

Climatic simulation



TIRA

Umweltsimulation
Environmental Simulation



Environmental Test Systems

TIRAclima, TIRAtemp, TIRAvibro
Climatic-, Temperature- and Vibration Test



Climatic simulation



TIRA GmbH

TIRA GmbH delivers measuring and testing systems world-wide for industry and research.

On several production locations, we are developing and manufacturing up-to-date plant engineering equipment including application-related software to simulate environmental influences, to test material properties as well as to detect and eliminate unwanted vibrations.

In accordance with CE requirements and with regard to national and international standards, our products are subject to strict quality inspection. The same care is taken as regards preservation and modernization of our conventional TIRA testing and measuring technology proven over years.

We are dedicated to progress, efficiency and quality of TIRA products in close co-operation with our customers and invest into the future of this potential. This is documented by our quality management, certified as per DIN ISO 9001 since 1995 and, since June 2003, as per DIN EN ISO 9001:2000.

Numerous possible applications from one hand

The corporate structure of TIRA Group, the interaction of Vibration Testing and Environment Simulation product lines, the integral mechanical production center and Materials Testing and Balancing Technology branches opens-up maximum flexibility and ambitious vertical production ranges.

An existing archive containing design data collected in more than 50 years of tradition, experience and current knowledge of our branch features a solid basis for first-class technology and reliable services.

We offer customized and standardized system solutions from one hand. We also render competent assistance to our customers in the fields of concept and development via design and assembly up to commissioning and after-sales service.

TIRA machines and systems have stood the test in industry, colleges and institutes all over the world. In order to consult and advise users and prospective buyers all over the world, appointed sales and service companies represent the trademark and know-how of TIRA GmbH in over 60 countries of the world.

(*Please find information of test rooms on a special sheet)

TIRA Environmental Simulation

The TIRA Environmental Simulation product line was founded with the objective to offer complete testing systems to our customers out of one hand.

The know-how of TIRA measuring and testing technology closely combined with highly-efficient environment simulation systems offers complex solutions of testing jobs in research, development, production and quality assurance.

A comprehensive range of services including up-to-date software, control and interface equipment was completed by a product series of standardized vibration test chambers and walk-in test rooms in modular design*.

Reliability and high quality of products and developments from the TIRA company are ensured by persistent quality and functionality inspections. An established service team of experienced and competent service engineers realizes quick and reliable servicing of systems on-site as well as smooth and on-time erection and commissioning of our products.

TIRA Environmental Simulation GmbH – a company being a reliable partner to our customers in the fields of research, development, environmental simulation and testing technology.

Demands made on your climatic and temperature test chamber

- Power range in accordance with national and international test standards, CE and EMC regulations
- Manufactured according to UNI EN ISO 9001 (EN 29001) Quality Standard and DNV
- Environment-friendly refrigerants and hermetically sealed, low-noise running compressors
- Variable temperature and humidity are quickly transferred onto the test loads
- Easy and flexible operation, up-to-date control systems
- Excellent documentation of test results
- Wide range of standard and special accessories to choose from
- Innovative design for the modern lab
- Short delivery time for standard units

Please let us introduce to you the new generation of test chambers **TIRAtemp**, **TIRAclima** and **TIRAvibro**. Call on us.

Climatic simulation



Versatile and flexible product range

- ✓ **Chambers to simulate environmental conditions**
(temperature, humidity, pressure, radiation, vibration)
- ✓ **Shock test chambers**
(air/air, liquid/liquid, horizontal, vertical)
- ✓ **Walk- In chambers**
(air bag test systems, sunlight simulation, plant growth chambers)
- ✓ **Special altitude test chambers**
(space simulation, altitude climatic chambers)
- ✓ **Combined vibration chamber systems**
(vertical and horizontal vibration systems)

Environmental Simulation – Environmental Protection

With the development of trend-setting technologies for environmental simulation will be as well natural the application from environment- friendly refrigerants and isolation materials as an appropriate manufacturing.

The refrigerants R404 a, R23 we used are CFC- free and admitted after the convention by Montreal and the executions of London and Copenhagen. Also the polyurethane foam has been used for thermal isolation is CFC free and guarantees in contrast to fibre glass a stable performance over time.

