

Measurement Equipment for Future

Transient Recorder

TransCom-RackX



**MF Instruments
GmbH**



TransCom-RackX - alle in one:

- **Transient Recorder**
 - **Fast paperless data recorder**
 - **DSO**
 - **FFT analyser**



TransCom-RackX
example of a housing

TransCom-RackX is the ideal measurement equipment for the following applications:

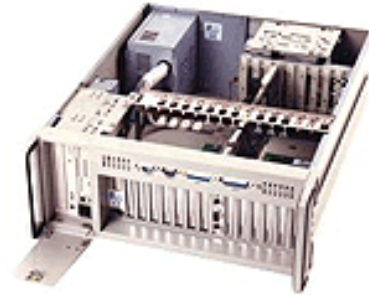
- teststands
- materials testing
- shock- and vibration measurement
- electrical converter development
- testing of switch performance
- sound and ultra-sound emissions
- process monitoring (with remote control)
- disturbance capture
- service tool for power stations and power distributors
- research and development of machine and general equipment
- chemical reaction
- crash Testing
- automobile manufacture

Powerful Hardware

- **highest level of quality**
- **best configured**



RackX_B
inputs on the back side
(housing exemplary)



RackX_F
inputs on the front side
(housing exemplary)

all advantages at a glance:

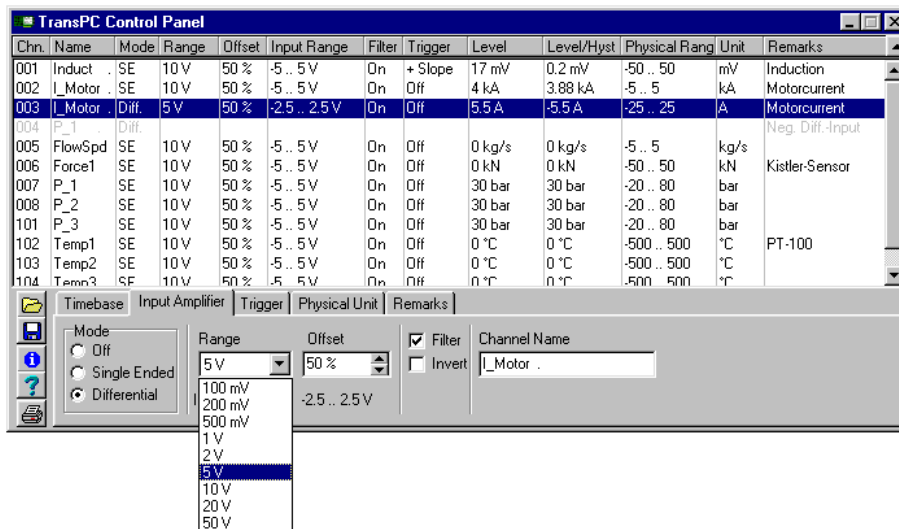
- rugged 19" rack housing
- Inputs on front or back side
- high processing speed with Pentium IV 2.8 GHz, 1 GB RAM
- 100 MBit Ethernet interface to connect the recorder with the company network
- 2 x USB 2.0 interface, printer interface
- connection of an external display is possible
- Control via GPIB or Ethernet (optional)

- 14 Bit resolution of amplitude or
- 16 Bit at 1/8 of the maximum sampling rate (above 14 Bit)
- basic accuracy: 0,1 %
- Up to 64 single ended resp. 32 differentiell input channels
- digital input channels as an option
- up to 80 MHz sampling rate per channel
- capture time from nanoseconds up to days
- input voltage range from 100 mV to 70 V (optional antialiasing filters)
- each channel is individually programmable in 1-2-5 steps
- free programmable input offset (0.1% steps)
- BNC inputs, 1 M Ω , 45 pF
- software controlled single ended or differential
- a wide range of trigger functions (optional slewrate trigger)
- large configurable (segmentable) data storage memory
- direct to disc data acquisition
- combined capture of high speed transients together with slow moving signals

- Synchronisation of up to 8 systems (512 single ended channels)

Hardware Setup

highly visible and efficient



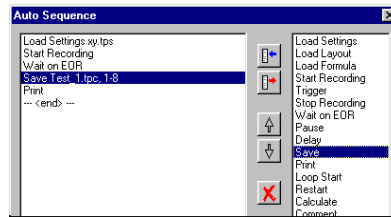
Clearly, a highly flexible measurement system with potentially high channel count requires an appropriate method of setting up the hardware. Utilising virtual knobs and sliders would soon overcrowd even the best high resolution displays.

