value between 1 and 99 seconds** A series fault would be recognized after the set time. The test is not executed in case of an error. **KÜ-time is set to "- -"** The series fault display is deactivated, the test would not be executed in case of an error.
1	**Testing with test cage:** By the contacting of the test object HV and Contact (both paths) are bridged, the start is only executed when the safety circuit is closed **and** a signal (change from Low to High) is applied at “Control-Start”. Endless test time “- -“.	Safety circuit closed **AND** HV and Contact closed **AND** High-Signal at "Control-Start" **End of the test:** Low-Signal at "Control-Start" **OR** Opening the test cage	**KÜ-time is set to 0,5 seconds** A series fault would be realized 0,5 seconds after the closing of the safety circuit and a High-Signal at “Control-Start”. The test is not executed in case of an error.
2	**Testing with test pistols and foot switch:** The test time is preset by the actuation of the foot switch **(Test time set endless "--")** The test object does **not** allow the touch contact of the test pistols and consequently no closing of the micro switches.	Safety circuit closed **AND** Signal at "Control-Start (by foot switch) **End of the test:** Letting go off the foot switch	The series fault control is deactivated.

StA-Mode	Use Case	Start of the high voltage test by:	Identification of the Series Fault
2	**Testing with test pistols and foot switch:** Test time is preset by a set **Test time (1-99 seconds)**. The test object does not allow the touch contact of the test pistols and consequently no closing of the KÜ.	**Safety circuit closed** **AND** **Start via Control** (by foot switch) **Termination:** Letting go off the foot switch **End of the test:** After the end of the test time	The series fault control is deactivated.

Table Startmodes

12.5.6 Control Input Mode 0 – Menu "CSt"

The signal “Control-Start” must be applied **constantly** during the test. When you e.g. let go off the foot switch before the end of the test time, a time error will be the consequence (display 9 blinks) and the test will be invalid (FAIL).

12.5.7 Control Input Mode 1 – Menu "CSt"

The signal "Control-Start" does not have to be applied constantly. At the beginning of a test the control-signal needs to be “High” for at least 30ms. The test can only be finished before the end of the test time by pressing the red button or opening the safety circuit.

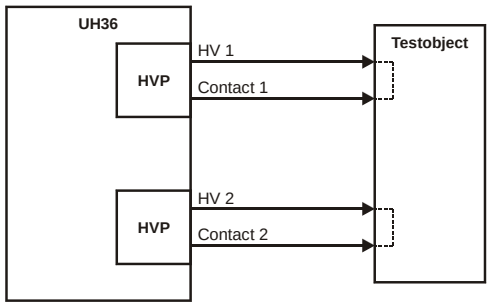
12.6 Controlling Contact Transmitting and Series Fault

What is the use of a high voltage test when the test voltage does not get to the test object because of a series fault or defect contacting (like e.g. broken contact pin)? The control of the contact transmitting and the control of the series fault make sure that you have the necessary process security.

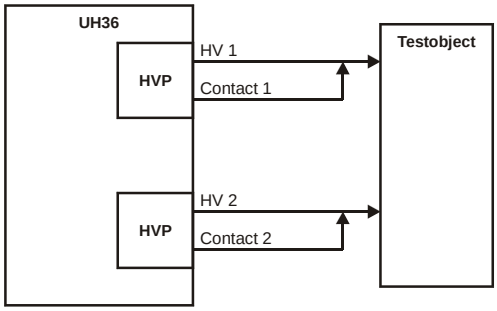
12.6.1 Function Principle

The control is realized by the four-wire test method with one high voltage path (HV) and one contact path (Contact) each. Consequently every high voltage plug resp- high voltage cable is executed double-pole. This enables the control of a cable break resp. the contacting of the test object.

But hereto every test point of the test object needs to be double-contacted, so that the particular pair is connected low-ohmicly via the connection pins of the test object. If there is no test object in the contacting mechanism, the pair must not be short-circuited.



When the double-connection at a test point is not possible at a test object, the pair belonging to this test point needs to be short-circuited as close to the test point as possible. But in that way the control of the contacting is not possible anymore. However, a cable break that lies between the tester and the connection is still recognized.



12.6.2 Synchronity Control

This control of the contacting and series fault is realized by a patented procedure which is also used for the test pistols HTP06C. The contacting of the two test pistols to the test object will always be executed slightly time-displaced, which is why the permitted time offset (contacting control time) is adjustable (see 12.5.2).