All connections and welding in the refrigeration system have been carefully checked by means of helium leak detectors (mass spectrometers) for absolute seal to bend forward against refrigerant losses, to ensure a perfect seal. The compressors are screwed on the impulse engine and therefore simple to repair.

Special Systems

Specific product-oriented tests require maximum care and flexibility even when selecting the test system!

Testing technology and cycles should be matched with the requirements and environment to a maximum possible extent to ensure that investigations can be performed safely and efficiently in a long term.

Standard series of construction do not always offer the optimal solution and realization of testing jobs. Products are very often tested and stressed insufficiently or excessively.

We develop and construct customized systems and individual special solutions for environment simulation.



Walk- In climatic test chamber, 10 m³



Temperature vibration test chamber, special moveable design



Climatic simulation

Model range *TIRAtemp*, *TIRAclima*

In the new series of climatic- and temperature test chambers the most modern technologies of control, air conditioning and refrigeration technology are connected to an efficient product for the environmental simulation. Basic models are available in two possible temperature ranges, whose nominal capacity varies from 250, 340, 600, 1200, 1600 up to 2000 l.

(*Please find information of bench top chambers from 16 to 160 l on a special sheet).

For the temperature regulation to be used single stage compressors to -40°C and compressor cascades to -75 °C.

Siemens Simatic S7 in connection with **WINKRATOS®** software and a large number of options, ensure a model range as an flexible and cost effective adjustment to your special testing jobs.



Special/ general features

- Control and management system:
Siemens Simatic S 7 SPC (stored program control) world-wide proven.
Allows communication with digital and analogue interfaces, permits integration of customized control jobs in the software.
- Chamber lining:
stainless steel with vapour- proof welding (all models)
- Drip cap:
invisibly placed under the door, it is extremely efficient
- 80 mm port hole:
available on all models
- Noise reduction system:
installed in the machine compartment, it reduces the chamber noise to 59... 68 db (A), according to the compressors size. Further noise reduction may be provided upon request.
- Double ceiling and double floor:
they allow a better air distribution inside the chamber avoiding condensation or dripping over the specimen
- Air treatment system:
it ensures a precise control of the climatic parameters inside the chamber with minimal thermal inertia;
a powerful reaction- type fan allows rapid temperature variations of both air and specimen
- Refrigeration system:
simple and reliable, it ensures optimum thermodynamic performances at any temperature
- Structure:
the equipment modularity allows easy servicing and upgrades.
- Ergonomics:
it allows easy access to the chamber wherever placed; the control interface is mounted on the front panel; the water tank is easily filled from the lower front panel.
- Design:
Modern two-colour design in RAL 7035 and RAL 5010 (other colours are possible as options)

Climatic simulation



■ Humidification system:

(for climatic test chambers) it offers two great advantages:

- correct functioning without the need of distilled or demineralized water
- the use of "dry" vapour in order to avoid condensation on the specimens and to reproduce real environmental conditions.

■ Humidity control:

(for climatic test chambers): carried out according to electronic technique by means of capacitive humidity sensor.

Capacitive humidity sensors work according to the principle of changing the electrical properties of a plastic polymer as a function of environmental humidity. Capacitive humidity sensors respond very quickly to humidity changes and can be used irrespectively of airflow and at negative temperatures. The system is distinguished by its high precision and excellent reproducibility.

EINSCHLÄGIGE NORMEN

TEMPERATURE TESTS

COLD ONLY

DIN 40046 part 3, test A
IEC 68-2-1, part A
BS 2011, part 2, test A
VG 95 332, part 3 and 22
MIL-STD 810 D, Met. 502.2
MIL-E 5272, test 4.2

HOT ONLY

DIN 40046, part 4, test 3
IEC 68-2-2, test B
BS 2011, part 2, test B
VG 95 332, part 4 and 34
MIL-STD 810 D, Met. 501.2
MIL-STD 883 C, Met. 1008.2
MIL-E 5272, Met. 4.1
MIL-STD 202 E, Met. 108 A
VG 95 210, Met. 108 A

