

Automatic Test System

ATS 400

Instruction Manual Base device



1	Table of Contents	2
1	Table of Contents	2
2	Safety	5
2.1	Used Symbols	5
2.2	Qualification of Staff	5
2.3	Fundamental Safety Notations	6
2.4	Responsibility and Warranty	6
2.5	Damage by Transport	6
3	General Information	7
3.1	Safety Information	7
3.2	Brief Description of the Product	7
3.3	Model and Type Designation	8
3.4	Validation	8
3.5	Handling according to Regulations	8
3.6	Scope of Delivery	8
4	About the Test System	9
4.1	Operating Components at the Front Side (all Types)	9
4.1.1	Main Switch	9
4.1.2	Multifunctional Rotary Switch „Navigation Plus“	9
4.1.3	Keyboard Foils	9
4.1.4	LED Display	10
4.1.5	Display	11
4.2	Equipment and Control Types	11
4.2.1	PREMIUM LINE X2: The Remote Type	11
4.2.2	PREMIUM LINE X4: The Stand-Alone Type	11
4.2.3	PREMIUM LINE X6: The PC-Inside Type	12
4.2.4	PREMIUM LINE X8: The High-End Type	12
4.3	Back Side with Interfaces	13
4.3.1	ETL-Interface for Selection and Operation Panels	14
4.3.2	User-Interface: Free configurable IOs (optional article 201327)	15
4.3.3	Common specification	16
4.3.4	ADF-Interface: Analogue IOs und Frequency Inputs (optional article 202734)	16
4.3.5	RS232-Interface	17
4.3.5.1	PC-Connection via KWP2000	17
4.3.5.2	Log Printer-Connection via a simple ASCII-Output	17
4.3.5.3	PC- or PLC-Connection via a simple ASCII-Protocoll	17
4.3.6	CAN 1: Interface for the Extension of the Test System	17
4.3.7	CAN 2: Interface for customer-specific Selection	17
4.3.8	HV-Connections: HV-Connection Jack, double pole, HVSO6C by ETL:	18
4.3.9	Connection for a PE-Probe Tip (Protective Earth CPOnductor-Test Probe):	18
4.3.10	SHK / HV-Safety Circuit: Connection Jack, eight-pole Female Socket:	19
4.3.10.1	Executing "Testing with Test Pistols":	19
4.3.10.2	Executing "Testing with Test Cage or two-hand Operating"	19
4.3.10.3	Executing "Testing in an Automation Solution":	19
4.3.11	WK400, Warning Light-Connection: Connection Jack, four-pole Female Socket:	20
4.3.12	Earthing:	20

5	Information for safe Operation	21
5.1	General Safety Information	21
5.2	Special Safety Information for High Voltage Testing and other dangerous Kinds of Testing	21
5.2.1	Testing with High Voltage Test Pistols	21
5.2.1.1	Fusing the Work Place	21
5.2.1.2	Protecting Outsiders.....	21
5.2.1.3	Protecting the Test Person	21
5.2.2	Testing with a Safety Test Cage.....	22
5.2.2.1	Fusing the Work Place	22
6	First Steps, Commissioning.....	23
7	Operation.....	24
8	Settings of the ETL Interface	25
8.1	Standard setting	25
8.2	Enabled.....	26
8.3	Button Start.....	27
8.4	Time	29
8.5	Safety circuit	31
8.6	Using the Buzzer.....	32
8.7	Disable SC, Con.....	32
8.8	KeepPolarity	32
8.9	Warn lamp flashing.....	32
8.10	Adaptive HV timing	32
9	Technical support	35
10	Technical Data	36
10.1	General Technical Data	36
10.2	HV-Modules, technical Data	37
10.2.1	HV-Module HVA5-100, Art.-Nr.: 201718 and HV-Module HVK5070, Art.-Nr.: 201819	38
10.2.2	HV-Module HVA2,5-100, Art.-Nr.: 201762	38
10.2.3	HV-Module HVA1,5-100, Art.-Nr.: 201780	38
10.2.4	HV-Module HVD3-CL, Art.-Nr.: 201598 and HV-Module HVK5030, Art.-Nr.: 201790 and HV-Module HVK2530, Art.-Nr.: 203048	39
10.2.5	HV-Module HVD3,6-CL, Art.-Nr.: 203566 and HV-Module HVK5036, Art.-Nr.: 20490239	
10.2.6	HV-Module HVK5070, Art.-Nr.: 201819	40
10.3	PE-Modules, technical Data.....	40
10.3.1	PE-Module AC10, Art.-Nr.: 201720.....	40
10.3.2	PE-Module AC25, Art.-Nr.: 201600.....	40
10.3.3	PE-Module AC32, Art.-Nr.: 202708.....	41
10.3.4	PE-Module AC40, Art.-Nr.: 204633.....	41
10.4	ISO-Modules, technical Data.....	41
10.4.1	ISO-Module DC5-CL, Art.-Nr.: 201599	41
10.4.2	ISO-Module DC10-CL, Art.-Nr.: 201776.....	42
10.4.3	ISO-Module DC30-CL, Art.-Nr.: 202709.....	42
10.5	Function Test-Modules, technical Data	43

10.5.1	FCTQ-Modul Q1ACMF-230AC-10A, Art.-Nr.: 201791.....	43
10.5.2	FCTQ-Module Q1ACMEX-270AC-500VA, potentialfree, Art.-Nr.: 201807.....	43
10.5.3	FCT-Module Measuring Module M10A, Art.-Nr.: 201666	43
11	Manufacturer's Declaration / EU-Declaration of Conformity	44
12	Warranty	45
13	Personal Notes.....	46

2 Safety

2.1 Used Symbols



WARNING

Information to prevent extensive material and ecological damage.



CAUTION

Information on handling and usage. Disregard may lead to malfunctioning or marginal material damage. Information to prevent extensive material and ecological damage.



DANGER

Information to prevent all kinds of personal damage.



ANNOTATION

Information to accentuate operating instructions.



TIP

Tips for the handling of the system or the operation.



INITIAL COMMISSIONING

Information on actions and data which are necessary for the initial commissioning of the system.

2.2 Qualification of Staff



PROFESSIONAL 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.

2.3 Fundamental Safety Notations

- All operations are only allowed under consideration of the relevant prescriptions and observance of the protective measures.
- Consider additionally the safety notations given in this document.

Pass on the safety notations to all other users.

2.4 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

The responsibility related to the used process media lies with the operator.

2.5 Damage by Transport



CAUTION

Avoid transport damage!

These devices must be transported on a pallet by a forwarding.

3 General Information

The existing testing device is build according to EN 61010-1, tested and has left the factory in a perfect safety-related state.

3.1 Safety Information



DANGER

To guarantee a riskless operation, the operator has to regard the advice and warnings given in this instruction manual and in the EN 50191 (DIN VDE 0104).

The testing system is bound to be used in the interior spaces and is only allowed to be used as a testing device to test the electric safety.

When installed in a special device suitcase of the series 400, the device can also be used outdoors, but it has to be protected from splashing water.

3.2 Brief Description of the Product

You have bought a high-quality CE Testing System to check the electric safety of electrotechnical products.

If vacuum cleaner, blow drier, machine tool, transformer or contact terminal – our testing devices and automatic testing machines ensure their efficiency and process reliability by a well thought out control concept and a future-oriented concept to bind all testing devices and testing systems on today's and tomorrow's information technology. Of course they are adapted to all usual norms and standards worldwide.

Depending on the test object and the number of pieces and cycles, the devices can be employed in manual test locations and likewise as a semi- or fully automatic component in the production. In the automatic operation all the measuring paths are connected with the test object via a relay matrix.

The favoured (sensible) combination is freely programmable.

High Reliability

Our testing devices are said to be particularly robust and suitable for daily use and are in action all over the world- often second by second and not rarely for 10 – 20 years.

Good Operability

Unified and well thought out controlling philosophies ensure a quick and unproblematic access to the actual testing task – guaranteed without a manual as well.

Security, Economic Efficiency and Precision

Everything that can be done for the safety of the operation personnel, the measurement precision, the throughput rate and the process security is consequently incorporated in ETL products. So at ETL the most expensive safety technology as well as functions to prevent the test object from damage and increase the process reliability are never expensive extras, but generally available in the standard delivery (positively driven safety relays, contacting surveillance, ramp function, residual voltage surveillance, ...).

Open designed interfaces- guaranteed Flexibility and Transparency

The connection happens via PLC and in the Series 400 additionally PC or driver. All test parameters then accommodate automatically.

Furthermore the Interfaces make permanent collection of data and the download of sets of test parameters as well as the control of operating parameters possible. On the PC the data management software **ETL DataView** is available to telecommand the test device; or you use DLL- or LabVIEW drivers for a comfortable connection of your application.

3.3 Model and Type Designation

Automatic Test System ATS 400

3.4 Validation

This document is valid für all products of the Series 400. This series of products forms the platform for many types and operation types.

You can find the description of the test modules in the „Technical Description“.

The operation types X2, X4, X5, X6 and X8 can be selected freely and combined with every test configuration.

You can find the number of the product on the type label. The type label is affixed at the back side of the test system.

Technical changes without prior announcement are reserved.

3.5 Handling according to Regulations



DANGER

Handling according to the regulations has to be taken care of!!
Please regard chapter 2.1 Safety Information.

3.6 Scope of Delivery

Please check the delivery for completeness. Thereby mind possibly smaller packages as well.

The following parts must be included:

- 1 power cable
- 1 instruction manual
- 1 safety circuit plug
- 1 Quick start manual for **ETL DataView** 3 (not for type X2)

Please check the delivery for possible transport damage.

In case of a transport damage, please inform the forwarder immediately (factual report).

Please keep the special packaging to ensure the ideal protection when the device is forwarded (e.g. for recalibration).