TransCom-RackX utilises a so-called control panel to assist in hardware setup. A highly visible combination of set up masks and list displays of channel parameters achieves the task. One or several channels can be marked, the marked areas indicate which channels are enabled for set up using the mask in the lower part of the display.

The masks are in the form of several “card files” used for setting up timebase, input amplifier (range, offset, filter, etc.) trigger (slope, window, level, pretrigger , etc.), and scaling of physical units.

In addition, a free text input field is available for user notes etc. on each channel.

Sequence Control



In many applications an automation of the data acquisition sequence is required (e. g. operator free event and failure registration).

TransCom-RackX solves this problem with an autosequencing function. A command sequence can be created using a simple set of macro-commands,

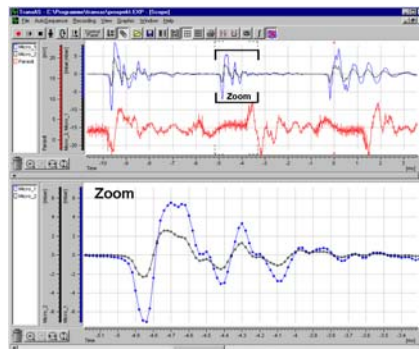
requiring no specialist programming abilities.

Another advantage of macro programming is to create short cuts for repeatedly used sequences in one keystroke e. g. measure, save, then print out etc..

Experienced programmers can use the “call” command to incorporate their own programs in the macro sequence. For example you could send an SMS message, or a command to start/stop a machine.

Measure, not Program

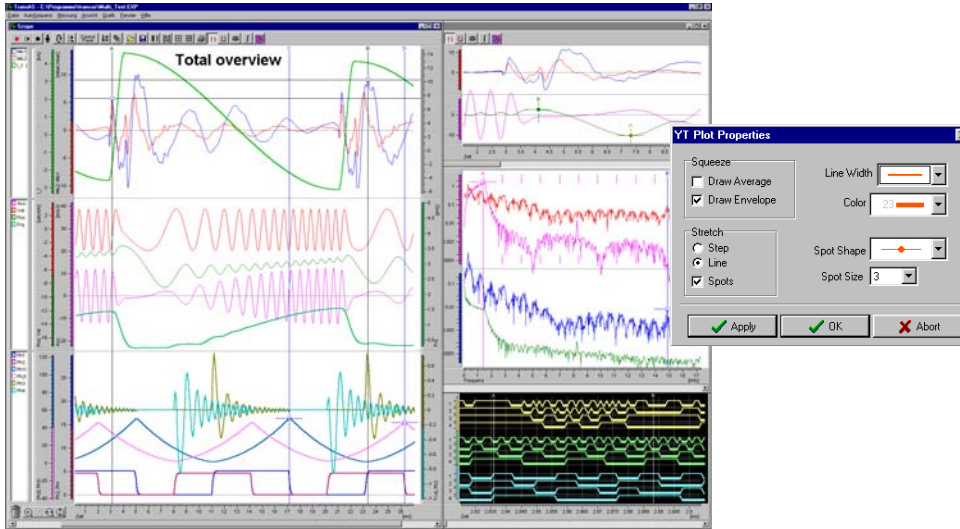
**effective immediately after being put into operation,
you can start measuring**



Up to now, multi-channel complex data acquisition tasks required a time consuming process to configure or program the hardware. Further work was required to produce the results in a satisfactory format. Through a combination of practical experience, and the strict application of the Microsoft Windows standards, the program of the **TransCom-RackX** offers you the flexibility in hardware control that can be applied to a universal range of applications, coupled with highly visible easy to use control functions.