HOT/ COLD

DIN 40046, part 14, test Nb
IEC 68-2-14 Nb
MIL-STD 311 A, part 112.1

CLIMATIC TESTS

CONSTANT CLIMATE

DIN 40046 part 2
DIN 40046 part 5, test C
DIN 50014
IEC 68-2-3, test Ca
VG 95210, part 4, test 103 B
MIL-STD 202 E, Met. 103 B
VG 95 332, part 5
DIN/IEC 68-2-56

VARIABLE CLIMATE

DIN/IEC 68-2-30 DB Var. 1
DIN/IEC 68-2-30 DB Var. 2
IEC 68-2-38
MIL-STD 202 E, Met. 106 D
MIL-STD 883 C, Met. 1004.4
DIN 40046 part 6 and 31
IEC 68-2-4, test D
BS 2011, part 2.1, test Da
VG 95210, part 7, Met 106 C
MIL-STD 750 B, Met. 1021.1
DIN 40046, part 101
DIN 50016
MIL-STD 311 A, part 105.1
MIL-E 5272, test 4.4
MIL-T 5422 E, part 4.4
MIL-STD 810, Met. 507 Proc. 1-2-3

(* can be optionally substituted by psychrometric humidity measurement as per Assmann)

CLIMATIC TEST CHAMBERS *TIRA*clima und *TIRA*temp

Types	<i>TIRA</i> temp	TTC 4025	TTC 4034	TTC 4060	TTC 4120	TTC 4160	TTC 4200	
		TTC 7025	TTC 7034	TTC 7060	TTC 7120	TTC 7160	TTC 7200	
	<i>TIRA</i> clima	TCC 4025	TCC 4034	TCC 4060	TCC 4120	TCC 4160	TCC 4200	
		TCC 7025	TCC 7034	TCC 7060	TCC 7120	TCC 7160	TCC 7200	
Useful capacity	L	224	336	557	1152	1535	2040	
Internal dimensions	mm	W	600	600	850	1000	1000	
		D	535	800	733	1130	1505	2000
		H	700	700	895	1020	1020	1020
External dimensions	mm	W	850	850	1100	1250	1250	1250
		D	1460	1725	1705	2160	2534	3035
		H ¹	1516	1516	1911	2036	2040	2040
PERFORMANCE PARAMETERS FOR TEMPERATURE TESTS								
Temperature range	°C	-40/ +180						
		-75/ +180						
Precision over time	K	±0,25...±0,3						
Temperature rise rate ²	K/min	5	4,5	4,0	3,0	2,5		
		5	4,5	4,0	3,0	2,5		
Temperature fall rate ²	K/min	3,5	3,0	4,0	3,0	2,5	2,0	
		3,5	2,0	4,0	3,0	2,5	2,0	
PERFORMANCE PARAMETERS FOR CLIMATIC TESTS								
Humidity range ³ (t= -20° bis +94°C)	% r.H.	10 ...98						
Humidity precision	% r.H.	±1...±3						
Internal dissipation (T=-25°C)	W	400	1000	1300	500			
		600	500	1200	1500	550		
Weight	kg	490	550	750	990	1300	1400	
		540	600	830	1090	1400	1500	
Sound pressure level ⁴	dB (A)	59	64	65				
		63	66	68				
Electrical power supply		400V + 6% / -10% / 50 Hz/ 3 ph + N + G						

¹ Height without wheels (when wheels are mounted add 50/ 70 mm)

² Temperature variation in compliance with IEC 60068-3-5 standard

³ dew point < +5°C only short time (non continuous test)

⁴ Measured at 1 m from the front in free environment



Climatic simulation



TIRAvibro Series – Vibration Test Chambers

TIRAvibro features a model series of vibration test chambers developed for combined tests under climatic and thermal impacts and mechanical and dynamical loads.

Suited to work with vertical and horizontal vibration systems, the climatic and temperature test chambers have been optimized particularly for operation with TIRA vibration test systems and integration into TIRA complete systems.

Incorporated in system solutions, the test chamber and shaker can be operated through a common test software (TEC). The base models of series are available in useful space sizes of 250- 1200 l and in two temperature ranges (-40°C, -70°C ... +180°C).*

Sliding or fixed floors feature the interface port to connect the vibration test system to the test chamber. Either a fixed or two flexible test chamber- floors are used as a function of vibration test to be completed.