4 About the Test System

4.1 Operating Components at the Front Side (all Types)



4.1.1 Main Switch

<p>The main switch is used to activate the test system. Depending on the test system, the main switch is either an illuminated button or a key switch button.</p>	
-------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------

4.1.2 Multifunctional Rotary Switch „Navigation Plus“

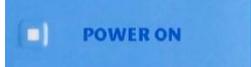
<p>For the navigation in the operation menus. By pushing the rotary switch an input acknowledgment (Enter) will be released. Swivelling it to the right will move the focus rightwards or downwards. Swivelling it to the left will move the focus leftwards or upwards.</p>	
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------

4.1.3 Keyboard Foils

<p>Button „PASS“: Input of the result „GOOD“, e.g. to confirm a visual testing.</p>	
<p>Button „FAIL“: Input of the result „BAD“, e.g. to confirm a visual testing.</p>	
<p>Button „START“: Button to initiate a test or a test step. The startconditions of a test can be input individually. The start via the starting button at the front of the test system is one of the freely adjustable startconditions.</p>	

<p>Button „LOCK“: Button to lock the safety circuit. At a manual test with test pistols the safety circuit must be locked consciously according to EN 50191.</p>	
---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------

4.1.4 LED Display

<p>LED „PASSED“: Indication of the overall result of the measurement. “Overall result” means the result of all test steps. Only when all test steps of a test sequence or a test plan have been O.K., the result „PASSED” is shown.</p>	
<p>LED „FAILED“: Indication of the overall result of the measurement. “Overall result” means the result of all test steps. When only one or several test steps of a test sequence or a test plan have not been O.K., the result „FAILED” is shown.</p>	
<p>LED „IN OPERATION“: Indication whether a test step is being active. The LED goes out between the test steps until the next test step is active again.</p>	
<p>LED „SAFETY CIRCUIT“: Indication whether the safety circuit is open or locked.</p>	
<p>LED „POWER ON“: Indication whether the test system is activated.</p>	
<p>LED „KEYLOCK“: Indication whether the keyboard or the control elements are completely or partly locked. Control elements can be locked in groups or completely. The control elements might also be locked at a remote access by a superordinate control.</p>	
<p>LED „REMOTE“: Indication whether the test system is being controlled by a superordinate control and whether the operation via the front of the test system is therefore locked partly or completely.</p>	
<p>LED „ERROR“: Indication whether an error of the test system has arrived. It might be a temporary error (e.g. overheat shutdown as a consequence of an overload of the test system) or a serious, possibly unrecoverable error. Please pay attention to the notifications and error indications on the display or activate the service to read the error memory via interface.</p>	

4.1.5 Display

Depending on the equipment of the test system, the front is either equipped with a display or not.

The types X2 and X6 have a closed front without a display.

The Types X4, X5 and X8 are equipped with touchscreen displays.

Please regard the chapter Equipment and Control Types.

4.2 Equipment and Control Types

The test system can be delivered in 4 different types of equipment resp. control concepts – from the pure Remote Type through to the PC-based system with TFT-Display and touchscreen.

4.2.1 PREMIUM LINE X2: The Remote Type

- Remote control via PC with the software **ETL DataView**
- Remote control via PC with a customer-specific application and ETL drivers (DLL, LabVIEW, ASCII)
- Remote control via PLC including a digital programme selection
- Several connectivity options for a control interface to input visual testings and to display status messages



4.2.2 PREMIUM LINE X4: The Stand-Alone Type

- Basic functions like the X2-Type and self-operation
- 640 x 480 graphic-touchscreen for the editing of test plans, for status messages and parameter changes
- Navigation Plus with rotary encoder
- Storing of test plans and results (XML, HTML, CSV)



4.2.3 PREMIUM LINE X6: The PC-Inside Type

- Basic functions like the X2-Type and self-operation
- Integrated PC with the software **ETL DataView** able to do standard printing, saving as XML, PDF, HTML, CSV and direct label printing on a Zebra printer.
- External monitor via VGA-connection, location flexible
- Navigation Plus with rotary encoder
- All PC-interfaces such as Ethernet, USB, Barcode, ...
- Installation and Windows 7 Professional 32 bit Edition inclusive
- Expandable functions like e.g. remote maintenance, status report via E-Mail, ...



4.2.4 PREMIUM LINE X8: The High-End Type

- Basic functions like the X2-Type and self-operation
- Premium Type with integrated PC, TFT Display (800 x 600 / ca. 236 x 174,3 mm) and touchscreen
- integrated PC with the software **ETL DataView** able to do standard printing, saving as XML, PDF, HTML, CSV and direct label printing on a Zebra printer.
- TFT-Touchscreen with extended operating functionality
- Navigation Plus with rotary encoder
- All PC-interfaces such as Ethernet, USB, Barcode, ...
- Installation and Windows 7 Professional 32 bit Edition inclusive
- Expandable functions like e.g. remote maintenance, status report via E-Mail, ...



4.3 Back Side with Interfaces



Depiction of the Types X8 and X6 with HV connection jacks. The Types X2, X4 and X5 do not have the PC-interface which is depicted on the right side.



Depiction of the Types X8 and X6 with a system plug. The Types X2, X4 and X5 do not have the PC-interface which is depicted on the right side.

Please pay regard to chapter 4.3.12 regarding the grounding of the system.

Current systems have a newer PC board, using another layout of connectors. There are no PS2 connectors. Instead it has now 4 USB connectors. There are the following connectors available:

- RS232 data termination equipment, in Windows as COM1.
- VGA analog, Sub-D 15 pole
- 1 Gigabit LAN port
- 4 USB connectors
- 1 Audio Line out
- 1 Audio Mic in

4.3.1 ETL-Interface for Selection and Operation Panels

The ETL-Interface contains the most important digital inputs and outputs to the remote control via PLC or to the connection of an operation interface. The settings and using of the interface is described in chapter 8 starting from page 25.

The interface is executed as a 25-pole SUB-D connection jack (female). The exact specifications of the pins are described in the following table:

PIN	IN/OUT	Designation	Explanation
1	Out	Output 24 V	
2		GND	
3	Out 1	Output PASS	Digital display of the overall result, e.g. to drive a "PASS"-lamp or a PLC.
4	Out 2	Output FAIL	Digital display of the overall result, e.g. to drive a „FAIL“-lamp or a PLC.
5	Out 3	Output IN OP	Digital display for a feedback signal of an active safety-related test of the test system. Between the individual tests the bit changes from 1 to 0.
6	Out 4	Output RESULT-IMPULSE	Adjustable digital display of an impulse, e.g. an impulse for an error buzzer in case of the overall result "FAIL" or an impulse for an expulsion of the test object in case of the overall result "PASSED".
7	Out 5	Output DUMMY-OUT	Digital output for the demand for or the start of a dummy test via e.g. a PLC. The test system is now waiting for the feedback signal of the PLC or for the dummy-test object to be ready for the test.
8	Out 6	Output READY FOR OPERATION	Digital Output to signalize the operable status after the activation of the device. The device then stands in a dormant state, e.g. waiting for the starting command of a PLC.
		or Locking	Using safety cabinets this output can be used to lock the safety cabinet even during the time no test is active. This is supported with ETL DataView 3 version 3.8.33.160 or newer and remote control using ETLKWP protocol .
9	Out 7	Output SHK	Safety Circuit: 0 = open, 1 = locked
		or Output external relay 1	Digital output for the selection of an external relay. The actuation and release time of the relay must not be longer than 200 ms because the corresponding test starts after that time.
10	Out 8	Output KÜ	Contact monitoring: 0=open, 1= contacts closed
		or Output external relay 2	Digital output for the selection of an external relay. The actuation and release time of the relay must not be longer than 200 ms because the corresponding test starts after that time.

11	IN 1	Button Start	Digital input to start a test operation.
12	IN 2	Button Stop	Digital input to stop a test.
13		GND	
14	Out	Output 24 V	
15	IN 3	Button PASS	Digital input to input a good test result by the test person.
16	IN 4	Button FAIL	Digital input to input a bad test result by the test person.
17	IN 5	Button DUMMY-IN	Digital input to report to the PLC that the dummy-test object is ready for the test.
18	IN 6	Input PP-SELECT	The test programme can be indicated digitally, e.g. by a PLC. Thereto the PLC has to set the Select Input (outside of the test process). The PLC now creates the digital combination at the Pins IN 7 – IN 12. As long as the input PP SELCT is set and the combination changes the corresponding test program will be loaded. The PP SELCT input must be set for at least 18 ms to recognize the combination. The programme has been filed before as a parameter data set in the test system.
19	IN 7	Input PP Bit 1	Bit combination for SELECT PP
20	IN 8	Input PP Bit 2	Bit combination for SELECT PP
21	IN 9	Input PP Bit 3	Bit combination for SELECT PP
22	IN 10	Input PP Bit 4	Bit combination for SELECT PP
23	IN 11	Input PP Bit 5	Bit combination for SELECT PP
24	IN 12	Input PP Bit 6	Bit combination for SELECT PP
25		GND	

4.3.2 User-Interface: Free configurable IOs (optional article 201327)

The USER-Interface contains additional digital inputs and outputs for the query of limit switches and for the setting of outputs and actuators.

The User-Interface can be programmed comfortably with an own test step card. It is supposed to replace an additional controller, e.g. a PLC, in simple controlling tasks.

The User-Interface is optional. It is executed as a 25-pole SUB-D connection jack (female) The exact specification of the pins are described in the following table:

PIN	IN/OUT	Designation	Explanation
1	Out	Output 24 V	
2		GND	
3	Out 1	Digital output 1	Freely configurable digital output, e.g. for the selection of cylinders or the like.
4	Out 2	Digital output 2	do.
5	Out 3	Digital output 3	do.

6	Out 4	Digital output 4	do.
7	Out 5	Digital output 5	do.
8	Out 6	Digital output 6	do.
9	Out 7	Digital output 7	do.
10	Out 8	Digital output 8	do.
11	IN 1	Digital input 1	Freely configurable digital input, e.g. for the query of limit switches or the like.
12	IN 2	Digital input 2	do.
13		GND	
14	Out	Output 24 V	
15	IN 3	Digital input 3	do.
16	IN 4	Digital input 4	do.
17	IN 5	Digital input 5	do.
18	IN 6	Digital input 6	do.
19	IN 7	Digital input 7	do.
20	IN 8	Digital input 8	do.
21	IN 9	Digital input 9	do.
22	IN 10	Digital input 10	do.
23	IN 11	Digital input 11	do.
24	IN 12	Digital input 12	do.
25		GND	

4.3.3 Common specification

The ETL-Interface and the User-Interface supply 24 Volt for external devices. All 4 Pins can supply together up to 2 A using a multfuse.