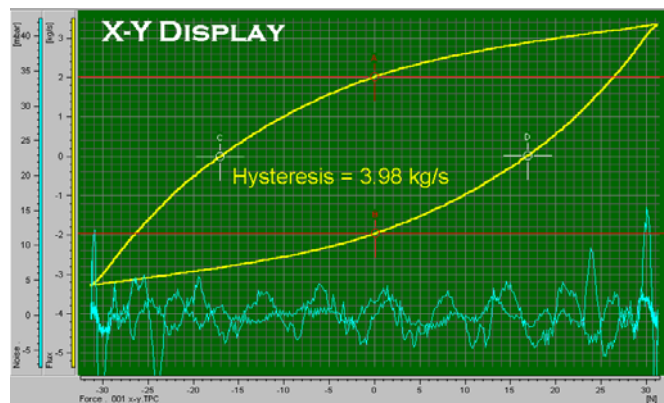
Laying out the optimal graphics using setup masks can often be a time consuming business. **TransCom-RackX** elegantly solves this problem using “Drag & Drop” techniques in addition to mouse-symbol, related floating menus. Simply place the mouse cursor over a relevant part of the graphics, where the pointer symbol will change to perform zooming, scrolling, panning of individual traces, text and read-out-cursors placements etc. Read-out tables and plot displays can be laid out using the mouse to move the data from one to the other. Undo/Redo function over several steps are available for zooming and scrolling.

An Unlimited Variety of Layouts



The increased screen resolution available in today's PC's allows for a large number of plots and data to be displayed simultaneously.

TransCom-RackX has the power to display practically an unlimited number of traces in many different windows. This feature is usable not only in post-processing, but also during data acquisition. Measurements in scope-mode, as well as spectrum and mathematically calculated curves are all continuously updated.



As in all **TransCom-RackX** graphic features, X-Y-display allows for several traces in several windows to be presented.

A Direct Way to Analyse

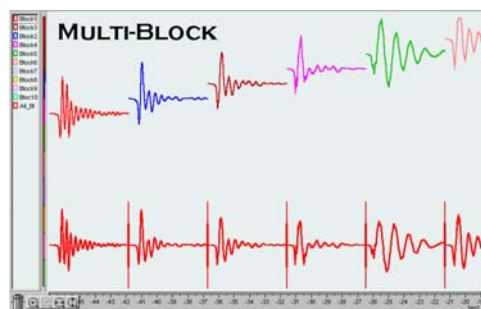


Signal scaling, labelling and grids are automatically optimised to match the selected portion of the signal trace.

Two main, and up to 24 additional cursors are available for direct and detailed signal analysis. Calculating scalar functions (single values such as minimum, average, slope, etc.) can be achieved by placing cursors in the relevant portion of the signal trace.

Several values can be simultaneously calculated from one or more traces and displayed in tabular form.

Multi-Block Mode

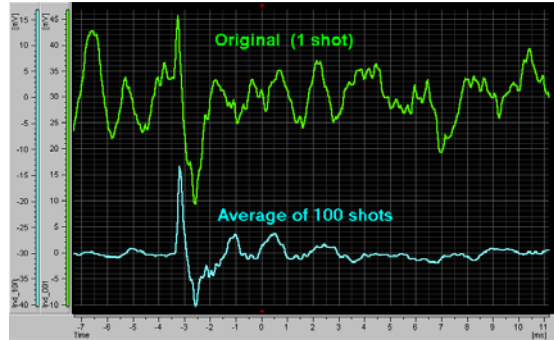


A series of bursts can be captured with minimum dead time between blocks.

Each measurement channel has its own physical memory. Depending on the number of configured channels, up to 16 million values can be captured and stored.

The memory may be segmented in block form for short period acquisitions. If a series of transients are to be captured, then the Multi-Block Mode is utilised to store them sequentially in consecutive blocks.

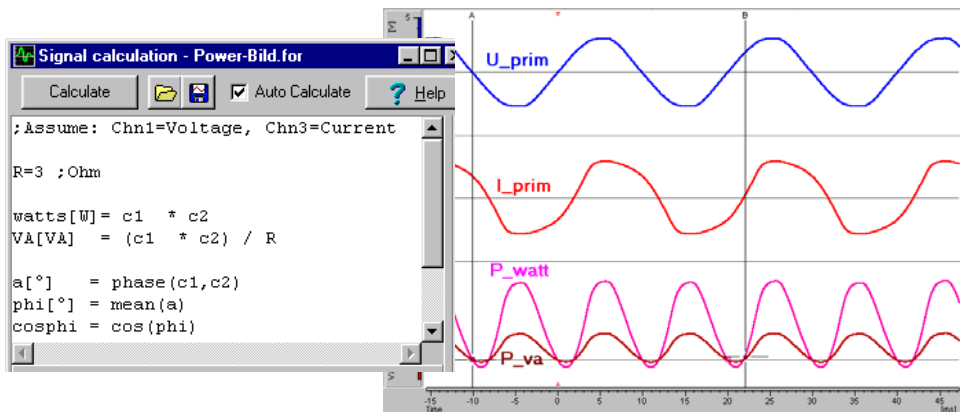
Synchronized Time Averaging



Averaging a signal over several triggered captures increases the signal to noise ratio making the desired signal more apparent.

