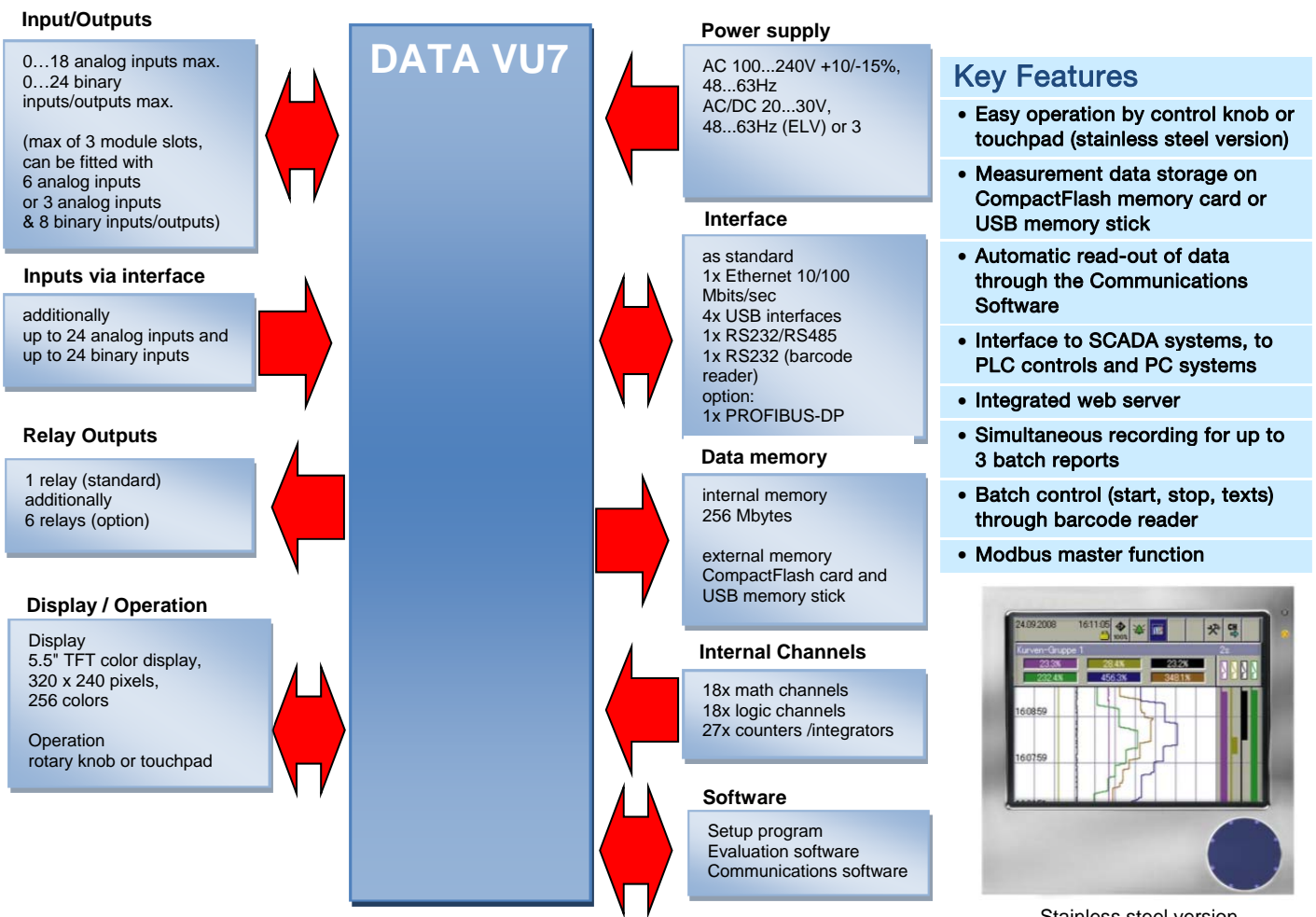# DataVU7 Paperless Recorder

- **6 to 18 internal analog inputs**
- **Up to 24 external inputs**
- **5.5'' TFT Display**
- **Up to 24 digital inputs and 7 relay outputs**
- **Set-up, Comms and Evaluation software**
- **144 x 144 mm Front Bezel**
- **Maths module, batch reports & web server**
- **Stainless steel version available**

Description

The DataVU7 represents a new generation of paperless recorders that stand out through their modular design for the acquisition of measured data (3 to 18 internal inputs can be utilized), the innovative operating concept and high standards of security prevents unauthorized access and manipulation of the stored data.
Within the DataVU7, data can be visualized in process images as measurement curves, as a bar graph or in alphanumerical form.

DATA VU7

Input/Outputs

0…18 analog inputs max.
0…24 binary
inputs/outputs max.

(max of 3 module slots,
can be fitted with
6 analog inputs
or 3 analog inputs
& 8 binary inputs/outputs)

Inputs via interface

additionally
up to 24 analog inputs and
up to 24 binary inputs

Relay Outputs

1 relay (standard)
additionally
6 relays (option)

Display / Operation

Display
5.5" TFT color display,
320 x 240 pixels,
256 colors

Operation
rotary knob or touchpad

Power supply

AC 100...240V +10/-15%,
48...63Hz
AC/DC 20...30V,
48...63Hz (ELV) or 3

Interface

as standard
1x Ethernet 10/100
Mbits/sec
4x USB interfaces
1x RS232/RS485
1x RS232 (barcode
reader)
option:
1x PROFIBUS-DP

Data memory

internal memory
256 Mbytes

external memory
CompactFlash card and
USB memory stick

Internal Channels

18x math channels
18x logic channels
27x counters /integrators

Software

Setup program
Evaluation software
Communications software

Key Features

- Easy operation by control knob or touchpad (stainless steel version)
- Measurement data storage on CompactFlash memory card or USB memory stick
- Automatic read-out of data through the Communications Software
- Interface to SCADA systems, to PLC controls and PC systems
- Integrated web server
- Simultaneous recording for up to 3 batch reports
- Batch control (start, stop, texts) through barcode reader
- Modbus master function