All digital outputs are source outputs.

All digital inputs are sink inputs.

4.3.4 ADF-Interface: Analogue IOs und Frequency Inputs (optional article 202734)

The ADF-Interface contains AD-Channels to import linearised sensor signals. By further DA-Channels measurement parameters and results can be output analogue. With the frequency inputs, e.g. a rotational speed signal can be acquired and added to a test step card for rotational speed tests. The ADF-Interface is optional.

The interface is executed as a 15-pole SUB-D connection jack (female).

The exact specification of the pins is described in the following table:

PIN	IN/OUT	Designation	Explanation
1		+ 2,5 V	
9		+ 5 V	
2		GND	
10	IN	AD1, AD-Channel 1	0 - 10 V DC, 12 bit resolution
3	IN	AD2, AD-Channel 2	0 - 10 V DC, 12 bit resolution
11	IN	AD3, AD-Channel 3	0 - 10 V DC, 12 bit resolution
4	IN	AD4, AD-Channel 4	0 - 10 V DC, 12 bit resolution
12	OUT	DA1, DA-Channel 1	0 - 10 V DC, analogue output of test

			statistics during the test
5	OUT	DA2, DA-Channel 2	0 - 10 V DC, analogue output of test statistics during the test
13	IN	FREQ 1.0	Frequency input for rotational speed acquisition sensor 1
6	IN	FREQ 1.1	Frequency input for rotational direction acquisition sensor 1
14	IN	FREQ 2.0	Frequency input for rotational speed acquisition sensor 2
7	IN	FREQ 2.1	Frequency input for rotational direction acquisition sensor 2
15		GND	
8	IN 3	+ 24 V DC	

4.3.5 RS232-Interface

The serial interface RS232 can be used in connection with a commercially available PC, a log printer (ASCII or tape printer) or a PLC.

The interface is executed as a 9-pole SUB-D plug (male). The exact specification of the connectivity options are described in the following chapters:

4.3.5.1 PC-Connection via KWP2000

The particularly interference free and data safe connection between PC and test system is realized via the Keyword Protocol 2000 (KWP 2000). Matching drivers (LabVIEW, DLL) as well as the complete data management system **ETL DataView 3** are available and described in their separate instruction manuals.

A commercially available null-modem cable is used for the electric connection between a PC and the test system.

4.3.5.2 Log Printer-Connection via a simple ASCII-Output

Protocol is not implemented yet!

4.3.5.3 PC- or PLC-Connection via a simple ASCII-Protocoll

This is an option available as article 205060.

4.3.6 CAN 1: Interface for the Extension of the Test System

System extensions of the standard test system are realized via the CAN 1-Interface. So e.g. an external relay matrix can be operated by the test system with a high process reliability. There is also a processor unit with CAN in the external unit. That way you can spare an expensive and unsafe cable system. The external task resp. hardware unit can be established modularly and autarchically. So the whole system is safer and more manageable.

The interface is build as a 9-pole SUB-D connection jack (female).

4.3.7 CAN 2: Interface for customer-specific Selection

Functionality is not implemented yet!

4.3.8 HV-Connections: HV-Connection Jack, double pole, HVS06C by ETL:

<p>The contacting is realized by two potential-free high voltage outputs via suitable panel jacks HVS06C. These outputs are each executed double pole with a connection jack for plug HVP06C (A Ø 6 mm and I Ø 2 mm). In connection with the double pole high voltage test pistols HTP06C it is possible to generate a definite start signal and to guarantee a permanent cable break monitoring. In an automated surrounding ,like e.g. a test station, a contacting monitoring can be reached additionally. Thereto each test point has to be double contacted.</p>		
1	Middle braid	Sense path for contact monitoring
2	Shielding	High voltage power line

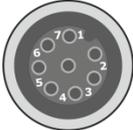
4.3.9 Connection for a PE-Probe Tip (Protective Earth C P conductor-Test Probe):

<p>Connection for contacting the test object via a test probe with start push button and result-LEDs. The start push button makes the definite start-up of the current source after the contacting possible and avoids in this way a possible damage at the surface of the test object. The result display in the handle piece of the test probe shows the test person the result status of the test. Therefore no direct visual of the test device is necessary. For a firm connection an alligator clip can be plugged in optionally.</p>	
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------

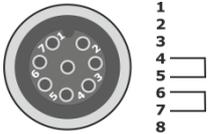
PIN	Designation	Explanation
1	Source path	Current path at the 4-conductor measurement (parallel to PIN 6)
2	Sense path	Measuring path at the 4-conductor measurement
3	24 V DC	Internal supply voltage for the Pins 4, 5 and 7
4	Input start button	Start condition for the protective earth conductor test. By the definite start-up of the current source after the contacting of touchable metal parts the surface of the test object is protected. The corresponding start button is situated at the test probe. A signal with internal 24 V DC generates the start signal (24 V DC from PIN 3).
5	Output "FAILED" (e.g. LED red)	A result-LED in the test probe shows the test result, there is no need of a direct visual of the test device. The LED goes out during the test and shows the result after the selected test time. Output negative switching against internal 24 V DC (PIN 3)
6	Source path	Current path at the 4-conductor measurement (parallel to PIN 1)
7	Output "PASSED" (e.g. LED green)	A result-LED in the test probe shows the test result, there is no need of a direct visual of the test device.

		<p>The LED goes out during the test and shows the result after the selected test time.</p> <p>Output negative switching against internal 24 V DC (PIN 3)</p>
--	--	--------------------------------------------------------------------------------------------------------------------------------------------------------------

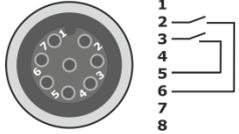
4.3.10 SHK / HV-Safety Circuit: Connection Jack, eight-pole Female Socket:

<p>For the implementation of a suitable safety circuit according to EN 50191.</p> <p>There are 3 different wiring possibilities at disposal to test standardizedly with test pistols, test cage or within a transfer line.</p>		 <p>Plug sight</p>
PIN	Designation	Explanation
1	PIN	Description see below
2	PIN	Description see below
3	PIN	Description see below
4	PIN	Description see below
5	PIN	Description see below
6	PIN	Description see below
7	PIN	Description see below
8	PIN	Description see below

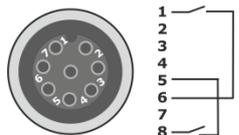
4.3.10.1 Executing "Testing with Test Pistols":

<p>For manual operating of the test system the safety circuit must be equipped with 2 studs. The safety circuit is locked by hand via the "LOCK" button at the front panel of the device.</p>	
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------

4.3.10.2 Executing "Testing with Test Cage or two-hand Operating"

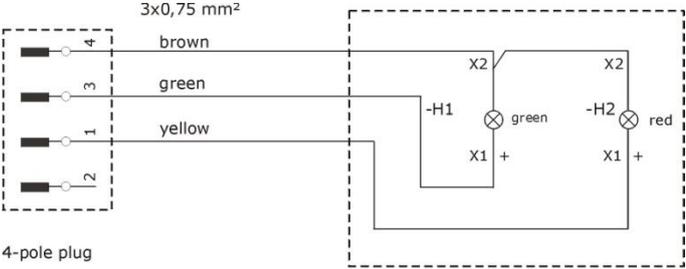
<p>In applications with test cage or two-hand operating, where the test object e.g. is changed by hand. The safety cage must be opened between the test to be able to lock the safety circuit again.</p>	
----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------

4.3.10.3 Executing "Testing in an Automation Solution":

<p>In applications in fully automatic test systems, in which the testing facility is fully encapsulated and the protection is only opened in case of service.</p> <p>The safety circuit locks automatically after the start-up of the test system when the protection is closed.</p>	
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------

4.3.11 WK400, Warning Light-Connection: Connection Jack, four-pole Female Socket:

For the connection of a warning lamp combination with each a red and a green allround light according to EN 50191.



3x0,75 mm²
brown
green
yellow

4-pole plug

Supplier:
Binder
S.713 99-0429-12-04

24 V DC, max. 15 Watts



Plug sight

PIN	Designation	Explanation
1	RS	Red lamp on: Status „Ready for start-up“: Device is turned on, the safety circuit is locked, high voltage can be turned on.
2	IOP	Red lamp on: Status „In Operation“: Device is turned on, the safety circuit is locked, high voltage test is in process.
3	RO	Green lamp on: Status „Ready for operation“: Device is turned on, the safety circuit is open.
4	GND	Common ground

With IO-CPU Version 33244 and newer the red lamp can be configured to blink during an active test. This setting can be done on factory site or with **ETL DataView 3** Version 3.5.20.127 or newer.

4.3.12 Earthing:

Redundant earthing (PE)

It is important to connect the earthing at the rear side with a cable of at least 4 mm² cross section to a separate grounding point. If this is not the case it could be that during high voltage breakdown the potential may rise. This could cause damage to the logic and PC components! (Loss of guaranty)



5 Information for safe Operation

5.1 General Safety Information



DANGER

Depending on the type, the test system can supply high potentials with high efficiency. The safety measures demanded in VDE 0104 (En 50 191) are to observe.

- 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 who have been authorised by 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 ATS 400 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.

5.2 Special Safety Information for High Voltage Testing and other dangerous Kinds of Testing

5.2.1 Testing with High Voltage Test Pistols

5.2.1.1 Fusing the Work Place

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“**:

5.2.1.2 Protecting Outsiders



DANGER

Outsiders must be protected from accidentally 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 lamps, red-green combination
- Distances to the high voltage according to EN 50191
- Instructions

5.2.1.3 Protecting the Test Person

The test person is protected by:

**DANGER**

The test person must be protected from accidentally touching the test object (and so from touching the high voltage) by:

- Using to 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
- Executing the test devices and the supplies
- Instructions

5.2.2 Testing with a Safety Test Cage

5.2.2.1 Fusing the Work Place

When a safety test cage (e.g. SICAB or DOCAB) is used, the test station is called a **„Test station with obligatory protection against contact“**. The test set-up simplifies substantially. Please regard the EN 50191 here as well.

**DANGER**

In test stations with obligatory protection against contact (test cage) a dummy resp. jumper connector must not be used because it jumps the safety circuit impermissibly! Therefore the correct setting of the safety circuit should be checked before the start of a test:

- Warning lamp green: ⇨ safety cage open
- Warning lamp red: ⇨ safety cage closed
- Install control lines and test cords so that damages and earth fault can be excluded!