The diaphragms are made adjustably to the mounting surface to seal-off the mechanical interface between test chamber- floor and the shaker. As compared to silicone, the used plastic fiber material has proven its long-term stability and thermal resistance. Hydraulic lifting or rail systems are used to sustain horizontal and vertical movements of vibration test chamber and to adjust the chamber to position of use and/or vibration shaker. Blind floors or cover plugs can be installed for climatic and temperature tests irrespectively of the vibration test system. The series can be matched individually with any application and extended by numerous accessories.

(*Other sizes and designs on request, as from 60 l)



Internal view, Vibration test chamber with sliding floor and vertical shaker

BASIC LINE TIRAvibro*TEMPERATURE- VIBRATION TEST CHAMBERS suited to work with vertical and horizontal TIRA vibration systems

Type	vertical	TTV 4025 V	TTV 4034 V	TTV 4060 V	TTV 4120 V
		TTV 7025 V	TTV 7034 V	TTV 7060 V	TTV 7120 V
	vertical/ horizontal	TTV 4025 VH	TTV 4034 VH	TTV 4060 VH	TTV 4120 VH
		TTV 7025 VH	TTV 7034 VH	TTV 7060 VH	TTV 7120 VH
Useful capacity	L	224	340	560	1220
Internal dimensions	mm	W	600	850	1000
		D	535	800	733
		H	700	700	900
External dimensions	mm	W	850	1520	1520
		D	2550	2800	2300
		H	1900	1900	2200
PERFORMANCE PARAMETERS FOR TEMPERATURE TESTS					
Temperature range	°C	-40/ +180			
Precision over time	°C	-70/ +180			
Temperature rise rate1	K/min	(-40/ +150°C)	3	2,5	1,5
			3	2,5	2
Temperature fall rate1	K/min	(4-150/ -40°C)	1,5	1	1,5
			3	2,5	2
Weight	kg	700	750	900	1200
		750	800	950	1300
Sound pressure level2	dB (A)	64		65	67
		66		65	68
Electrical power supply		400 V +6% / -10% / 50Hz / 3 ph +N +G			
Interfacing with vibration test system					
Interfacing with vibration test system for vertical excitation:					
vertical		1 fixed floor with porthole to the vertical shaker, equipped with heated connector elements; 2 diaphragms (blended aramid fiber fabric, coated on one side 3) to ensure two-sided sealing to the shaker			
Interfacing with vibration test system for vertical and horizontal excitation:					
vertical/ horizontal		2 replaceable (sliding) floors with portholes to the shaker, equipped with heated connector elements; (1 x for operation with vertical shaker; 1 x for operation with horizontal shaker / slip table) special quick-action closures to fix the removable floor to the chamber; 4 diaphragms (blended aramid fiber fabric, coated on one side 3) to ensure two-sided sealing to the shaker			

* all basic chamber models are available in stress screening ES or economy E version and with humidity control kit (climatic chamber)

- 1) Temperature variation in compliance with IEC 60068-3-5 standard
- 2) measured at 1 m from the front in free environment
- 3) Aramid fiber (aromatic polyamide), discovered and developed by Messrs. DuPont, known under the manufacturer's trademark Kevlar® or Twaron®;

properties:
high specific strength, low density, high heat resistance (up to approx. +150°C), high mechanical stability, also used in ballistics.
Used preferably for TIRA vibration test chambers as a substitute of silicone thanks to its excellent properties.



Diaphragms, inside and outside, to seal-off the vibration shaker with thermal barrier seated and interface to locate the test specimen

Climatic simulation



TIRA Full Test Systems for Environmental Simulation

Quality, reliability, and safety of products require utmost care from the concept to the end-user.

To meet this pretentious requirement, one nowadays investigates the interactions between objects and their direct or indirect environment by means of environment testing systems.

Based upon such experience, Products are developed with reference to specific applications as well as high quality and long lifetime achieved. Such flaws as material and production faults can be detected early and costly breakdowns or callback actions avoided.

In practical use, the products are exposed to various environmental influences at the same time such as e.g. temperature, humidity, vibrations, and transport loads.

User-specific one-sided test systems are used as combinations in the test setup and linked to form full test systems.