Stainless steel version

Technical data

Analog inputs

Thermocouple

Designation	Type	Standard	Meas. range	Accuracy[1]
Fe-CuNi	L	DIN 43 710	-200 to +900 °C	±0.1 %
Fe-CuNi	J	EN 60 584	-200 to +1200 °C	±0.1% from -100 °C
Cu-CuNi	U	DIN 43 710	-200 to +600 °C	±0.1 % from -150°C
Cu-CuNi	T	EN 60 584	-270 to +400 °C	±0.1 % from -150 °C
NiCr-Ni	K	EN 60 584	-200 to +1372 °C	±0.1 % from -80 °C
NiCr-CuNi	E	EN 60 584	-200 to +1000 °C	±0.1 % from -80 °C
NiCrSi-NiSi	N	EN 60 584	-100 to +1300 °C	±0.1 % from -80 °C
Pt10Rh-Pt	S	EN 60 584	0 to 1768 °C	±0.1 5%
Pt13Rh-Pt	R	EN 60 584	0 to 1768 °C	±0.15%
Pt30Rh-Pt6Rh	B	EN 60 584	0 to 1820 °C	±0.1 5% from 400 °C
W3Re/W25Re	D		0 to 2495 °C	±0.1 5% from 500 °C
W5Re/W26Re	C		0 to 2320 °C	±0.1 5% from 500 °C
W3Re/W26Re			0 to 2400 °C	±0.1 5% from 500 °C
Chromel-copel			-200 to +800 °C	±0.15 % from -80 °C
GOST R 8.585-2001			-200 to +1372 °C	±0.1 % from -80 °C
Chromel-alumel			0 to 1395 °C	±0.15 %
GOST R 8.585-2001				
PL II (Platinel II)				
Minimum span			Type L, J, U, T, K, E, N, chromel-alumel, PL II: 100 °C Type S, R, B, D, C, W3Re/W26Re, chromel-copel: 500 °C	
Range start/end			freely programmable within the limits, in 0.1 °C steps	
Cold junction			Pt100 internal or thermostat external constant	
Cold junction accuracy (internal)			± 1 °C	
Cold junction temperature (external)			-50 to +150 °C adjustable	
Sampling cycle			Channel 1 - 18: 125 ms	
Input filter			2nd order digital filter; filter constant adjustable from 0 to 10.0 sec	
Electrical isolation			see **Electrical dat** and electrical isolation	
Resolution			> 14 bit	
Features			also programmable in °F	

[1] The linearization accuracy refers to the maximum measuring range. The linearization accuracy is reduced with short spans.

Resistance thermometer

Designation	Standard	Connection circuit	Meas. range	Accuracy[1]	Meas. curr.
Pt100	EN 60 751 (TC = 3.85 * 10⁻³ 1/°C)	2/3-wire 2/3-wire 4-wire	-200 to +100 °C -200 to +850 °C -200 to +850 °C	±0.5 °C ±0.8 °C ±0.5 °C	≈ 250 µA ≈ 250 µA ≈ 250 µA
Pt100	JIS 1604 (TC = 3.917 * 10⁻³ 1/°C)	2/3-wire 2/3-wire 4-wire	-200 to +100 °C -200 to +650 °C -200 to +650 °C	±0.5 °C ±0.8 °C ±0.5 °C	≈ 250 µA ≈ 250 µA ≈ 250 µA
Pt100	GOST 6651-94 A.1 (TC = 3.91 * 10⁻³ 1/°C)	2/3-wire, 4-wire 2/3-wire, 4-wire	-200 to +100 °C -200 to +850 °C	±0.5 °C ±0.8 °C	≈ 250 µA ≈ 250 µA

Sensor	Standard	Wiring	Range	Accuracy[1]	Current
Pt500	EN 60 751 (TC = 3.85 * 10⁻³ 1/°C)	2/3-wire, 4-wire 2/3-wire, 4-wire	-200 to +100 °C -200 to +850 °C	±0.5 °C ±0.9 °C	≈ 100 µA ≈ 100 µA
Pt1000	EN 60 751 (TC = 3.85 * 10⁻³ 1/°C)	2/3-wire 2/3-wire 4-wire	-200 to +100 °C -200 to +850 °C -200 to +850 °C	±0.5 °C ±0.8 °C ±0.5 °C	≈ 100 µA ≈ 100 µA ≈ 100 µA
Ni 100	DIN 43 760 (TC = 6.18 * 10⁻³ 1/°C)	2/3-wire, 4-wire	-60 to +180 °C	±0.4 °C	≈ 250 µA
Pt50	ST RGW 1057 1985 (TC = 3.91 * 10⁻³ 1/°C)	2/3-wire 2/3-wire 4-wire 4-wire	-200 to +100 °C -200 to +1100 °C -200 to +100 °C -200 to +1100 °C	±0.5 °C ±0.9 °C ±0.5 °C ±0.6 °C	≈ 250 µA ≈ 250 µA ≈ 250 µA ≈ 250 µA
Cu 50	(TC = 4.26 * 10⁻³ 1/°C)	2/3-wire 2/3-wire 4-wire 4-wire	-50 to +100 °C -50 to +200 °C -50 to +100 °C -50 to +200 °C	±0.5 °C ±0.9 °C ±0.5 °C ±0.7 °C	≈ 250 µA ≈ 250 µA ≈ 250 µA ≈ 250 µA
Cu 100	GOST 6651-94 A.4 (TC = 4.26 * 10⁻³ 1/°C)	2/3-wire 2/3-wire 4-wire 4-wire	-50 to +100 °C -50 to +200 °C -50 to +100 °C -50 to +200 °C	±0.5 °C ±0.9 °C ±0.5 °C ±0.6 °C	≈ 250 µA ≈ 250 µA ≈ 250 µA ≈ 250 µA
Connection circuit	2-, 3-, or 4-wire circuit				
Minimum span	15 °C				
Sensor lead resistance	max. 30 per conductor for 3-wire/4-wire circuit max. 10 per conductor for 2-wire circuit				
Range start/end	freely programmable within the limits, in 0.1 °C steps				
Sampling cycle	Channel 1 - 18: 125 ms in total				
Input filter	2nd order digital filter; filter constant adjustable from 0 to 10 sec				
Electrical isolation	see **Electrical dat** and electrical isolation				
Resolution	>14 bit				
Features	also programmable in °F				

[1] The linearization accuracy refers to the maximum measuring range.   The linearization accuracy is reduced with short spans.

Resistance transmitter and potentiometer

Designation	Meas. range	Accuracy[1]	Meas. curr.
Resistance transmitter	up to 4000 Ω	±4 Ω	≈ 100 µA
Potentiometer	< 400 Ω ≥ 400 Ω to 4000 Ω	±400 mΩ ±4 Ω	≈ 250 µA ≈ 100 µA
Connection circuit	resistance transmitter: 3-wire circuit potentiometer: 2-/3-/4-wire circuit		
Minimum span	60 Ω		
Sensor lead resistance	max. 30 per conductor for 4-wire circuit max. 10 per conductor for 2-/3-wire circuit		
Resistance values	freely programmable within the limits, in 0.1 steps		
Sampling cycle	Channel 1 - 18: 125 ms in total		
Input filter	2nd order digital filter; filter constant adjustable from 0 to 10.0 sec		
Electrical isolation	see **Electrical dat** and electrical isolation		
Resolution	>14 bit		

[1] The linearization accuracy refers to the maximum measuring range.   The linearization accuracy is reduced with short spans.