6 First Steps, Commissioning

- Install the test system at a suitable and permissible place.
- Plug in the main cable (contained in the scope of delivery) on the back side of the device and regard the power supply: 230 V, 50 - 60 Hz.
- If necessary assign the safety circuit (SHK) resp. plug in the safety circuit plug of the supplies (e.g. test cage).
- Plug the warning lamp in the plug-in connector „WK400“ on the back side of the test system.
- If necessary plug in operation components such as keyboard, barcode reader or mouse (possible depending on the equipment type).
- If necessary establish the connection to the network. Establish the connection to the Ethernet with a fitting patch plug. In case of an X6 or X8 equipment type the test system can be involved in the network (XP-Professional).
- Install the connections on the power side. Either plug in the round high voltage plugs like denoted or establish all connections with one plug-in mount if you have a test system with system connector. Secure the HV-plugs with the dedicated fittings resp. the system connector with the locking lever!
- If necessary plug in the test probe for the protective earth conductor test.
- If necessary connect operation panels or PLC controls with the ETL-Interface.
- If necessary establish the connection to a superordinate control, e.g. via the RS232-Interface for the connection of a PC application.



DANGER

Estimation of the test place and training of the personnel:

Have all guidelines of the standards, especially those of the EN 50191, been kept resp. implemented?

- Have you realised the necessary instructions of the test persons, e.g. electrically instructed person, necessary for electrotechnical laypersons?

- Turn on the test system.

7 Operation

For operating the ATS 400 you have the following possibilities:

- Operating using **ETL DataView**. In the types X4, X5, X6 and X8 **ETL DataView 3** is installed on the integrated computer and starts automatically when powering on the device. With the type X2 **ETL DataView 3** is optional accompanied on a medium. Using **ETL DataView 3** is described in a separate document. You can download all current documents from ftp://ETL-FTP:d0wn10ad@134.98.90.37/Manuals/DataView_3_en.zip.
- Operating using your own application on Windows XP, Windows Vista resp. Windows 7. For controlling the device is a interface-DLL available. The documentation of the interface-DLL is in a separate document. In this case **ETL DataView** can not be used and must be removed from the auto start. You can download all current documents from ftp://ETL-FTP:d0wn10ad@134.98.90.37/Manuals/ETLKWP_DLL_en.zip.
- Operating using your own application created in LabVIEW for Windows XP, Windows Vista, Windows 7, LabVIEW RT, Linux und MacOS. For controlling the device is a LLB created in LabVIEW 7.1.1 available. The VIs have password protected block diagrams to allow conversion to newer versions of LabVIEW and to other platforms. The documentation of the LLB is in a separate document. In this case **ETL DataView** can not be used and must be removed from the auto start. You can download all current documents from ftp://ETL-FTP:d0wn10ad@134.98.90.37/Manuals/ETLKWP_LabVIEW_en.zip.
- Operating using the serial interface and the ASCII-protocoll. The documentantion of the ASCII-protocoll LLB is in a separate document. In this case **ETL DataView** can not be used and must be removed from the auto start. You can download all current documents from ftp://ETL-FTP:d0wn10ad@134.98.90.37/Manuals/ASCII_Protokoll_en.zip.

8 Settings of the ETL Interface

The settings can be on factory or using **ETL DataView 3**. In **ETL DataView 3** you find the dialog from the main menu under **Settings -> I/O-Interface**. Grayed out elements are for information only and are related to the equipment of the device. The settings for an external control and the tones can be configured independently for the pass and failed case.

Closing the dialog with the button **Back** will save the settings. Closing the dialog with the button **Menu** the settings will not be saved. The settings are stored in the ATS400.

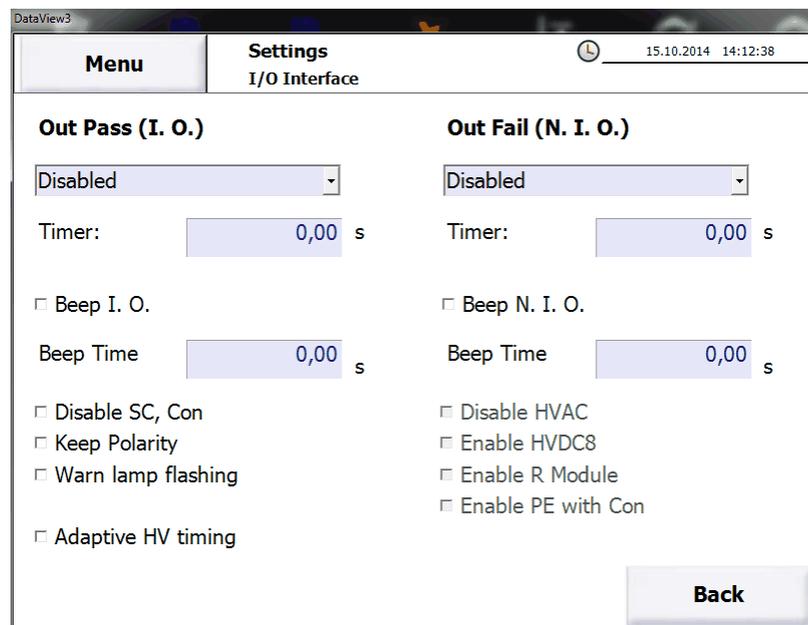
The time diagrams for the different settings are valid using **ETL DataView 3**. Using your own application by controlling with the DLL or LabVIEW the the function ETLKWPTestResult must be used to generate the signal **Ready for Operation**. By controlling with the ASCII-protocoll the whole commanding is done using the interface.

In the case a test plan consists of several test steps the signals **In Operation** and **Ready for Operation** will change there state for each test step.

It is only the start signal as start condition displayed. This must be used in the test plan as start condition. Other signals can be used by **ETL DataView**. For the following diagrams these signals are considered as set. Using the setting **Safety circuit** then security curcuit must be used as start condition instead of start signal.

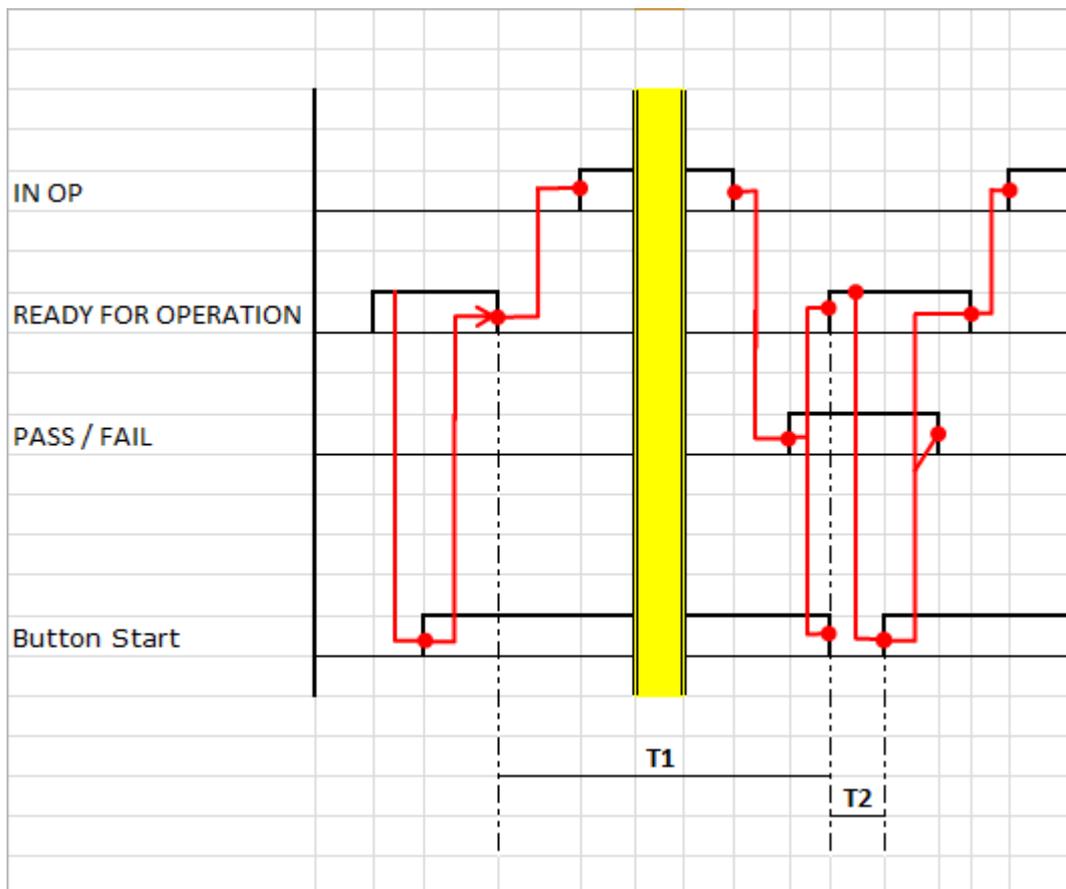
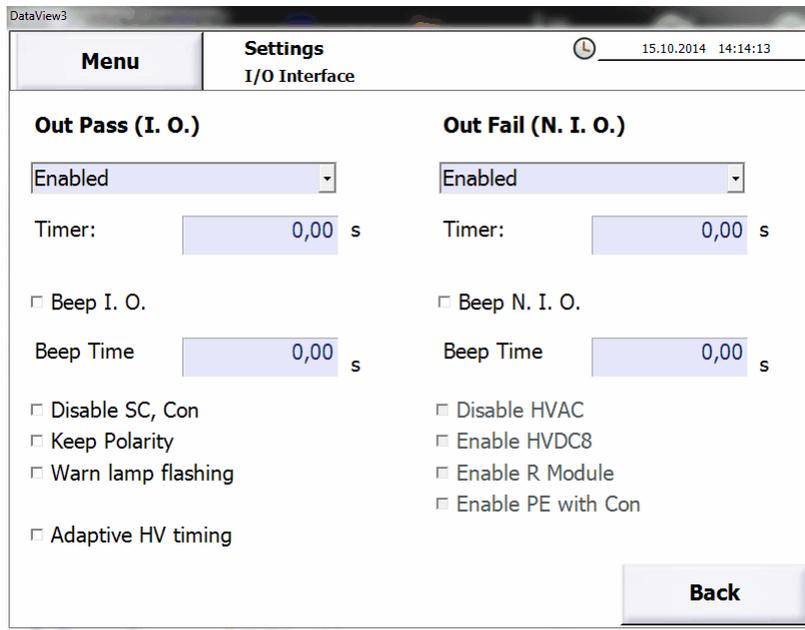
8.1 Standard setting

This setting is factory default. There will be not output on the ETL interface and no tones.