TIRA delivers full test systems from one hand.

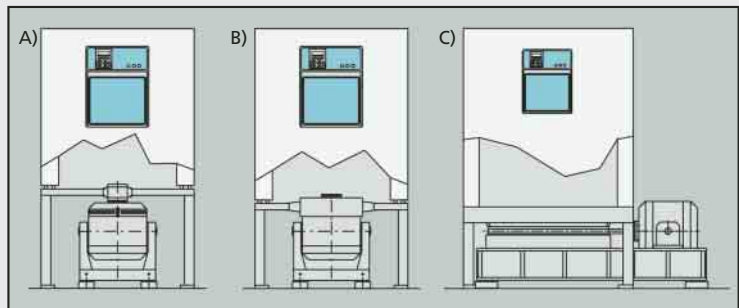


TIRA vibration test chamber system to match with vertical vibration shaker

TIRA Vibration Test Chamber Systems

Possible adjustments of vibration shaker to test chamber:

- A) Integration through head extender provided on shaker head
- B) Integration of vibration shaker through head expander linked with the shaker
- C) Integration of slip table (slip table system)



TEC (TIRA Environmental Control) – Operator Software for TIRA Vibration Test Chamber Systems to program test chamber and vibration control system

TIRA Environmental Control Software opens-up new possibilities for operation of complete systems to the user.

The software for vibration test chamber systems developed in a joint project of TIRA environmental simulation and vibration technology product lines, allows the user to freely and simply program complex test cycles without restricted test time duration as well as graphic representation and evaluation of results.

The software communicates with the test chamber and the associated vibration control system through active-X interface and RS232 interface port. In a visualized status window, the user gets permanently updated values of :

Climatic test chamber:

- Current test time duration
- Program status
- Temperature
- Humidity

Vibration control system:

- Acceleration rate
- Level
- Test time remaining
- Control system status



Climatic simulation



TIRA Climatic Test Chamber "Economy"

CLIMATIC TEST CHAMBERS "ECONOMY"							
Types		TCC 2025	TCC 2034	TCC 2060	TCC 1120	TCC 1160	
Useful capacity	L	224	336	557	1152	1535	
Internal dimensions	mm	W	600	600	850	1000	1000
		D	535	800	733	1130	1505
		H	700	700	895	1020	1020
External dimensions	mm	W	850	850	1100	1250	1250
		D	1460	1725	1705	2160	2534
		H ¹	1516	1516	1911	2036	2040
PERFORMANCE PARAMETERS FOR TEMPERATURE TESTS							
Temperature range	°C	-20/ +180			-10/ +150		
Precision over time	K	±0,25...±0,3					
Temperature rise rate ²	K/min	1,7	1,4	1	0,8	0,7	
Temperature fall rate ²	K/min	1,7	1,3	1	0,5	0,3	
PERFORMANCE PARAMETERS FOR CLIMATIC TESTS							
Humidity range	% r.H.	10 ...95					
Humidity precision	% r.H.	±1...±3					
Internal dissipation (T= 0°C)	W	500					
Weight	kg	460	520	720	960	1000	
Sound pressure level ⁴	dB (A)	59					
Electrical power supply		230V + 6% / -10% / 50 Hz/ 1 ph + G					

The "Economy" series was developed particularly for tests with low power demand. They are intended for general applications when high environmental performances are not required. An ideal tool for tropical tests on pharmaceutical products (stability tests), plastic, rubber, paper, semiconductor (85/85).

¹ Height without wheels (when wheels are mounted add 50/ 70 mm)

² Temperature variation in compliance with IEC 60068-3-5 standard

TIRA Climatic Test Chamber "Stress Screening"