Input for DC voltage, DC current

Basic range	Accuracy[1]	Input resistance
-12 to +112 mV -10 to +210 mV -1.5 to +11.5 V -0.12 to +1.12 V -1.2 to +1.2 V -11.2 to +11.2 V	±100 µV ±240µV ±6 mV ±1 mV ±2 mV ±12 mV	$R_E \geq 1$ MΩ $R_E \geq 470$ kΩ $R_E \geq 470$ kΩ $R_E \geq 470$ kΩ $R_E \geq 470$ kΩ $R_E \geq 470$ kΩ
Shortest span	5 mV	
Range start/end	freely programmable within the limits in 0.01 mV steps	
-1.3 to +22 mA -22 to +22 mA	±20 µA ±44 µA	burden voltage ≤ 3 V burden voltage ≤ 3 V
Shortest span	0.5 mA	
Range start/end	freely programmable within the limits in 0.01 mA steps	
Overrange/underrange	according to NAMUR NE 43	
Sampling cycle	Channel 1 - 18: 125 ms in total	
Input filter	2nd order digital filter; filter constant adjustable from 0 to 10.0 sec	
Electrical isolation	see **Electrical dat** and electrical isolation	
Resolution	>14 bit	

[1] The linearization accuracy refers to the maximum measuring range.   The linearization accuracy is reduced with short spans.

Transducer short circuit/break

	Short-circuit[1]	Break[1]
Thermocouple	not detected	detected
Resistance thermometer	detected	detected
Resistance transmitter	not detected	detected
Potentiometer	not detected	detected
Voltage $\leq \pm 210$ mV	not detected	detected
Voltage $> \pm 210$ mV	not detected	not detected
Current	not detected	not detected

Binary inputs/outputs (option)

Input or output	configurable as input or output
Number	8, 16 or 24, depending on the device version, to DIN VDE 0411, Part 500; max. 25 Hz, max. 32 V
Input	
- level	logic "0": -3 to +5 V (input current max. ±1 mA), logic "1": 12 to 30 V (2.5 mA $\leq$ input current $\leq$ 5 mA)
- counting frequency	8 Hz
High-speed input	the first two binary inputs of each module (B1, B2, B9, B10, B17, B18), if the module is not fitted with relays or 6 analog inputs
- task	count function, e. g. for flow measurement
- counting frequency	10 kHz
Output	
- type	open-collector output, switches relative to positive voltage
- level	logic "0": transistor is inhibited (max. permissible voltage across switching transistor 30 V, max. leakage current 0.1 mA) logic "1": transistor is switched on (max. voltage across switching transistor 1.6 V, max. current 50 mA)
- sampling cycle	at least 1 sec (1 Hz)

Outputs

1 relay (standard)	changeover (SPDT), 3 A, 230 V AC[1]
6 relays (option)	changeover (SPDT), 3 A, 230 V AC[1,2]

[1] With resistive load.   [2] It is not permissible to mix SELV circuits and supply circuits.

Interfaces

RS232/RS485 (connector 7)	Qty. 1, switchable between RS232 and RS485
- protocol	Modbus master, Modbus slave and barcode reader
- baud rate	9600, 19200, 38400
- modem	can be connected
- connector	SUB-D
- external inputs	via the Modbus master/slave function, 24 analog and 24 binary
RS232 for barcode reader (connector 2)	Qty. 1
- protocol	Modbus master, Modbus slave and barcode reader
- baud rate	9600, 19200, 38400
- connector	SUB-D
- external inputs	via the Modbus master/slave function, 24 analog and 24 binary
Ethernet (connector 6)	
- quantity	max. 1
- protocols	TCP, IP, HTTP, DHCP, SMTP, ModbusTCP
- baud rate	10 Mbits/sec, 100 Mbits/sec
- connector	RJ45
- data format	HTML
USB host (connector 5)	
- quantity	2 (or 1 with stainless steel front), connector 5 and front connector (not with stainless steel front); no parallel operation
- use	for connecting a memory stick
- max. current	100 mA
USB device (connector 15)	
- quantity	2 (or 1 with stainless steel front), connector 15 and front connector (not with stainless steel front); no parallel operation)
- use	for connecting to the (master) computer

Screen

Resolution / size	320 x 240 pixels / 5.5"
Type / number of colors	TFT color screen / 256 colors
Screen refresh rate	> 150 Hz
Brightness setting	adjustable on instrument
Screen saver (switch-off)	Via timer or control signal

Electrical data

Supply voltage (switch-mode PSU)	100 - 240 V AC +10/-15 %, 48 - 63 Hz or 20 - 30 V AC/DC, 48 - 63 Hz (ELV)

Electrical safety
 	
Protection class I
Test voltages (type test)
  - mains supply circuit to meas. circuit
  - mains supply circuit to housing
    (protective conductor)
  - measuring current circuits to
    meas. current circuit and housing
  - electrical isolation
    between analog inputs
	to EN 61 010, Part 1, August 2002
	overvoltage category II, pollution degree 2
	terminal for PE conductor
	
	with AC supply: 2.3 kV/50 Hz, 1 min,
	with AC/DC supply: 2.3 kV/50 Hz, 1 min
	with AC supply: 2.3 kV/50 Hz, 1 min,
	with AC/DC supply: 2.3 kV/50 Hz, 1 min
	
	500 V/50 Hz, 1 min
	
	up to 30 V AC and 50 V DC

Supply voltage error	< 0.1 % of range span
Power consumption	approx. 40 VA
Data backup	CompactFlash memory card

Electrical connection
  - mains supply and relays
 	
  - analog and binary inputs
	at rear through pluggable screw terminals, 5.08 mm raster,
	max. conductor cross-section $\leq$ 2.5 mm^2 or 2x 1.5 mm^2 with ferrules
	at rear through pluggable screw terminals, 3.81 mm raster,
	max. conductor cross-section $\leq$ 1.5 mm^2

Environmental influences

Ambient temperature range	0 to +50 °C
Ambient temperature effect	0.03 %/ °C
Storage temperature range	-20 to +60 °C
Climatic conditions	$\leq$ 75% relative humidity, no condensation

EMC
  - interference emission
  - immunity to interference
	EN 61 326-1
	Class A - only for industrial use -
	to industrial requirements

Housing

Housing front	zinc die-casting, optionally in stainless steel (option)
Housing type	housing for flush-panel mounting to IEC 61 554, in stainless steel
Bezel size	144 mm x 144 mm to IEC 61 554
Depth behind panel	193 mm (incl. terminals)
Panel cut-out	$138^{+1.0}$ mm x $138^{+1.0}$ mm to IEC 61 554
Panel thickness	2 - 40 mm
Housing mounting	in panel to DIN 43 834
Operating position	unrestricted, but taking into account the viewing angle of the screen, horizontally ±65°, vertically +40° to -65°
Enclosure protection	to EN 60 529 Category 2, front IP65, rear IP20
Weight	approx. 3.5 kg

Approvals/marks of conformity

Mark of conformity	Testing laboratory	Certificates / certification numbers	Test basis	valid for
c UL us	Underwriters Laboratories	E352967	UL 61010-1 CAN/CSA-C22.2 No. 61010-1	the flush-mounted instrument; not in conjunction with extra code 350

CompactFlash memory card and USB interfaces behind housing door.