8.2 Enabled

Using this setting the output will be active until the next devcie under test will be tested. With this setting each test step can be started with the start signal.

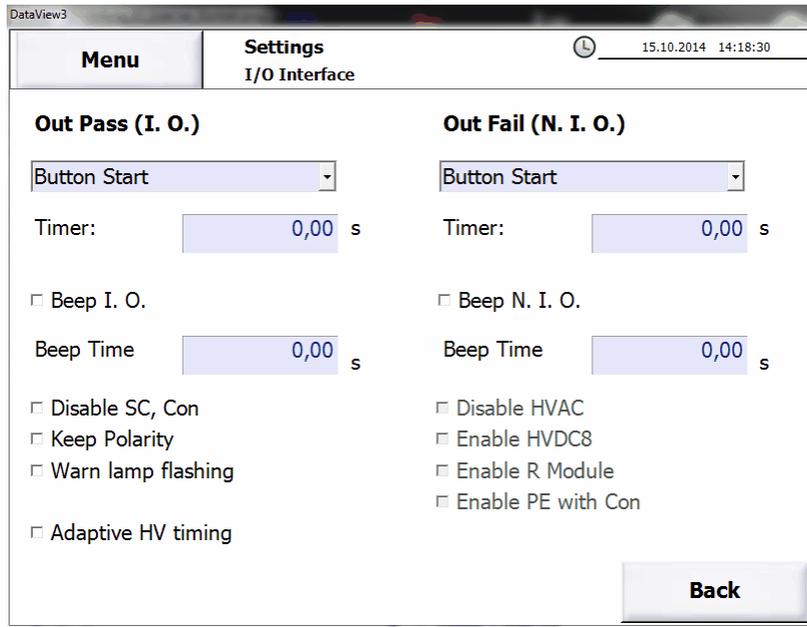


Symbol	Name	Limits	Annotation
T ₁	Testtime	> 200 ms	Time from start of one test until the start of the next test.

Symbol	Name	Limits	Annotation
T ₂	Response time	> 18 ms	Necessary minimum time to recognize a change in the start signal.

8.3 Button Start

Using this setting the output will be active as long as the start signal is active. Using this setting only the whole test plan can be started with the start signal.



DataView3

Menu **Settings** 15.10.2014 14:18:30
I/O Interface

Out Pass (I. O.) **Out Fail (N. I. O.)**

Button Start Button Start

Timer: 0,00 s Timer: 0,00 s

Beep I. O. Beep N. I. O.

Beep Time 0,00 s Beep Time 0,00 s

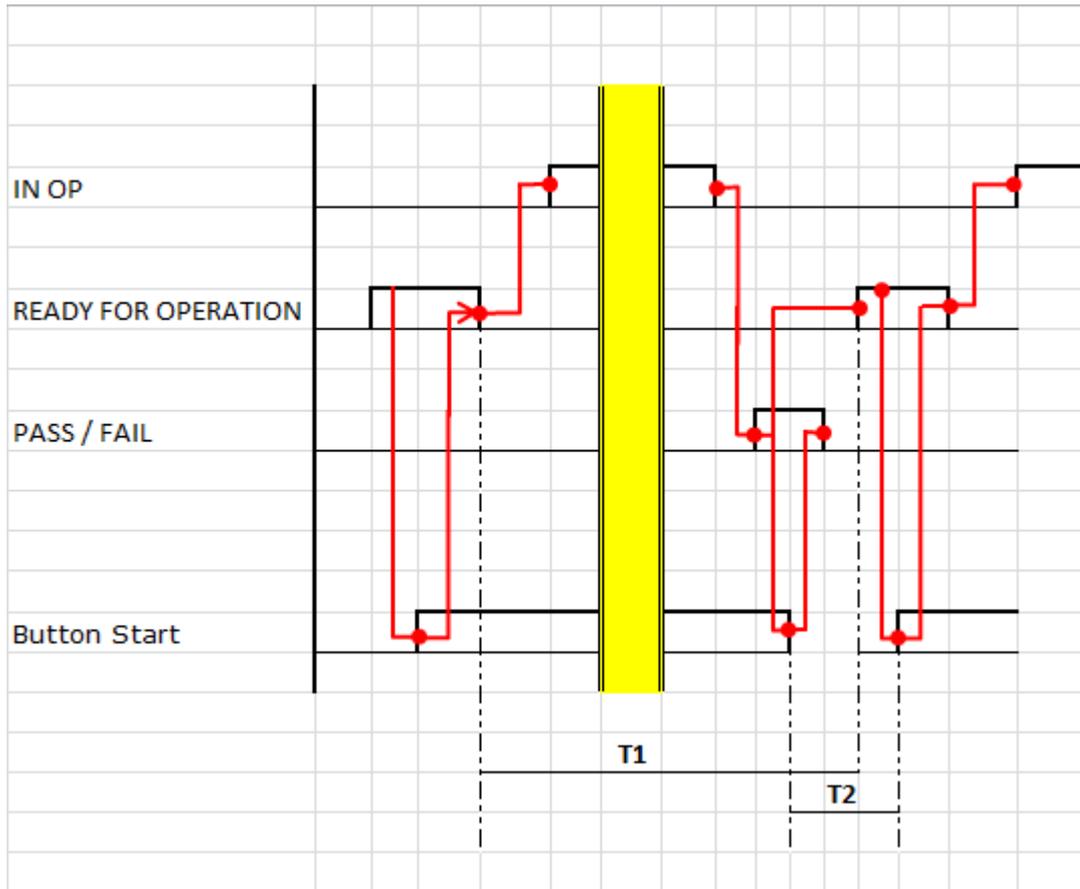
Disable SC, Con Disable HVAC

Keep Polarity Enable HVDC8

Warn lamp flashing Enable R Module

Adaptive HV timing Enable PE with Con

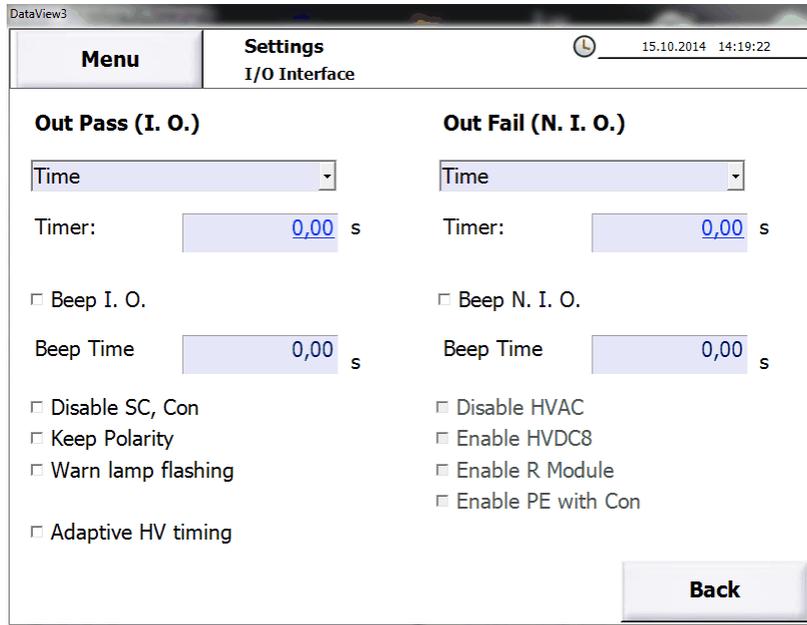
Back



Symbol	Name	Limits	Annotation
T ₁	Testtime	> 200 ms	Time from start of one test until the start of the next test.
T ₂	Response time	> 18 ms	Necessary minimum time to recognize a change in the start signal.

8.4 Time

Using this setting the output will be active according to the time given in **Timer:**. The time can be set in steps of 10 ms. As maximum time 10 seconds is possible.



Menu **Settings** 15.10.2014 14:19:22
I/O Interface

Out Pass (I. O.) **Out Fail (N. I. O.)**

Time Time

Timer: 0,00 s Timer: 0,00 s

Beep I. O. Beep N. I. O.