CLIMATIC TEST CHAMBERS "STRESS SCREENING"							
Types		TCC 4025 ES TCC 7025 ES	TCC 4034 ES TCC 7034 ES	TCC 4060 ES TCC 7060 ES	TCC 4120 ES TCC 7120 ES	TCC 4160 ES TCC 7160 ES	
Useful capacity	L	224	336	557	1152	1535	
Internal dimensions	mm	W	600	600	850	1000	1000
		D	535	800	733	1130	1505
		H	700	700	895	1020	1020
External dimensions	mm	W	850	850	1100	1250	1250
		D	1460	1725	1705	2160	2534
		H ¹	1516	1516	1911	2036	2040
PERFORMANCE PARAMETERS FOR TEMPERATURE TESTS							
Temperature range	°C	-40/ +180 -70/ +180					
Precision over time	K	±0,5...±0,1					
Temperature rise rate ²	K/min	10	9	6,1		5	
Temperature fall rate ²	K/min	11,5	10	7	6	5,5	
		6,1	5,5	4		3,5	
		6,6	5,5	6		3,5	
PERFORMANCE PARAMETERS FOR CLIMATIC TESTS							
Humidity range	% r.H.	10 ...98					
Humidity precision	% r.H.	±1...±3					
Internal dissipation (T=-25°C)	W	1600	1300	2500	3500	2600	
Weight	kg	2000	1500	3500	4500	3000	
		630	610	820	1070	1400	
Sound pressure level ⁴	dB (A)	60		66	67		
		65	63	68	70		
Electrical power supply		400V + 6% / -10% / 50 Hz/ 3 ph + N + G					

With the TIRA "Stress Screening" a chamber line was constructed first of all for extensive and demanding tests. They are intended for Environmental Stress Screening (ESS) or generally in the reliability growth processes where a 5°K/ min is a must.

The chambers are equipped with water condenser (remote air condenser as option).

¹ Height without wheels (when wheels are mounted add 50/ 70 mm)

² Temperature variation in compliance with IEC 60068-3-5 standard

³ dew point < +5°C only short time (non continuous test)

⁴ Measured at 1 m from the front in free environment

Climatic simulation



Included as standard in the basic version

Humidification water recycling system: it consists of a PVC tank with indication and control of the water level. It can also work with non recycled water.

Wheels: self- pivoting wheels

Serial interface: RS 232 or RS 422 for connection to the remote control system (distances up to 15 and 1500 metres respectively)

Port hole: 80 mm diameter, fitted with rubber cap. It allows internal- external electrical, mechanical or hydraulic connections.

Thermostat: max/ min digital thermostat with independent probe. It can be also used to disconnect the supply of the device under test.

UPS connection: (the UPS is an optional accessory) it is used for the supply of the microprocessor unit in order to guarantee data storage and acquisition even in case of power failure

No. 1 internal grid shelf



Optional



WINKRATOS- Software running under WINDOWS 95/ 98/ 2000: installed on remote PC supplied by TIRA or belonging to the customer. Documentation of all functions on a Windows surface.

Multichamber remote control: consisting of PC complete with WINKRATOS software (multichamber control version) and connection kit for controlling several chambers (up to 16) from the same PC station.

Analog- inputs: Set of no. 6 analog inputs 0÷10V for user's data acquisition; Set of no. 4 analog input for PT100 measurement acquisition

Noise reduction system: water- condensed, hermetically-sealed compressors allows a 2÷4db (A) reduction of the chamber noise

Inspection window: multiple- crystal, with double heated transparent film, variable size

Handling port hole/ manipulation lead-through: positioned on the door, for the handling of specimens inside the chamber, as from 250 liter

Notch feed-through: on the door frame, it allows the introduction inside the chamber of pre- connected electronic equipment, without disassembling connectors or plugs.

UV- Lamp: to be used for ageing tests on painted surfaces, plastic materials, rubber, etc.; correct functioning is within 0°C and +40°C

Internal shelves: AISI 304 stainless steel adjustable in height, grid shelves to be added to the one supplied



Climatic simulation



Siemens Simatic S7 Control System

Basic performance

- Operation panel with LCD Display
- Key board with 8 Function keys
- Alphanumeric keyboard with huge display
- SPC (storage program control) Simatic S 7 in a modular upgradable performance
- Serielle Interface RS 232