Control knob to rotate and press

Instrument Description

Hardware

The DataVU7 recorder has a modular design. The basic form consists of a PSU board (incl. relays) and a CPU board (incl. Ethernet, RS232/RS485, RS232 for barcode reader and USB) Module slots 1, 2 and 3 can be fitted with the following options, 6 analog inputs, 3 analog inputs & 8 binary inputs/outputs or slot 3 can be fitted with a module with 6 relays.
As an option, the PSU board can be equipped with PROFIBUS-DP communications.

Data recording

Measurements are logged continuously with a 125 ms sampling cycle, where reports are compiled and limits checked.

Measurements are transferred to the main memory of the instrument, according to the programmed cycle time and stored value (max, min, average, min & max, instantaneous value or economy mode).
The recorder saves the data in groups, and an input can be assigned to several groups to a maximum of 9.

Main memory (SRAM)

The data stored in the SRAM are regularly copied to the internal memory in 20 kbyte blocks.

Internal memory

When a block in the main memory has been filled, it is written to the internal memory with a capacity of 256 Mbytes.

Every write action is monitored, to immediately identify any errors in saving the data.
The instrument monitors the capacity of the internal memory and activates one of the "memory alarm" signals when the capacity falls below the configurable residual capacity level. These signals can be used, for instance, to operate the alarm relay. The memory is written as FIFO First-In-First-Out, i. e. when the memory is full, the oldest data is automatically overwritten by the new data.
Data from the internal memory can be shown as a history presentation on the recorder. The size of this memory can be configured.

Data transfer to the PC

Data transfer from the recorder to external CompactFlash memory card (not available with stainless steel front), USB memory stick or via a communications interface (USB device, RS232, RS485, Ethernet).

Data security

The data are stored in an encrypted form in a proprietary format. This ensures a high level of data security. If the recorder is disconnected from the supply, then:
- RAM and clock time are buffered by a lithium battery (standard) $\geq$ 10 years or with a storage capacitor $\geq$ 2 days (ambient temperature -40 to +45 °C),
- measurement and configuration data in the internal memory will not be lost.

Recording duration

Depending on the configuration of the instrument, the recording period can vary over a considerable range (from a few days up to several months).

Report

For each channel of a group, a report (maximum/minimum/average or integrator) can be run over defined periods.

Batch reports

Three batch reports can be created simultaneously in the recorder. The measured data, start, end and duration of each batch can be displayed together with a batch counter and freely defined texts, on the recorder and within the Evaluation Software on request, a barcode reader can be used to start batches and read batch texts.

Limit level to change operating mode

Over/under limit conditions trigger alarms. These can be used, for instance, as a control signal to change the operating mode.
The storage cycle and recorded value can be configured separately for all three operating modes.
An alarm delay function can be filter out brief occurrences of limit conditions, so that no alarm is generated.

Normal operation

If the instrument is **not** in timed or event operation, normal operation is active.

Event operation

Event operation is activated/deactivated by a control signal (binary input, group/combination alarm, ...). As long as the control signal is active, the instrument will be in event operation.

Timed operation

Timed operation is active on a daily basis within a programmable time period. The operating modes have different priorities.

Counters/integrators

27 additional internal channels are available as counters, integrators, operating time counters or for flow measurements.
These counters are controlled through the digital inputs, the alarms, or via the logic channels. The analog channels can be used for the integrators.
Numerical indication is shown in a separate window, with up to 9 digits. The acquisition time can be selected as: periodic, daily, weekly, monthly, yearly as well as external, total (overall count) or daily from ... to.
Up to 6 binary inputs are available as high-speed counters with a 10 kHz sampling cycle rate.

Math/logic module (option)

The module for math and logic (18 channels of each) enables, for example, the combination of analog channels, and also the combination of analog channels with counters and digital inputs. Operators for formulae are: +, -, *, /, SQRT(), MIN(), MAX(), SIN(), COS(), TAN(), **, EXP(), ABS(), INT(), FRC(), LOG(), LN(), humidity, moving average or !, &, |, ^, as well as (and).
The math and logic module can only be configured through the setup program.

Operation and configuration

On the recorder

The instrument is configured from the control knob (or with stainless steel front, from the touchpad) on the front panel under menu guidance.

↺ Shift current menu position (cursor) to the left or upwards.

↻ Shift current menu position (cursor) to the right or downwards.

⊙ When the control knob is pressed, the current function is executed.
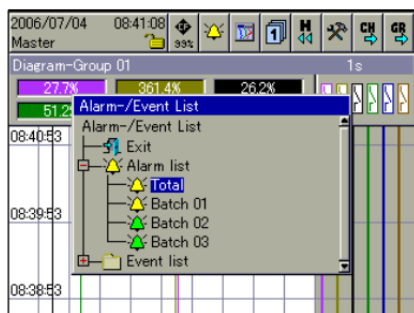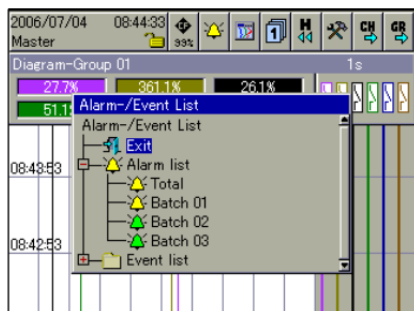
Example:

`2006/07/04 08:45:23 Master 93%`

↺ Rotate control knob to the left.

`2006/07/04 08:47:11 Master 93%`

⊙ Press control knob.

Result: The menu for the alarm and event list is called up.

`2006/07/04 08:41:08 Master`
Diagram-Group 01   1s
27.7%   361.4%   26.2%
51.2
Alarm-/Event List
Alarm-/Event List
└ Exit
└ Alarm list
  └ Total
  └ Batch 01
  └ Batch 02
  └ Batch 03
└ Event list
08:40:53
08:39:53
08:38:53

↺ Rotate control knob to the left.

`2006/07/04 08:44:33 Master`
Diagram-Group 01   1s
27.7%   361.1%   26.1%
51.1
Alarm-/Event List
Alarm-/Event List
└ Exit
└ Alarm list
  └ Total
  └ Batch 01
  └ Batch 02
  └ Batch 03
└ Event list
08:43:53
08:42:53

⊙ Press control knob.

Result: The menu for the alarm and event list is closed again.

`2006/07/04 08:47:11 Master 93%`

Integrated user lists (different users with different authorizations) protect the recorder against unauthorized access.