Beep Time 0,00 s Beep Time 0,00 s

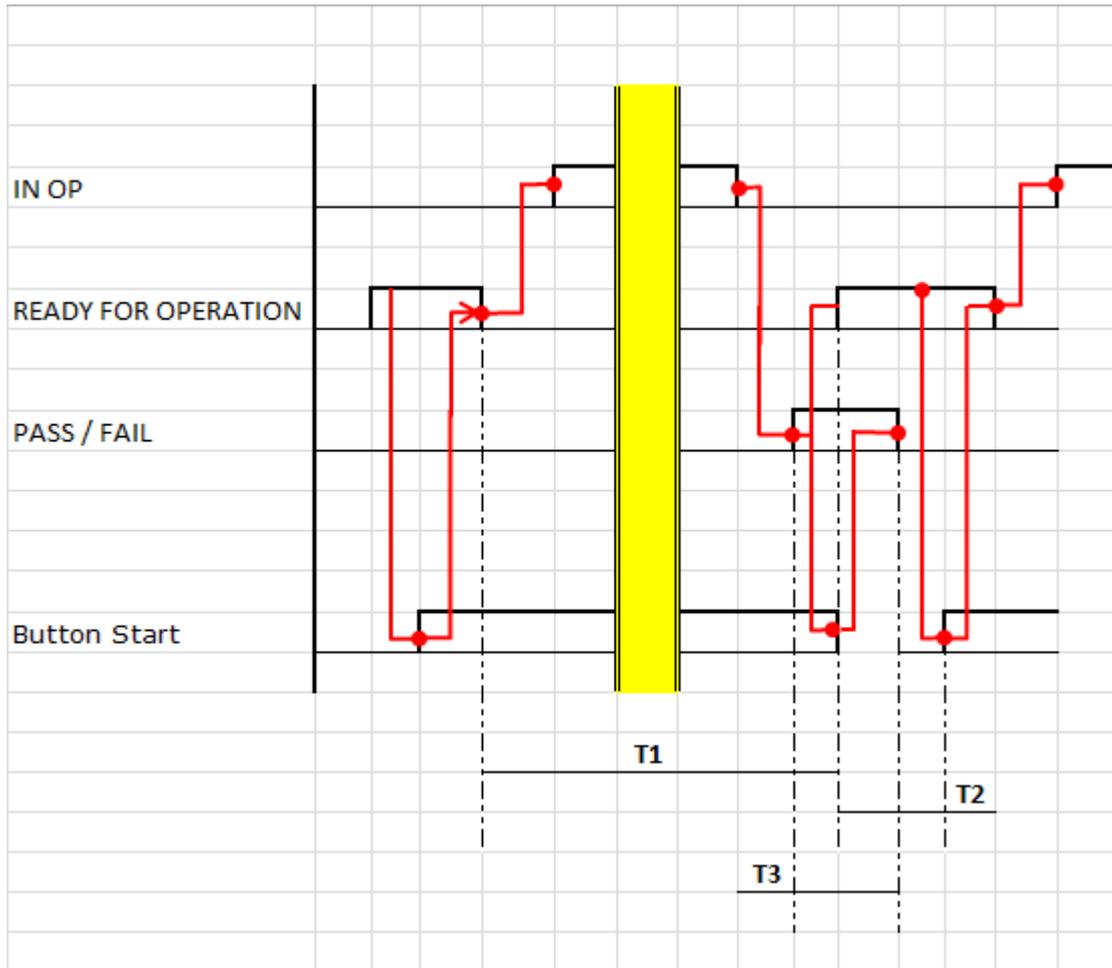
Disable SC, Con Disable HVAC

Keep Polarity Enable HVDC8

Warn lamp flashing Enable R Module

Adaptive HV timing Enable PE with Con

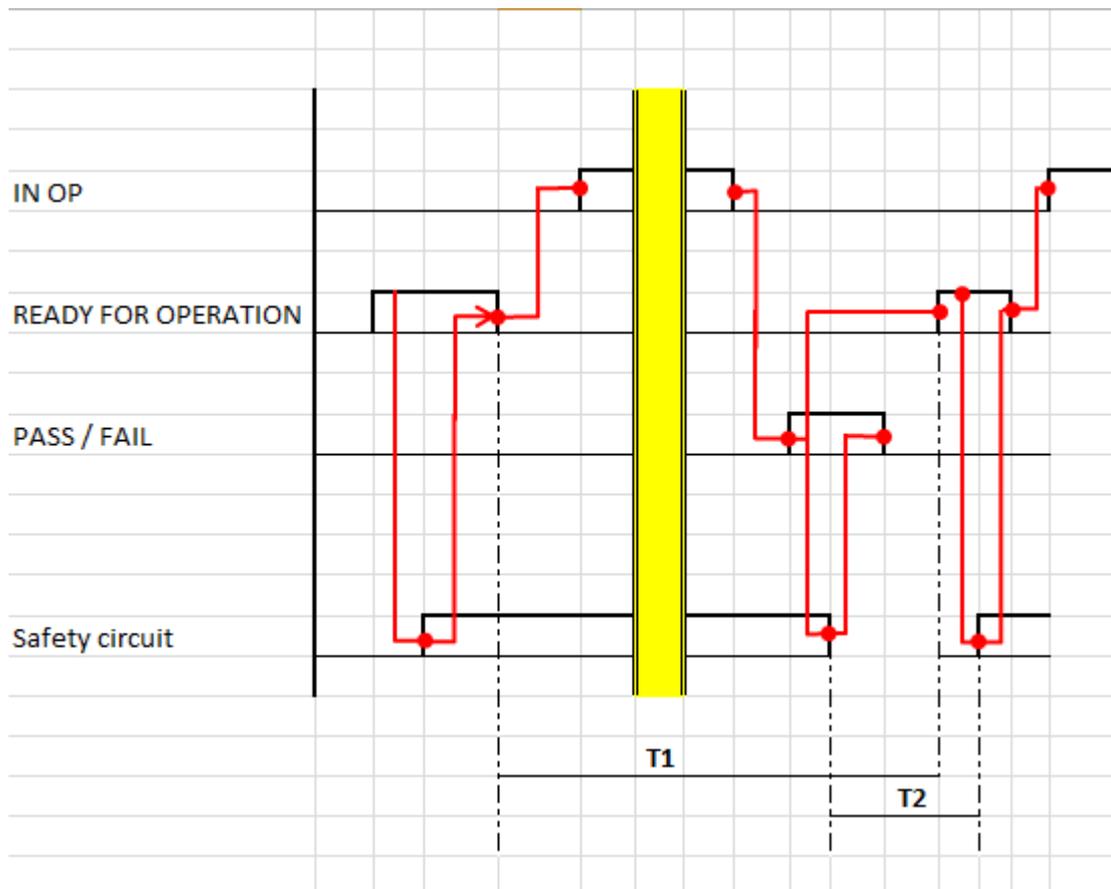
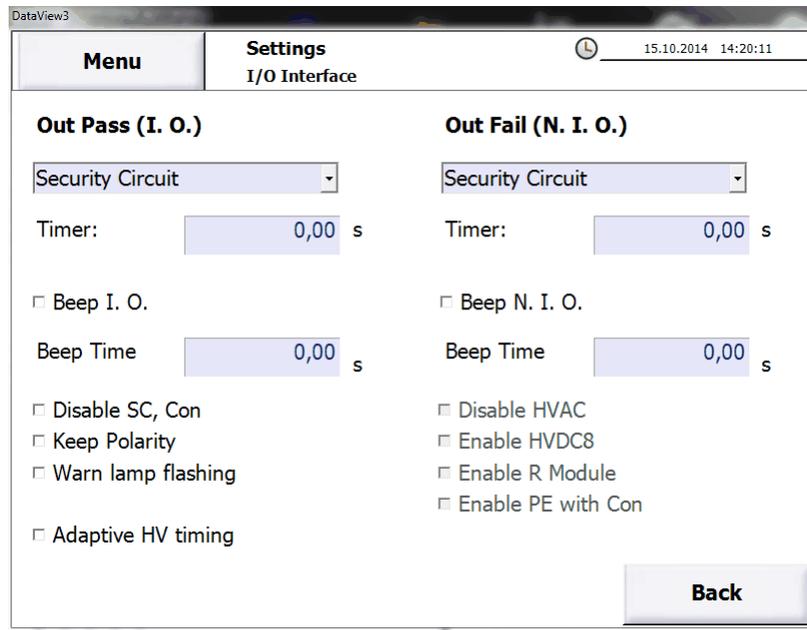
Back



Symbol	Name	Limits	Annotation
T_1	Testtime	> 200 ms	Time from start of one test until the start of the next test.
T_2	Response time	> 18 ms	Necessary minimum time to recognize a change in the start signal.
T_3	Result time	10 ms – 10 s	Time the result will be available. Calculate the time according to the formula: $T_3 = T_{Zyklus} + 18 \text{ ms}$, where T_{Zyklus} is the cycle time of the polling. Round up the value to the next multiple of 10 ms.

8.5 Safety circuit

Using this setting the output will be active as long as the safety circuit is active. Using this setting only the whole test plan can be started with the safety circuit.



Symbol	Name	Limits	Annotation
T ₁	Testtime	> 200 ms	Time from start of one test until the start of the next test.
T ₂	Response time	> 18 ms	Necessary minimum time to recognize a

Symbol	Name	Limits	Annotation
			change in the start signal.

8.6 Using the Buzzer

The built in buzzer will be used if the checkbox **Beep I.O.** resp. **Beep N.I.O.** is active. The duration of the tone depends on the time given in the field **BeepTime**.

The buzzer will also be activated when powering on the system if the checkbox for **Beep I.O.** is active.

8.7 Disable SC, Con

In the case this checkbox is inactive the signals **Security circuit closed** and **Contacting closed** are routed to the ETL Interface.

Is this checkbox active this signals can be used to control an external equipment. In **ETL DataView 3** this will be configured in the test steps on the property page **Matrix**, using your own application this controlled by the parameter **Contacting**.

8.8 KeepPolarity

Is this checkbox inactive an optional relais matrix will be switched to the default position at the end of a test plan.

Is this checkbox active the position of an optional relais matrix will be kept active after the end of a test plan.

8.9 Warn lamp flashing

Has the device IO-CPU firmware 33244 or newer and safety circuit firmware 2 or newer this checkbox will be displayed.

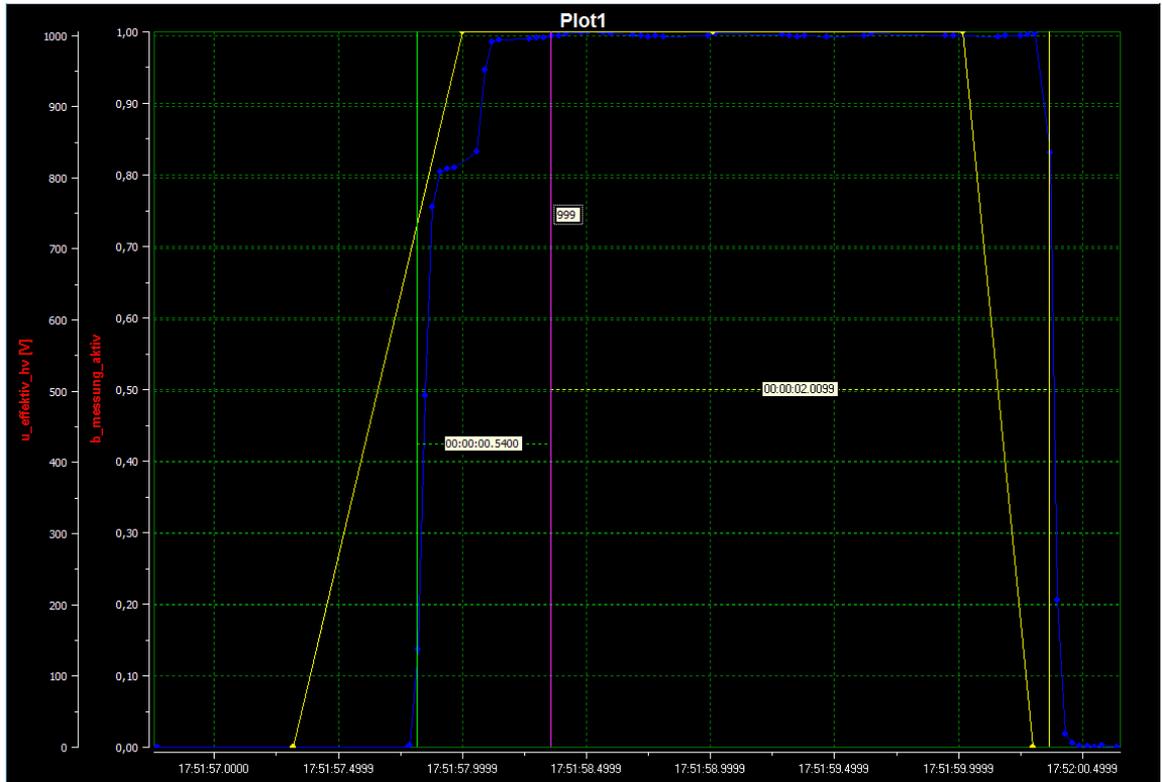
Is this checkbox active the red warning lamp will be flashing during an active test.