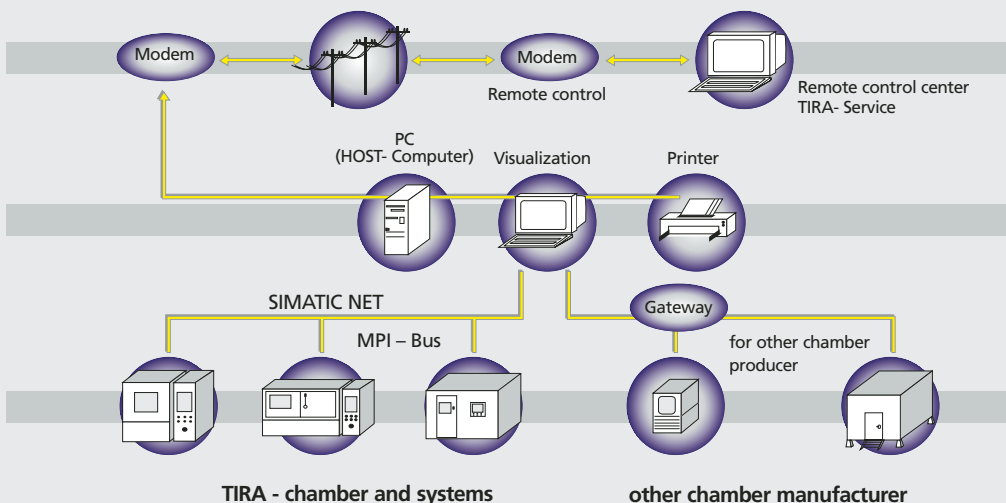
Performance

- Menue guided and easily programmable
- Graphical measurements evaluation
- Service- and Help functions
- Industrial data communication
- Open bussystem- architecture for networking
- Measure and stimulation of testsystems
- Intranet- and Internetkommunikation
- Complex Data Logging
- Simatic S 7 Prozessvisualisation via Siemens Win CC Software
- High data transmission speed with Profibus or MPI (Multi Point Interface)
- Documentation and Data Logging
- Open for costumized solutions
- World wide service support
- Telephon- Remote control



**Siemens
inside...**

Network principle:



Climatic simulation



WINKRATOS® Software

WINKRATOS® is the new generation control and management system running under WINDOWS 95/ 98/ 2000
Powerful and flexible, WINKRATOS® offers many innovative features and it allows the user to:

Main features

- Connection to Siemens Simatic S 7 through RS 232 or RS 422 serial port if the PC must be connected to a chamber only or for multiseriale connection of several chambers (up to 16)
- Colour printing on any WINDOWS 95/ 98/ 2000 compatible printer
- Multiple access password levels

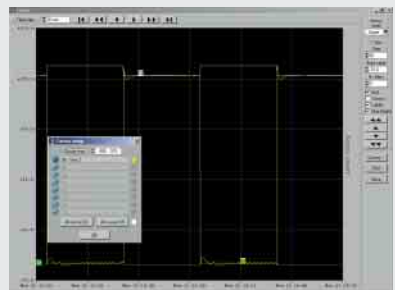
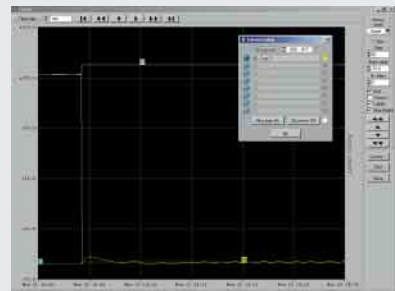
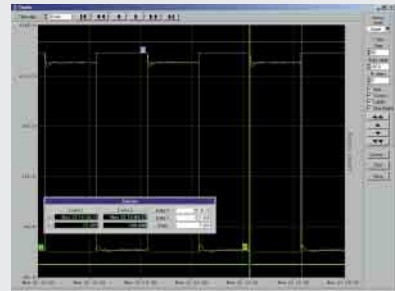
Acquisition functions

- Real- time measurement of test parameters by means of graphic cursors
- Max. flexibility for cycles to be set
- Storage of occurred events such as alarms, commands, ect.