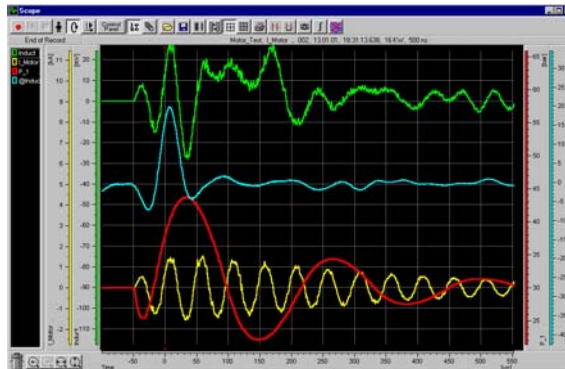
Curve Calculation?

Write a Formula



A formula editor is available that makes trace calculations easy. Defined functions can be initiated in manual or automatic mode.

Single Transient - or like an Oscilloscope



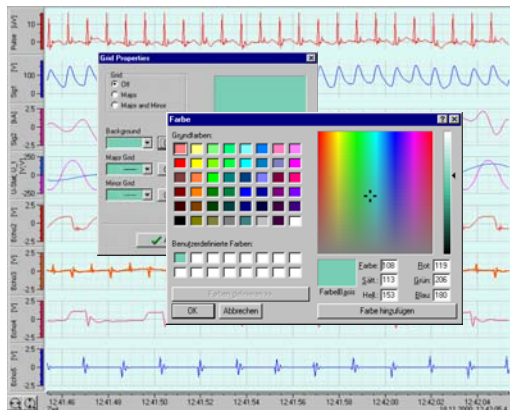
Single transients or repeated events are both displayed in scope mode. The captured signals are stored in the Transient modules independent of the PC memory, and can be displayed directly after capture.

Repetitive signals are displayed flicker free, due to high speed data processing.

Refresh rates of less than 50 ms are easily achieved.

Long but still Fast:

Direct to Disc



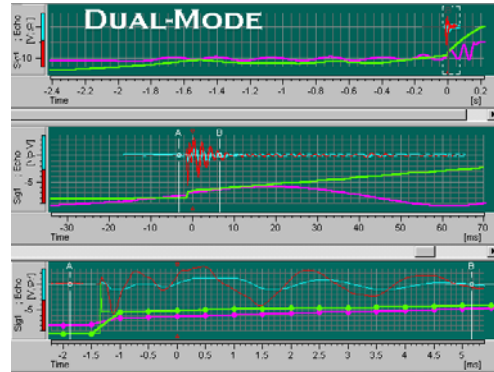
The software is able to utilise the **TransCom-RackX** as a multichannel high speed data recorder.

An unlimited number of traces (trends) can be displayed in up to 16 plot windows. If the direct to disk feature is enabled, you have a paperless recorder with sample rates that range from hours to 3 MHz.

A finite capture time can be set, or the recorder can be allowed to run up to the limit of the hard disk space. This stored data is displayed in the normal way using **TransCom-RackX** analysing functions. Such measurements normally involve a large amount of samplings. The unlimited zoom and scroll functions make plot manipulation easy.

Envelop display mode enables short transient events which occur during a long data capture to be highlighted.

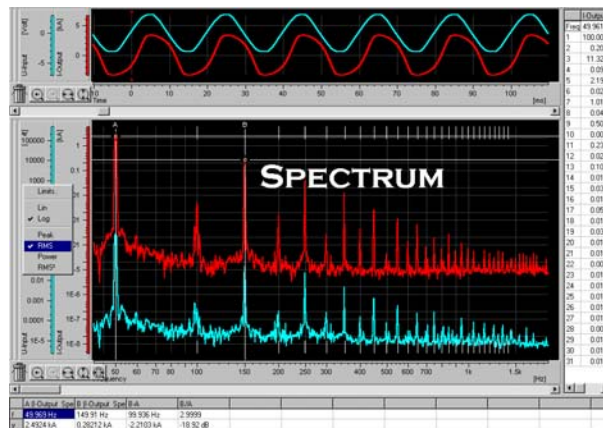
Fast Capture on Slow Signals



Unique is the ability to combine high speed sampling (up to the range of several MHz) simultaneously with slow speed background signal recording.