8.10 Adaptive HV timing

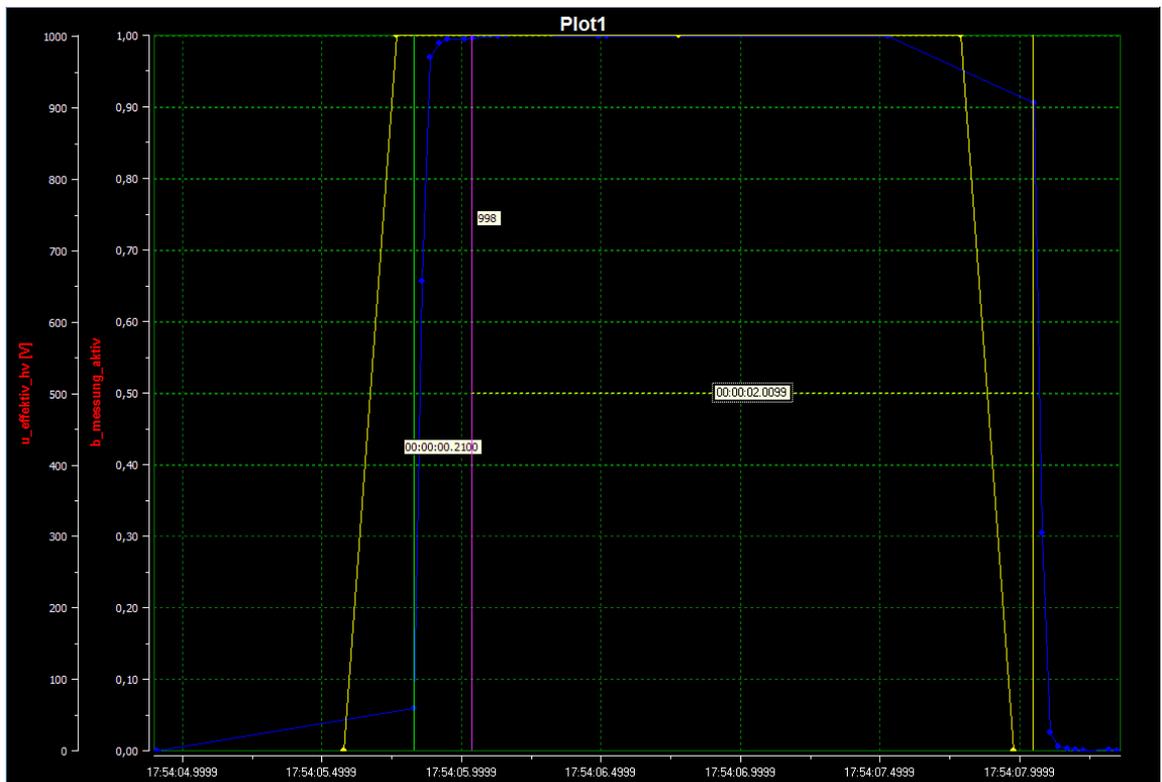
Has the device IO-CPU firmware 33284 or newer this checkbox will be displayed.

Is this checkbox active the start of the test will be modified during a high voltage test with AC current.

Normally during the start of the test an intermediate measurement will be done to set the test voltage in respect to the load.



Is the checkbox active it will be recognized that the load between units under test will not change. After 5 units under test with the same load have been measured the intermediate measurement will be omitted.



The intermediate measurement gets active again if one of the following cases occurs:

- The nominal voltage has changed.
- The load of the units under test has changed.

9 Technical support

In the case you have questions about the operation of the device contact via email support@etl-prueftechnik.de. Your request should provide the information as in the example below if possible. The serial number is located on a label on the rear side of the device. You can find the version numbers in **ETL DataView 3** under **Information** -> **Software**. Using your own application you can get them with the appropriate functions.

Dear Supportteam,

I have a question regarding/a problem with the following device:

Order number:

Serial number:

Version ETL Dataview:

Version IO-CPU:

Version LT-CPU:

10 Technical Data

10.1 General Technical Data

General	Power connection:	230 V, 50 Hz / 60 Hz	
	Power consumption:	Max. 10 A, depending on the type up to 16 A	
	Display:	Type X2:	without Display
		Type X4:	TFT-Display with Touch 5,7 inches, 640 x 480
		Type X5:	TFT-Display with Touch 10,4 inches, 800 x 600
		Type X6:	without Display, with VGA-connection
		Type X5:	TFT-Display with Touch 10,4 inches, 800 x 600
	Setting the test parameters:	Manually or fully automatically via interface	
	Programming:	Via display or external control	
	Error signal:	Acoustically, optically or via interface	
	Dimensions (W x H x D):	410 x 210 x 435 mm	
	Weight:	From ca. 18 – 35 kg	
	Casing:	Metal, light grey	
	Temperature range:	5 - 45 °C	
Basic equipment:	Instruction manual, main cable, safety circuit plug		
Calibration:	Factory calibration certificate inclusive		
Interfaces	ETL Interface, digital:	Start, stop, result good / error and test in process, etc.	
	Optional: USER Interface, digital:	Freely configurable IOs	
	Optional: ADF Interface:	Analogue IOs and frequency inputs	
	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 und 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.	
	PE Test probe:	Connection for contacting the test objects via a test probe with start push button and result-LEDs.	
	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	Keyboard lock:	Individually configurable
	Output options:	Individual configuration of the result outputs
	Buzzer options:	Individual configuration of the acoustic signals
	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 at I.O., not N.I.O. or all the times
	Ramp options:	Ramp time and kind of the ramp decrease
Test time:	Test time scaling	
Test time	Setting range:	0,5 – 6 000 s
	Resolution:	0,01 s

10.2 HV-Modules, technical Data

Special function	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
	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.

**10.2.1 HV-Module HVA5-100, Art.-Nr.: 201718
and HV-Module HVK5070, Art.-Nr.: 201819**

Test voltage	Output voltage:	0,01 – 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
	Curve shape:	Sinus, produced electronically
	Voltage stability:	Output voltage regulated electronically, PI-regulator
Test current	Output current:	0,1 – 100,0 mA
	Resolution, Digit:	0,1 mA
	Measuring uncertainty:	1 % of the measured value +/- 3 Digits
	Short circuit current:	> 200 mA
Output power	Transformer power:	> 500 VA
General	Safety:	According to En 50191, potential-free

10.2.2 HV-Module HVA2,5-100, Art.-Nr.: 201762

Test voltage	Output voltage:	0,01 – 2,50 kV AC
	Resolution, Digit:	10 V
	Measuring uncertainty:	1 % of the measured value +/- 2 Digits
	Frequency of the voltage:	50 Hz / 60 Hz
	Curve shape:	Sinus, produced electronically
	Voltage stability:	Output voltage regulated electronically, PI-regulator
Test current	Output current:	0,1 – 100,0 mA
	Resolution, Digit:	0,1 mA
	Measuring uncertainty:	1 % of the measured value +/- 3 Digits
	Short circuit current:	> 200 mA
Output power	Transformer power:	> 500 VA
General	Safety:	According to EN 50191, potential-free

10.2.3 HV-Module HVA1,5-100, Art.-Nr.: 201780

Test voltage	Output voltage:	0,01 – 1,50 kV AC
	Resolution, Digit:	10 V
	Measuring uncertainty:	1 % of the measured value +/- 2 Digits
	Frequency of the voltage:	50 Hz / 60 Hz
	Curve shape:	Sinus, produced electronically
	Voltage stability:	Output voltage regulated electronically, PI-regulator
Test current	Output current:	0,1 – 100,0 mA
	Resolution, Digit:	0,1 mA
	Measuring uncertainty:	1 % of the measured value +/- 3 Digits
	Short circuit current:	> 200 mA

Output power	Transformer power:	> 500 VA
General	Safety:	According to EN 50191, potential-free

10.2.4 HV-Module HVD3-CL, Art.-Nr.: 201598 and HV-Module HVK5030, Art.-Nr.: 201790 and HV-Module HVK2530, Art.-Nr.: 203048

Test voltage	Output voltage:	50 – 3 000 V DC
	Resolution, Digit:	1 V
	Measuring Uncertainty:	1 % of the measured value +/- 5 Digits
	Direct current voltage:	Produced electronically
	Voltage carrying:	Active charge resp. discharge
	Voltage stability:	Output voltage regulated electronically, PI-regulator
Test current at HV DC	Output current:	0,01 – 2,00 mA
	Resolution, Digit:	0,01 mA
	Measuring uncertainty:	1 % of the measured value +/- 3 Digits
	Output current:	Current-limited according to EN 50191, < 12 mA, single-point bonded
Resistance	Testing range 1:	0,50 – 1,99 MΩ
	Resolution, Digit:	0,01 MΩ
	Measuring uncertainty:	1 % of the measured value +/- 3 Digits
	Testing range 2:	2,0 – 99,0 MΩ
	Resolution, Digit:	0,1 MΩ
	Measuring uncertainty:	2 % of the measured value +/- 3 Digits
	Testing range 3:	100 – 400 MΩ
	Resolution, Digit:	1 MΩ
	Measuring uncertainty:	4 % of the measured value +/- 3 Digits