Example: Startmode = 0 ; Contacting control time = 2 s ; Test time = 3 s
You want to test with test pistols and start contacting the test object with one of them. The contacting control time now starts running. When you do not contact the test object with the second test pistol within two seconds, the error code “Err 2” will appear in the display (12 and 16).

This error is deleted either by removing or by contacting the test object with both test pistols.

Notation:
The contacting control display does only react after the end of the delay time. Therefore you should set a short contacting control time.
When “endless” (“- -“ is shown in display 7) is set, the contacting control display is turned off

12.7 EndPass and EndFail - Settings – Menu "EP" resp. "EF"

Precondition: You are situated in the menu “System Settings – EF resp. EP”, see 12.1.

With the buttons (13) ▲ and ▼ you select the desired EndFail resp. EndPass code. Store this setting by pressing the button (17) “PRGM” (keep pressed for at least 3 seconds – until “P” does

Adjustable codes:

0	The outputs `PASS` and `FAIL` are deactivated.
1	The outputs are active after the end of the test, analogue to the result.
2	If “Control-Start” gets “low” after the end of the test, the outputs will be reset.
3	The outputs will be reset after the end of the time which is set in the test time display (8) with the buttons (10) ▲ and ▼.
4	The outputs will be reset when the safety circuit (test cage or two-hand operation) is opened.

12.8 Buzzer Settings – Menu "Bu"

Precondition: You are situated in the menu “System Settings – Bu”, see 12.1.

With the buttons (13) ▲ and ▼ you select the desired buzzer code. Store this setting by pressing the button (17) "PRGM" (keep pressed for at least 3 seconds – until “P” does not blink anymore).

Basically the following is valid:
- There will be a short confirming sound after the start-up and the programming.
- The buzzer signals the beginning and the end of the test with a short signal sound. In case of an operator error the buzzer will sound for 2 seconds (except when code 0 is chosen).
- The signal sound to “Err 2” is never deactivated (except when code 0 is chosen).
- A current error sound can always be reset by pressing the red button (2).
- The beginning of a new test resets the buzzer.

Adjustable Codes:

0	The buzzer is deactivated.
1	In case of a current error the buzzer will sound until the red button (2) is pressed.
2	If "Control-Start" gets "low" after a current error, the buzzer will be reset.
3	The buzzer will be reset after the end of the time which is set in the test time display (8) with the buttons (10) ▲ and ▼.
4	The buzzer will be reset when you open the safety circuit (test cage or two-hand operation).

12.9 Standard Ramp Time – Menu "rA"

The standard ramp time can be set from 0,5 to 9,9 seconds resp. from 10 to 99 seconds.

Precondition: You are situated in the menu “System Settings – rA”, see 12.1.

With the buttons (10) ▲ and ▼ you select the desired ramp time. Store this setting by pressing the button (17) "PRGM" (keep pressed for at least 3 seconds – until “P” does not blink anymore).

Notation:
When a test programme with stored ramp time is selected this ramp time is valid. The standard ramp time does only influence the normal operation mode.

12.10 Test Time Mode – Menu "tP"

In the factory setting the test time is displayed in seconds. Some applications require a very long test time. In this menu the scaling/display of the test time can be changed from seconds to minutes.

Precondition: You are situated in the menu "System Settings – tP", see 12.1.

With the buttons (13) ▲ and ▼ you select the desired test time mode. Store this setting by pressing the button (17) "PRGM" (keep pressed for at least 3 seconds – until “P” does not blink anymore).

Adjustable Codes:

0	Test time in seconds
1	Test time in minutes

In the mode “Test time in seconds” the display 8 always shows the set value of the test time. Display 9 always shows the actual resp. result value.

In the mode “Test time in minutes” display 8 shows the set value in seconds and display 9 shows the set value in minutes, when a test is not in process, so e.g. when the parameters are being set. During a test the actual value is shown in the same displays, so the set value can not be seen until the end of the test.

Caution:
This setting also affects the stored test programmes!

12.11 Data Logger Mode – Menu "loG"

The data logger operation is set to 0 in the factory setting and so it is off. This operation enables the linewise writing of test results via serial interface, e.g. to catch a result via a terminal programme or via ETL SerialLogger and later finish it in EXCEL.

Precondition: You are situated in the menu “System Settings – loG”, see 12.1.