Through the setup program

As an alternative to the configuration from the control knob on the recorder, the instrument can also be configured through the setup program.
Communication between the setup program and the paperless recorder is made through the:
- USB device interface,
- serial interface,
- Ethernet interface,
- CompactFlash memory card or
- USB memory stick.
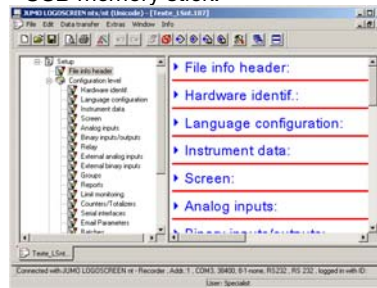
The configuration data can be archived on a data storage medium and output to the printer.

Operating language

Two languages (see order details) are integrated in the instrument ex-factory. The setup program is used to change the operator language. The languages available: English, French, German, Russian, Japanese, Chinese, Italian, Romanian, Czech, Hungarian, Polish and Greek. Other language versions (with Unicode capability) can be created.

Web server

The web server is integrated in the DataVU7 as standard. Four different modes of presentation are available:
- online visualization
- three freely programmable HTML pages
- current batch reports
- 4-way view (1 to 4 recorders or different visualizations)
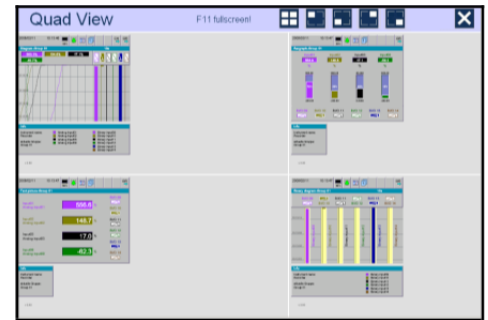
On the PC side, the web server can be addressed with web browser. For visualizing graphics, an SVG Viewer (from Adobe®, for instance) must be installed on the PC in addition to the Internet Explorer.

Process images (editor)

The setup program can create process images and transfer them to the paperless recorder for display. Up to 25 objects (images, analog channels, binary channels, texts, ...) can be used in a process image.

`2008/02/11 08:58:05 Master 100%`
Process image-Group 01
-48.202
118.01
2.4909
3.5370
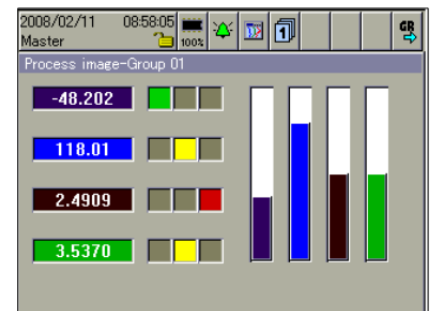
One process image is integrated in the paperless recorder ex-factory.

Visualization on the instrument

Operator level
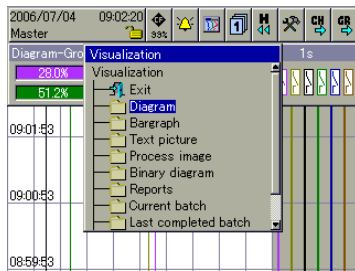
Selection of visualization

Vertical diagram
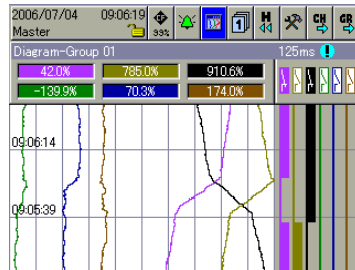
Recorder chart presentation of analog and binary channels

Display of scaling and limit markers of a channel (can be switched on/off)

Numerical display of current analog channels

Bar graph presentation
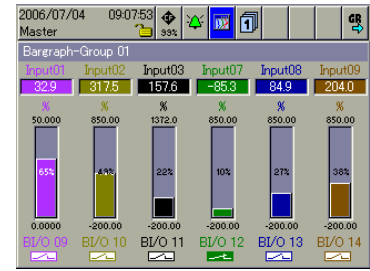
Bar graph presentation of analog channels

On / Off presentation of binary channels

Display of current analog channels with scaling and limit markers

Color change of bar graph to red when limits are infringed

Numerical presentation
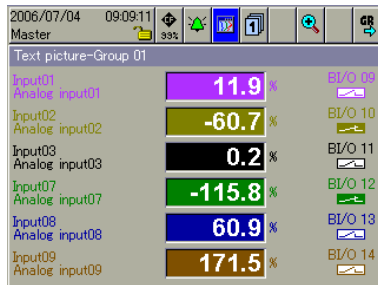
Large numerical presentation of analog channels, including the channel name and description

Each analog channel can be switched to the foreground

On / Off presentation of binary channels

Numerical 1ch presentaion
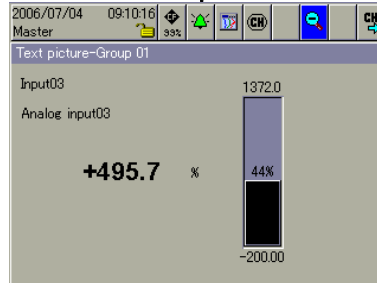
Clear presentation of an analog channel

An analog input is shown simultaneously as a bar graph and a number

Display of channel name and description

Display of scaling and limit markers

Process image
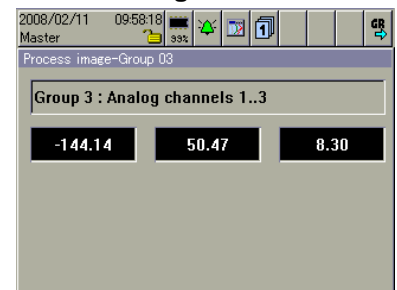
Freely configurable presentation (through the setup program) of analog and binary signals with background pictures

One process image for each group

Binary presentation
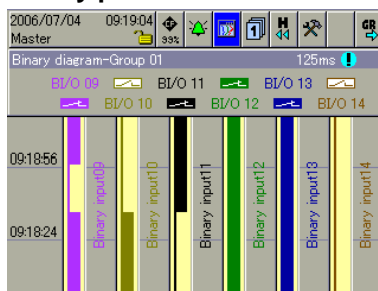
On / Off presentation of binary channels

Report
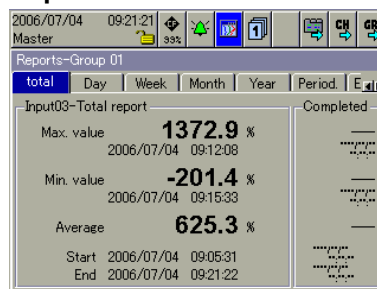
Display of different reports for the analog channels of a group

Details of minimum, maximum, - average / integral values and time period

Display of the previous report

Batch reports
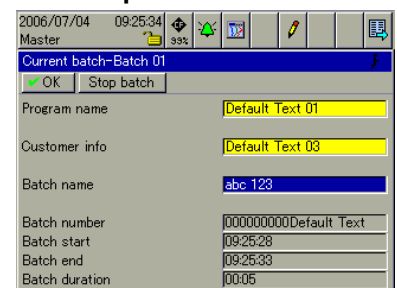
3 batches documented simultaneously