10.2.5 HV-Module HVD3,6-CL, Art.-Nr.: 203566 and HV-Module HVK5036, Art.-Nr.: 204902

Test voltage	Output voltage:	50 – 3 600 V DC
	Resolution, Digit:	1 V
	Measuring uncertainty:	1 % of the measured value +/- 5 Digits
	Direct current voltage:	Produced electronically
	Voltage carrying:	Active charge resp. discharge
	Voltage stability:	Output voltage regulated electronically, PI-regulator
Test current	Output current:	0,01 – 2,00 mA
	Resolution:	0,01 mA
	Measuring uncertainty:	1 % of the measured value +/- 3 Digits
	Output current:	Current-limited according to EN 50191, < 12 mA, single-point bonded

10.2.6 HV-Module HVK5070, Art.-Nr.: 201819

Test voltage	Output voltage:	0,01 – 7,00 kV DC
	Resolution, Digit:	10 V
	Measuring uncertainty:	1 % of the measured value +/- 2 Digits
	Direct current voltage:	Rectified AC-voltage
	Voltage carrying:	Active charge resp. passive discharge
	Voltage stability:	Output voltage regulated electronically, PI-regulator
Test current	Output current:	0,1 – 70,0 mA
	Resolution:	0,1 mA
	Measuring uncertainty:	1 % of the measured value +/- 3 Digits

10.3 PE-Modules, technical Data

Special functions	4-conductor measurement:	Test with a separated current and measuring path
	Start button in the test probe:	Definite start-up of the current source
	Result display:	Test result additionally in the handle piece of the test probe
	Control of the test current:	Control of the standardized minimum current
	Minimum current control:	Control of a preset minimum current during the test

10.3.1 PE-Module AC10, Art.-Nr.: 201720

Resistance	Testing range:	1 – 500 mΩ
	Resolution, Digit:	1 mΩ
	Measuring uncertainty:	1 % of the measured value +/- 3 Digits
Test voltage	Output voltage:	No-load voltage < 12 V AC
	Alternating current voltage:	Produced electronically
Test current	Output current:	2,0 – 10,0 A AC, infinitely variable
	Resolution:	0,1 A
	Measuring uncertainty:	1 % of the measured value +/- 3 Digits

10.3.2 PE-Module AC25, Art.-Nr.: 201600

Resistance	Testing range:	1 – 500 mΩ
	Resolution, Digit:	1 mΩ
	Measuring uncertainty:	1 % of the measured value +/- 3 Digits
Test voltage	Output voltage:	No-load voltage < 12 V AC
	Alternating current voltage:	Produced electronically
Test current	Output current:	2,0 – 25,0 A AC, infinitely variable
	Resolution:	0,1 A
	Measuring uncertainty:	1 % of the measured value +/- 3 Digits

10.3.3 PE-Module AC32, Art.-Nr.: 202708

Resistance	Testing range:	1 – 500 mΩ
	Resolution, Digit:	1 mΩ
	Measuring uncertainty:	1 % of the measured value +/- 3 Digits
Test voltage	Output voltage:	No-load voltage < 12 V AC
	Alternating current voltage:	Produced electronically
Test current	Output current:	2,0 – 32,0 A AC, infinitely variable
	Resolution:	0,1 A
	Measuring uncertainty:	1 % of the measured value +/- 3 Digits

10.3.4 PE-Module AC40, Art.-Nr.: 204633

Resistance	Testing range:	1 – 500 mΩ - limiting value of the resistance is adjustable 30 A – range: 1 - 500 mΩ 40 A - range: 1 - 300 mΩ
	Resolution, Digit:	1 mΩ
	Measuring uncertainty:	1 % of the measured value +/- 3 Digits
Test voltage	Output voltage:	No-load voltage < 12 V AC
	Alternating current voltage:	Produced electronically
Test current	Output current:	2,0 – 40,0 A AC, infinitely variable
	Resolution:	0,1 A
	Measuring uncertainty:	1 % of the measured value +/- 3 Digits

10.4 ISO-Modules, technical Data

Special functions	Ramp function:	The voltage is run up ramp-wise to the selected test voltage, only then the test time begins, freely programmable.
--------------------------	----------------	--------------------------------------------------------------------------------------------------------------------

10.4.1 ISO-Module DC5-CL, Art.-Nr.: 201599

Resistance	Testing range 1:	0,50 – 1,99 MΩ
	Resolution, Digit:	0,01 MΩ
	Measuring uncertainty:	1 % of the measured value +/- 3 Digits
	Testing range 2:	2,0 – 99,0 MΩ
	Resolution, Digit:	0,1 MΩ
	Measuring uncertainty:	2 % of the measured value +/- 3 Digits
	Testing range 3:	100 – 400 MΩ
	Resolution, Digit:	1 MΩ
	Measuring uncertainty:	4 % of the measured value +/- 3 Digits
Test voltage	Output voltage:	50 – 3 000 V DC
	Resolution, Digit:	1 V
	Measuring uncertainty:	1 % of the measured value +/- 5 Digits
	Direct current voltage:	Produced electronically

	Voltage carrying:	Active charge resp. discharge
	Voltage stability:	Output voltage regulated electronically, PI-regulator
Test current	Output current:	Current-limited according to EN 50191, < 12 mA

10.4.2 ISO-Module DC10-CL, Art.-Nr.: 201776

Resistance	Testing range 1:	0,50 – 1,99 MΩ
	Resolution, Digit:	0,01 MΩ
	Measuring uncertainty:	1 % of the measured value +/- 3 Digits
	Testing range 2:	2,0 – 99,0 MΩ
	Resolution, Digit:	0,1 MΩ
	Measuring uncertainty:	2 % of the measured value +/- 3 Digits
	Testing range 3:	100 – 400 MΩ
	Resolution, Digit:	1 MΩ
	Measuring uncertainty:	4 % of the measured value +/- 3 Digits
Test voltage	Output voltage:	50 – 1 000 V DC
	Resolution, Digit:	1 V
	Measuring uncertainty:	1 % of the measured value +/- 5 Digits
	Direct current voltage:	Produced electronically
	Voltage carrying:	Active charge resp. discharge
	Voltage stability:	Output voltage regulated electronically, PI-regulator
Test current	Output current:	Current-limited according to EN 50191, < 12 mA

10.4.3 ISO-Module DC30-CL, Art.-Nr.: 202709

Resistance	Testing range 1:	0,50 – 1,99 MΩ
	Resolution, Digit:	0,01 MΩ
	Measuring uncertainty:	1 % of the measured value +/- 3 Digits
	Testing range 2:	2,0 – 99,0 MΩ
	Resolution, Digit:	0,1 MΩ
	Measuring uncertainty:	2 % of the measured value +/- 3 Digits
	Testing range 3:	100 – 400 MΩ
	Resolution, Digit:	1 MΩ
	Measuring uncertainty:	4 % of the measured value +/- 3 Digits
Test voltage	Output voltage:	50 – 3 000 V DC
	Resolution, Digit:	1 V
	Measuring uncertainty:	1 % of the measured value +/- 5 Digits
	Direct current voltage:	Produced electronically
	Voltage carrying:	Active charge resp. discharge
	Voltage stability:	Output voltage regulated electronically, PI-regulator
Test current	Output current:	Current-limited according to EN 50191, < 12 mA

10.5 Function Test-Modules, technical Data

Special functions	Short-circuit test:	Fully electronically with current limiting
--------------------------	---------------------	--------------------------------------------

10.5.1 FCTQ-Modul Q1ACMF-230AC-10A, Art.-Nr.: 201791

Test voltage	FCT Module	Source
	Output voltage:	depending from mains voltage
	Resolution, Digit:	1 V
	Number of phases:	one-phase
	Maximum range	0-400 V AC
	Remark	short circuit test between L and N before switching the mains voltage to DUT
Test fequency	Resolution, Digit:	0.1 Hz
	Maximum range	45.0 – 65.0 Hz

10.5.2 FCTQ-Module Q1ACMEX-270AC-500VA, potentialfree, Art.-Nr.: 201807

Test voltage	FCT Module	Source
	Output voltage:	0 – 270 V A, electronical source
	Resolution, Digit:	1 V
	Number of phases:	one-phase
	Maximum range	0-400 V AC
	Remark	no short circuit test neccassary, electronic source is current limited
Test fequency	Resolution, Digit:	0.1 Hz
	Maximum range	45.0 – 65.0 Hz

10.5.3 FCT-Module Measuring Module M10A, Art.-Nr.: 201666

Test voltage	FCT Module	Measurement module
	Measured voltage range:	0-532 V AC
	Displayed resolution, Digit:	1 V
	Internal resolution:	0,13 V AC
	Measuring accuracy:	1 % of the measured value +/- 2 Digits
	Number of phases:	one-phase
Test current	Measured current range:	0.01 – 21,73 A AC
	Dispalyed resolution, Digit:	0,01 A
	Internal resolution:	0,0053 A
	Measuring accuracy:	1% of the measured value +/- 6 Digits

11 Manufacturer's Declaration / EU-Declaration of Conformity

Test system ATS 400 (Series 400)

Manufacturer: ETL Prüftechnik GmbH
Lembergstraße 23
70825 Korntal-Münchingen

The designated product corresponds with the regulations of the following European guidelines:

Low-voltage directive
EMC guideline

Applied harmonised standards: EN/IEC 61010-1
EN 61326-1
EN 61000-3-3
EN 61000-3-2
EN 50191

Issuer: ETL Prüftechnik GmbH

Location, Date: Korntal, 20.04.2010

Legally binding signature:



Mathias Braunmiller
Chief Executive



This declaration certifies the correspondence with the named guidelines, but it does not contain a warranty of qualities.

The safety notations of the provided product information must be regarded.

12 Warranty

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.

13 Personal Notes



Lembergstraße 23
70825 Korntal

Telefon: +49 711 83 99 39-0
Telefax: +49 711 83 99 39-9
Internet: www.etl-prueftechnik.de
E-Mail: info@etl-prueftechnik.de