In this Dual-Mode the hardware operates as high speed transient recorder with its own physical memory. During this process the software is capturing and transferring data to hard disk at a slower rate.

Frequency Analysis up to 40 MHz



Sometimes it is necessary to convert time signals into the frequency domain. **TransCom-RackX** performs this task using a fast Discrete Fourier Transformation.

The advantage of this method is that there are no restrictions on the number of samples acquired. This means that the number of time points must not be organised in a factor of two and can be a block of many millions of samples. Up to 99 harmonics can be identified and listed.

Technical Specifications

TPCX (14Bit-ADC)	8014-4S	8014-4D	4014-4S	4014-4D	2014-4/8S	2014-4/8D	1014-4/8S	1014-4/8D	
TPCX (16Bit-ADC)	8016-4S	8016-4D	4016-4S	4016-4D	2016-4/8S	2016-4/8D	1016-4/8S	1016-4/8D	1)
Input channels	4 SE or 2 Diff.	4 SE or 4 Diff.	4 SE or 2 Diff.	4 SE or 4 Diff.	4/ 8 SE or 2/4 Diff.	4/8 SE or 4/8 Diff.	4/8 SE or 4/8 Diff.	4/8 SE or 4/8 Diff.	7)
Input resolution	14 / 16 Bit								1)
Max. sampling rate (all channels simultaneous)	4 x 80MHz (125ns)		4 x 40MHz (25ns)		4 x 20MHz (50ns) resp. 8 x 20MHz		4 x 10MHz (100ns) resp. 8 x 10MHz		
Memory (per module)	4 x 16MWorte resp. 8 x 8MWorte (= 128MByte), optional up to total 256MWorte (= 512MByte)								
Input Amplifier									
Ranges (1-2-5 Steps)	+/-50mV .. +/-50V resp. 0.1V .. 100V (100V limited at 70V)								
Adjustable Offset	0...100% in Steps of 0.1%								
Input-Impedance	1 MOhm (+/-0.2%) / 40pF (+/-5%)								
Input-Coupling	AC / DC Software switchable (AC: -3dB at < 5Hz) invertable by software								
Bandwidth	30MHz (8MHz ranges < 1V)		18MHz (7MHz ranges < 1V)		10MHz (6 MHz ranges < 1V)		5MHz (4 MHz ranges < 1V)		
Rise Time (10..90%)	16ns (50ns ranges < 1V)		25ns (60ns ranges < 1V)		40ns (70ns ranges < 1V)		70ns (80ns ranges < 1V)		
Settling time to 1%	< 200ns				< 200ns		< 200ns		
Lowpass-Filter (RC-type)	2 Stages (1 MHz and 100kHz) and OFF by Software selectable								
Anti-Aliasing-Filt. (Option)	200Hz ... 5MHz, Butterworth min. 4th. Order, Software selectable								
Common Mode Range	Differenzial-Mode: +/-8V resp. +/-80V ranges >=10V								
Common Mode Rejection	>74dB (DC...1kHz); >60dB (...100kHz); >40dB (...5MHz)								
Range Error (+/-)	max. 0.1% typ. 0.03% (with auto calibration)								
Offset Error (+/-)	max. 0.1% typ. 0.02% (with auto calibration)								
Offset Drift (+/-)	max. 0.0100%/°C, typ. 0.0050%/°C (compensation possible by auto calibration)								
Input noise at max. sampl. rate	< 0.300mVrms		< 0.200mVrms		< 0.150mVrms		< 0.150mVrms		2)
at 5MHz sampl. rate	< 0.150mVrms		< 0.120mVrms		< 0.100mVrms		< 0.100mVrms		
at 1MHz sampl. rate	< 0.100mVrms		< 0.070mVrms		< 0.050mVrms		< 0.050mVrms		
at 100kHz sampl. rate	< 0.050mVrms		< 0.030mVrms		< 0.020mVrms		< 0.020mVrms		
at 10kHz sampl. rate	< 0.055mVrms		< 0.015mVrms		< 0.010mVrms		< 0.010mVrms		
Signal-to-noise (SNR). *4,*3)	59dB		68dB		70dB		70dB		3) 4)
at 5MHz sampl. rate *3)	66dB		70dB		72dB		72dB		
at 1MHz sampl. rate *3)	69dB		74dB		76dB		76dB		
at 100kHz sampl. rate *3)	79dB		82dB		84dB		84dB		
at 10kHz sampl. rate *3)	89dB		90dB		92dB		92dB		
Cross Talk Attenuation	> 80dB (> 60dB at ranges <1V)								
Special: Auto calibration	Automatic adjustment of gain and offset in all ranges. (execution by software)								
Trigger									
Trigger channels	4 resp. 8 on Analog-Inputs, pos./neg. slope, with or without hysteresis, Window-IN, Window-OUT								
Advanced Trigger (Option)	all Analog-Inputs: Slew Rate, Pulse length or Period (too short or too long=Missing Event)								
External Trigger input	1 per System (TTL) pos. or neg. slope								
Trigger delay	-100% (Pretrigger) to +200% (Posttrigger) in steps of 1%								
Miscellaneous									
Digital-Inputs (Marker) only with 14Bit-Modules (Option)	8 resp. 16 (2 per Analog-Input) (TTL) Optocoupled terminal box (5, 12, 24, 48 V) as an option								
Online-Harddisk-Recording (Chart-Mode)	Sum sampling rate up to 5 MHz per module		Sum sampling rate up to 5 MHz per module		Sum sampling rate up to 5 MHz per module		Sum sampling rate up to 5 MHz per module		6)
Ext. control inputs (TTL)	Trigger, Arm/Disarm, ext. sampling rate (fmax = 1/4 max. sampling rate)								
Status-Outputs (TTL)	Trigger-Out, Record-Active (indicates recording state)								
ICP® Sensor supply (Option)	4mA supply for ICP-Piezo-Sensors over the signal inputs								