Changeover between current and completed batch reports

Electronic signature is possible

Batch texts via interface and barcode reader, among others

Counter/integrator presentation
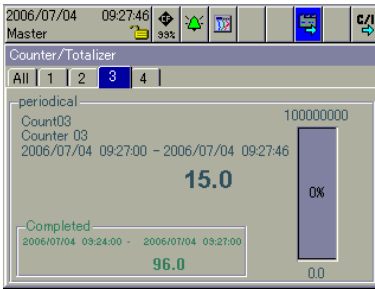
Presentation of up to 27 counters or integrators

Changeover between individual and overall display

Display of the current and the most recently completed count

Group selection
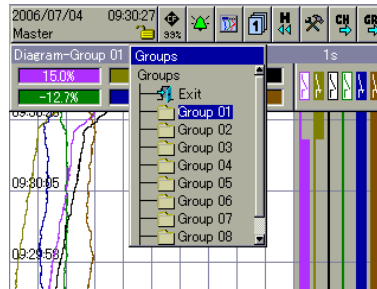
Up to 9 groups are configurable

Up to 6 analog and 6 binary channels can be shown for each group

Measurement signals can be used in several groups

History presentation
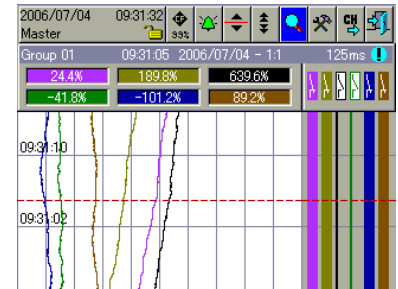
All stored measurement data are shown as curves at different zoom levels

Display of scaling and limit markers of a channel

Numerical display of the measurements of the analog channels at the cursor position

Shifting of the visible section within the stored measurement data

Presentation of alarm lists

Display of current alarms

For the instrument as a whole or batch-related

Up to 150 entries visible on the recorder

Presentation of event lists

Display and storage of events and alarms

For the instrument as a whole or batch-related

Up to 150 entries visible on the

Configuration
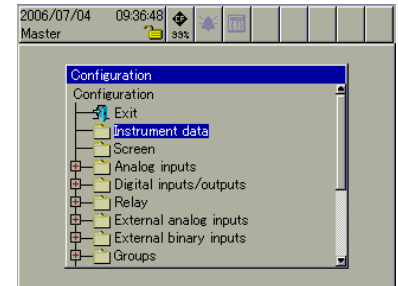
Configuration on the recorder itself, by rotating and pressing the control knob

Configuration through the setup program

Visualization through the web browser
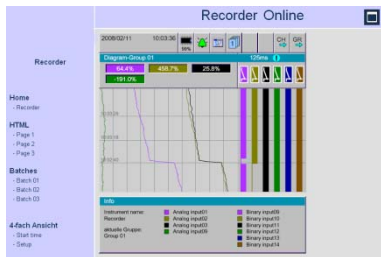
Online visualization of a recorder

Selection of (max.) three customized HTML pages (created on request)
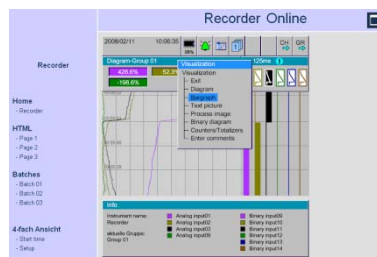
Navigation through the different recorder visualizations (curves, bar graph, text, process, ...)

Max. four recorders or four different visualizations simultaneously

PC programs
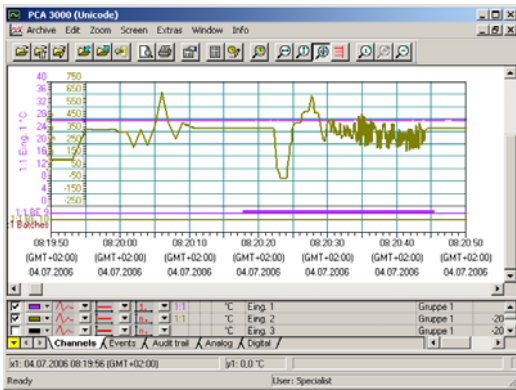
PC Evaluation Software (PCA3000)

The PC Evaluation Software (PCA3000) is a program which runs under Windows 2000/XP/Vista/Win7, and is used to manage, archive, visualize and evaluate the recorder data.

- The data from differently configured instruments are recognized by the PC Evaluation Software and stored in an archive database. All management is fully automatic. The user only has to manually allocate an identifier (supplementary description).

- The user can at any time gain access to certain data sets which can be distinguished by the identifier. It is also possible to restrict the time periods to be evaluated.

- Any analog or binary channels of a DataVU7 recorder (even from different groups) can subsequently be combined into PCA groups in PCA3000.

- Since each group is displayed in a separate window, several groups can be shown simultaneously on the screen and compared.

- Operation by mouse or keys.

- Using the export filter, it is possible to export the stored data, so that they can be processed in other programs such as Excel.

- The PC Evaluation Software PCA3000 has network capability, i.e. several users can obtain data from the same archive file (*.177) in a network directory, independently of each other.

PCA Communications software (PCC)

- Data can be read out from the recorder via the USB device interface, the serial interface (RS232/RS485) or via the Ethernet interface. The data can be read manually or automatically (e.g. daily at 23.00 hrs).

- Data can also be retrieved via remote control, through a modem.