With the buttons (13) ▲ and ▼ you select the desired data logger mode. Store this setting by pressing the button (17) "PRGM" (keep pressed for at least 3 seconds – until “P” does not blink anymore).

Adjustable Codes:

0	Data logger off
1	Data logger on

Caution:
This setting changes the output format on the serial interface. The output of the results does not happen suitably for an external ASCII-printer anymore, but linewise (please regard **LAn** System Setting *Language and Mode Selection* for an external printer (see 12.4)).

Logger function is only possible with a set test time.

12.12 Spark Identification "FE" (not contained in type UH36)

The electronic measurement equipment can be set more sensible with regard to low-energy disruptive breakdowns. Especially at devices with current limit the identification of low-energy disruptive breakdowns in case of low test voltages is very difficult. In this menu you can set the sensibility of the electronic measurement equipment. In the factory setting the spark identification is turned on because it makes sense for most of the use cases. When working with large charge carriers (test objects), e.g. radiators, it might be the case that a limit value tripping can already happen during the contacting. In this case the spark identification should be turned off resp. set less sensible.

Precondition: You are situated in the menu "System Settings – FE" , see 12.1.

With the buttons (13) ▲ and ▼ the function spark identification can be activated/deactivated.
0 = without spark identification
1 = with spark identification

With the buttons (10) ▲ and ▼ the percentage from 1 – 99 can be input. It refers to the set test voltage.
Th reaction of the spark identification is shown in the current display (12) after the reaction. In this case a concentrically blinking 1 (resp. I) appears in the LED display (12).

Example: At a test voltage of 1000 V the value 20 means that an irruption of the voltage by 200 V leads to the tripping (in practice the value 20 has proved itself).

Caution:
This setting also affects the stored test programmes!

12.13 ASCII - Protocol "ASC"

With the buttons (13) ▲ and ▼ the function ASCII can be activated/deactivated.

0 = standard, function deactivated.

A firmware update as well as the remote control via the operation software DataView or the communication via driver is only possible in the setting = 0.

1 = ASCII, ASCII-Protocol activated: For the communication via standard Windows terminal programmes or from a PLC. For this function a separate instruction set is available.

13. Error Codes

The UH36 is an intelligent tester and has its own error administration. If an error occurs during a test or in the standby-operation as well, the test person will immediately be informed. In the following table the possible errors and their rectification are described.

Error code	Description	Rectification of the error
Err 1	Temperature error ("Err 1" blinks) E.g. after having burned several times shortly behind one another it can get round to a big heat development in the device. When the temperature in the interior of the device exceeds a certain value, the device turns off the high voltage resp. does not allow to turn it on again.	Provide a good ventilation and let the device cool down until the display “Err 1” does not blink anymore, but is shown statically in the display. Now you can continue with the test operation without any restrictions.
Err 2	Contacting control (also see 12.6)	
	- when using test pistols The error also occurs when both test pistols contact the test object at the same time.	Test with a continuity tester at the plug of the test pistols. In case of a contacted test probe the exterior and interior pins of the plug are short-ciruited (< 100 Ohm). If this is not the case, there is a cable break.
	- when using test cages with 2-wire technique The error appears after the closing of the test cage (and “Control-Start” – in startmode 1).	Check the wiring; The interior and exterior pins of the particular plugs need to have continuity (< 100 Ohm).
	- when using test cages with 4-wire technique The error appears after the closing of the test cage (and “Control-Start” – in startmode 1).	Check the contacting; when the test object is input the resistance between the interior and exterior pin of the plug needs to be < 100 Ohm.
	- generally The error could not be rectified by the measures mentioned above.	Pull both high voltage plugs out of the UH36. Start a test with “Control-Start” or by closing the test cage (startmode 0; KÜ-time = 1s). If the error still appears, please contact our aftersales service.
Err 3	Internal error	This error can not be rectified by the user. Please contact our aftersales service.
Err 4	Internal error This error can occur because of a too high capacitive charging of the UH36.	The error has to be confirmed with the red button and the device must be turned off. Turn on the high voltage without contacting a test object (yellow button) – if the error still appears, you have to put the tester out of operation immediately. Please contact our aftersales service.
Err 5	Internal error	These errors can not be rectified by the user. Please contact our aftersales service.
Err 6	Internal error	
Err 7	Internal error	
Err 8	Internal error	
Err 9	Internal error	

Your Notes :