*1) With 16 Bit-Modules the ADC resolution is reduced to 14 Bits, if the sampling rate is higher than 1/8 of the maximum sampling rate.

*2) Noise depends on sampling speed

*3) With 14 Bit-Modules the Signal-To-Noise-Ratio (SNR) is reduced by 2 dB

*4) With 8-Channel Modules the Signal-To-Noise-Ratio (SNR) is reduced by 3 dB

*6) The max. sampling rate in harddisk recording mode depends on the PC especially on the number of harddisks.

*7) Input type single-ended or differentially is software selectable

Part 2 of Technical Specifications - Main systems

	Rack B	RackX B XL	RackX F
Connectors	BNC back side	BNC back side	BNC front side
max. number of channels	40 single-ended resp. 20 differentiell	64 single-ended resp. 32 differentiell	40 single-ended resp. 20 differentiell
Processor	Pentium IV, 2.8 GHz	Pentium IV, 2.8 GHz	Pentium IV, 2.8 GHz
Memory	1024 MB	1024 MB	1024 MB
Harddisk	2 x 120 GB (RAID 1)	2 x 120 GB (RAID 1)	2 x 120 GB (RAID 1)
Drives	DVD-CD/RW	DVD-CD/RW	DVD-CD/RW
Interfaces	4 x USB 2.0, Ethernet 10/100MBit, printer, Monitor (DVI, VGA)	4 x USB 2.0, Ethernet 10/100MBit, printer, Monitor (DVI, VGA)	4 x USB 2.0, Ethernet 10/100MBit, printer, Monitor (DVI, VGA)
Operating system	Windows XP Prof.	Windows XP Prof.	Windows XP Prof.
Housing			
Type	19" Rack with handles	19" Rack with handles	19" Rack with handles
Dimensions	W x H x D 482 x 177 x 432 mm	W x H x D 482 x 177 x 674 mm	W x H x D 482 x 177 x 465 mm
Weight	approx. 12 Kg	approx. 18 Kg	approx. 13 Kg
Environmental			
Power	95 – 132V u. 180V – 260 V 47 – 63Hz	95 – 132V u. 180V – 260 V 47 – 63Hz	95 – 132V u. 180V – 260 V 47 – 63Hz
Temperature	Operating: 0°C – 50°C Non Operating: -10°C – 70°C	Operating: 0°C – 50°C Non Operating: -10°C – 70°C	Operating: 0°C – 50°C Non Operating: -10°C – 70°C
Humidity	up to 85% non condensating	up to 85% non condensating	up to 85% non condensating
Colour	white	white	white

16.9.2005, All specifications subject to change without notice!

Hint: Possibility to synchronise several TransCom-RackX systems!

With pleasure we also offer you Transient Recorders

- up to 64 channels in a 19" rack case
- up to 100 MHz per channel
- with fiber optical isolation
- up to 96 channels integrated in one system
- several systems to combine

with consideration to your special wishes

**MF Instruments
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