Functional overview
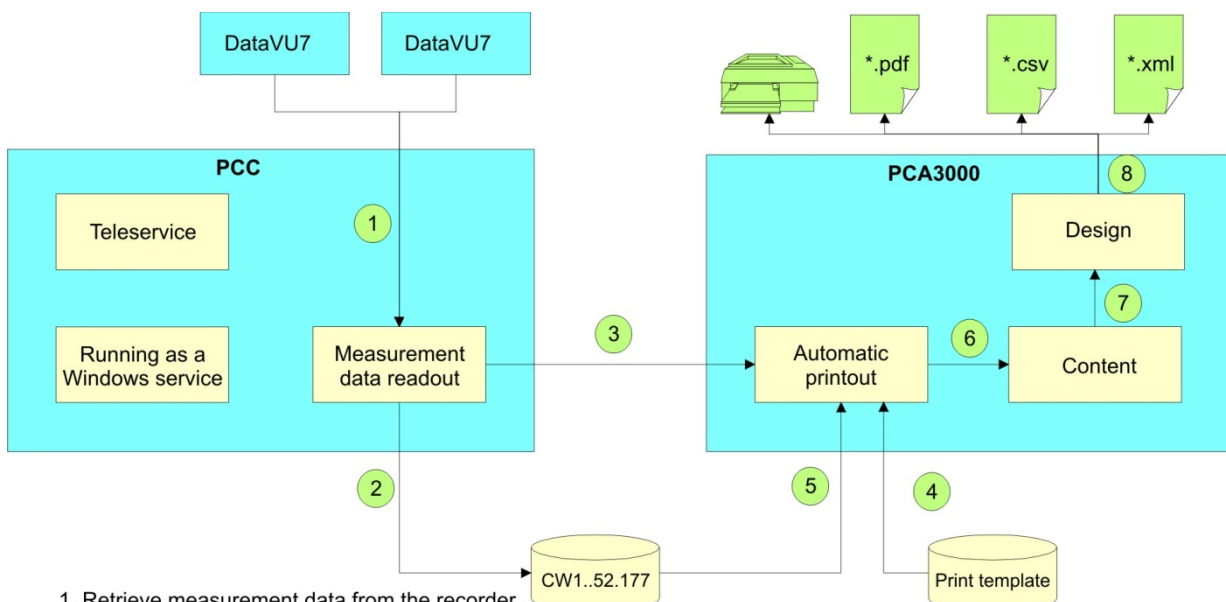
1. Retrieve measurement data from the recorder.
2. Store measurement data in archive files (*.177).
3. Activate "automatic printout" in PCA3000.
   The print template is selected within PCC.
4. Read the print template. Print templates are created within PCA3000.
5. Data transfer from archive.
6. Determine the content defined in the print template.
7. Use the determined content in the defined design.
8. Output the completed design in the defined formats.

Interfaces

USB interfaces (standard)

RS232/RS485 interface (standard)

RS232 interface
for barcode reader (standard)

Ethernet interface (standard)

PROFIBUS-DP interface
(option)

	USB Host/Device	RS232 RS485	Ethernet	PROFIBUS-DP	External CF card
Read current measurement data	yes (device only)	yes	yes	yes	no
Write current measurement data	no	yes	yes	yes	no
Read out stored measurement data	yes	yes	yes	no	yes
Read /write configuration	yes	yes	yes	no	yes
Write user list	yes	yes	yes	no	yes

USB interfaces

With USB interfaces, a distinction is made between the host and the device interface.

A USB memory stick can be attached to the host interface. The device interface, in conjunction with a standard commercial USB cable, is used to operate the setup program. The paperless recorder without stainless steel front has host and device interfaces connected in parallel on both the front and back panels, of which only one of each type can ever be used. The paperless recorder with stainless steel front has only one host and one device interface at the rear panel.

RS232/RS485 interface

Current process data, as well as specific device data, can be read via the RS 232 or RS 485 interface. Data in the internal memory can also be read by the PC Evaluation Software PCA3000 and the PCA Communications Software (PCC). The RS 232 interface permits a maximum lead length of 15 m, the RS 485 interface 1.2 km. Connection is by a 9-pin SUB-D connector on the back of the instrument. Modbus (master and slave) protocols are available, and the transmission mode used is RTU (Remote Terminal Unit).

RS232 for barcode reader

A barcode reader can be used to start or stop batch reporting, and to set batch texts (customer information, batch number...).

The barcode reader is operated via the RS232/RS485 interface, and the RS232 interface for the barcode reader can also be used as a Modbus master or slave.

Ethernet interface

The Ethernet interface can be connected to local networks for communication between the recorder and the setup program and the PCA Communications Software. The IP address is set permanently through the instrument configuration, in the setup program or automatically received from a DHCP server. The integrated web server allows simultaneous access by several PCs to 3 HTML and 3 batch pages. Transmission protocol: TCP/IP Network type: 10BaseT, 100BaseT

PROFIBUS-DP interface

The recorder can be integrated into a fieldbus system according to the PROFIBUS-DP standard via the PROFIBUS-DP interface. This PROFIBUS version , in particular, is designed for communication between automation systems and distributed peripheral field devices.

Data is transmitted serially according to the RS485 standard, to a maximum 12 Mbits/sec. Using the included project design tool (GSD generator; GSD = device master file), an application-specific GSD file is created, which is used to integrate the recorder within the fieldbus system.

External CompactFlash memory card (CF)

The external CompactFlash memory card (CF) is used to transfer the data from the internal memory to the PC, excluding versions with Stainless steel front. Configuration data can be created on the PC and then transferred to the recorder from the memory card. On the PC side, data on the card is accessed using a read/write device (CompactFlash reader/writer).

External inputs via interface

The paperless recorder can acquire and store up to 24 external analog inputs and 24 binary inputs. Furthermore, the interfaces can be used to enter comments in the event list of the recorder.

Connection diagram

Rear view with pluggable screw terminals

Connector number
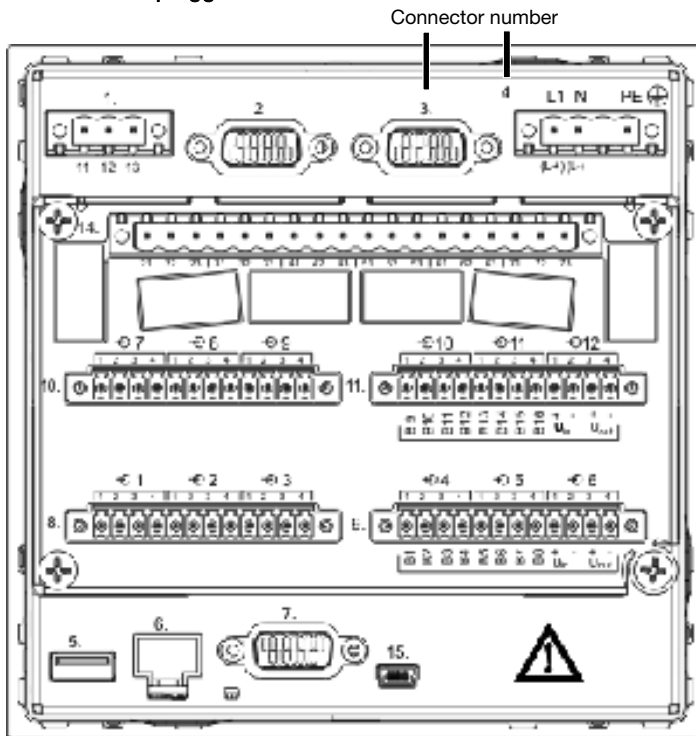
Module slot 3 (top)
fitted with one relay card.

Module slot 2 (middle)
fitted with 6 analog channels or
3 analog channels and
8 binary inputs/outputs.

Module slot 1 (bottom)
fitted with 6 analog channels or
3 analog channels and
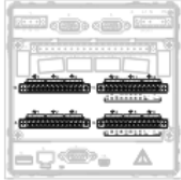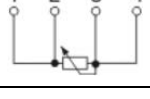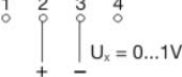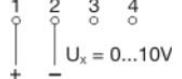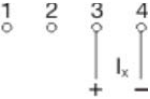8 binary inputs/outputs.