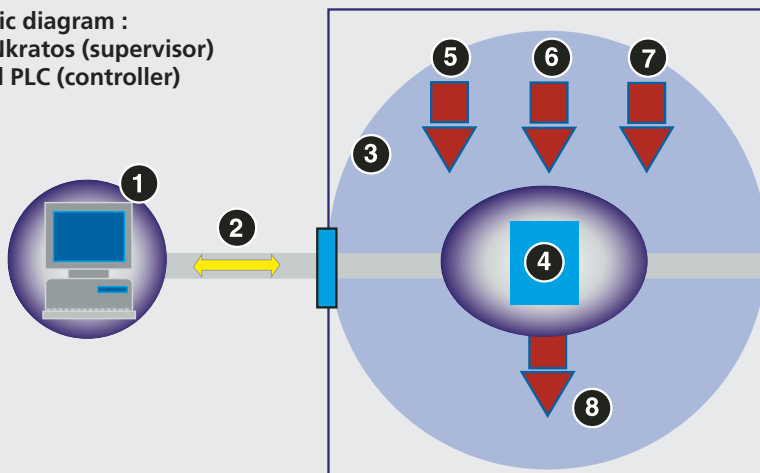
Graphic functions

- Fully- configurable layout of acquired measures' charts
- Display of several charts on the monitor
- Several colours to be chosen at one's choice for the display of different parameters' curves
- Enable/ disable of chart display and grids
- Real- time update of acquired measures' charts

WINKratos may be installed on PC supplied by TIRA or belonging to the customer and may be connected to any TIRA Test cabinets and Walk- In chambers.



Logic diagram :
WINKratos (supervisor)
And PLC (controller)



- 1 PC with WINKRATOS Software
- 2 RS 232 serial connection (RS 422 on request)
- 3 TIRA Test cabinets/ Walk- In chamber
- 4 SPS Siemens Simatic S7
- 5 sensors
- 6 alarm inputs
- 7 digital control inputs
- 8 PID regulators

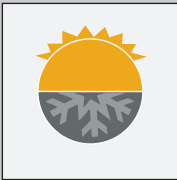


REFERENCES:

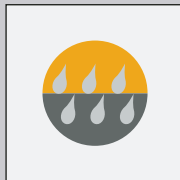
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- MEN Mikro Elektronik GmbH, Nürnberg
- AUDI AG, Ingolstadt
- Valeo, Ungarn
- RWE Schott Solar GmbH, Alzenau
- AL-KO, Österreich
- Elettronica GmbH, Meckenheim
- EXCOR Korrosionsforschung, Dresden
- Delphi Automotiv Systems, Wuppertal
- EADS Dornier, Friedrichshafen
- VW AG, Puebla Mexico
- IMA Materialforschung, Dresden
- Thyssen Krupp Automotive, Essen
- Bosch Rexrot Intramat, Lohr am Main
- Continental AG
- Daimler Chrysler AG
- HTWS Hochschule für Technik, Zittau
- Fraunhofer Gesellschaft
- Porsche AG
- TAKATA-PETRI AG, Ulm
- VTH Versuchsanstalt, Darmstadt
- Robert Bosch GmbH
- Küster, Ehringshausen
- Magna Steyr, Österreich
- INA Wälzlager Schaeffler oHG, Herzogenaurach
- Molex Elektronik GmbH, Ettlingen
- Opel AG, Bochum
- Phillips AG, Wien
- Martinswerk GmbH, Bergheim
- Sellner GmbH, Neuendettelsau
- Siemens AG, München
- Tesat Spacecom, Backnang
- Volkswagen AG, Wolfsburg
- Webasto Thermosysteme, Neubrandenburg



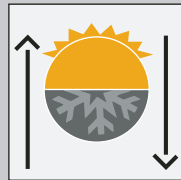
Test chambers for:



Heat and cold



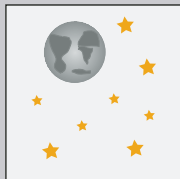
Heat, cold and humidity



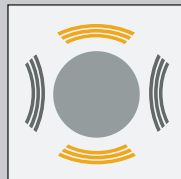
Thermal shock



Sunlight test



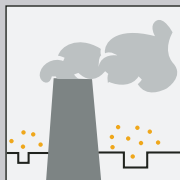
Space simulation



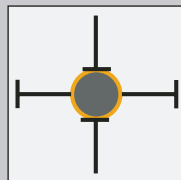
Vibration test



Wind and rain



Corrosion and industrial atmosphere



Traction and compression

TIRA Umweltsimulation GmbH

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