Instrument variant 1
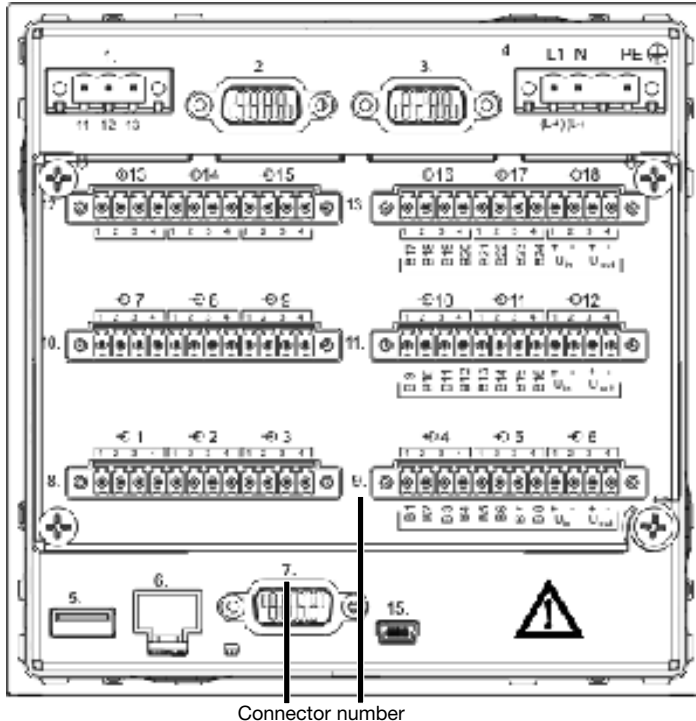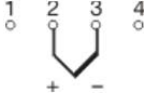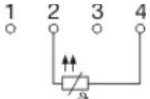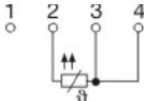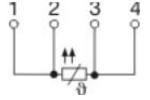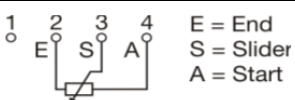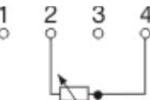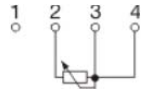
Module slot 3 (top)
fitted with 6 analog channels or
3 analog channels and
8 binary inputs/outputs.

Module slot 2 (middle)
fitted with 6 analog channels or
3 analog channels and
8 binary inputs/outputs.

Module slot 1 (bottom)
fitted with 6 analog channels or
3 analog channels and
8 binary inputs/outputs.

Connector number

Instrument variant 2

Terminal assignment	Connector	Diagram
Supply		
Supply as on nameplate	Connector 4 L1 (L+) N (L-) PE	
Analog inputs		
Thermocouple	Connectors 8 to 11 (input 1 to 12) for instrument variant 1 or Connectors 8 to 13 (input 1 to 18) for instrument variant 2	
RTD in 2-wire circuit		
RTD in 3-wire circuit		
RTD in 4-wire circuit		
Resistance transmitter		E = End S = Slider A = Start
Potentiometer in 2-wire circuit		
Potentiometer in 3-wire circuit		
Potentiometer in 4-wire circuit		
Voltage input 0 - 1 V		$U_x = 0...1V$
Voltage input 0 - 10 V		$U_x = 0...10V$
Current input		I_x

Binary inputs/outputs

Configuration (through the setup program or on the instrument) defines which are binary inputs and which are outputs.
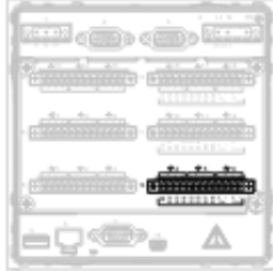
B1 … B8	Connector 9	
voltage-controlled LOW = -3 to +5 V DC LOW = 12 to 30 V DC internal power supply 24 V/60 mA (U_{out})	only on modules with 3 analog inputs B1 binary input/ output 1 … B8 binary input/ output 8 U_{in}+ external power supply U_{in}- ground U_{out}+ +24 V internal power supply U_{out}- ground	Example: Connecting a load to binary output 4 (B4) and a solid-state relay to binary output 3 (B3) requires an external power supply. Diagram of the connector
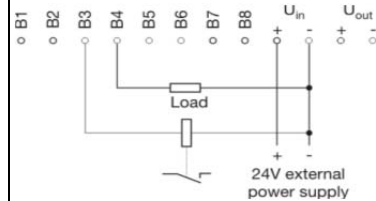
B9 … B16	Connector 11	
voltage-controlled LOW = -3 to +5 V DC LOW = 12 to 30 V DC internal power supply 24 V/60 mA (U_{out})	only on modules with 3 analog inputs B9 binary input/ output 9 … B16 binary input/ output 16 U_{in}+ external power supply U_{in}- ground U_{out}+ +24 V internal power supply U_{out}- ground	Example: Binary input 12 (B12) is operated from the internal power supply. Diagram of the connector:
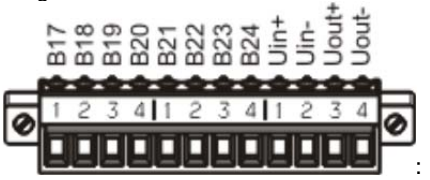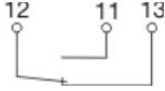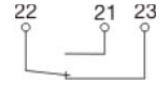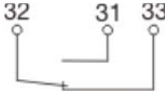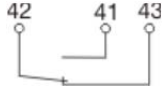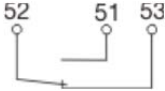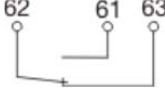
|		

B17 … B24
 	
voltage-controlled
LOW = -3 to +5 V DC
LOW = 12 to 30 V DC
 	
internal power supply 24 V/60 mA (U_{out})
 	
	Connector 13
	only for instr. variant 2
	and for modules with
	3 analog inputs
	
	B17 binary input/
	      output 17
	…
	B24 binary input/
	      output 24
	
	U_{in}+ external power
	      supply
	U_{in}- ground
	U_{out}+ +24 V internal
	      power supply
	U_{out}- ground
		
		Example:
		Binary input 20 (B20) is operated from the internal power supply.
		
		Diagram of the connector

Relay outputs

Relay 1 changeover (SPDT)	Connector 1 	
Relay 2 changeover (SPDT)		
Relay 3 changeover (SPDT)	Connector 14 only for instrument variant 1 	
Relay 4 changeover (SPDT)		
Relay 5 changeover (SPDT)		
Relay 6 changeover (SPDT)		
Relay 7 changeover (SPDT)		

Interfaces

RS232 for barcode reader 9-pin SUB-D socket connector	Connector 2 	2 RxD 3 TxD 5 GND	Receive Data Transmit Data Ground
PROFIBUS-DP 9-pin SUB-D socket connector (extra code)	Connector 3 	3 RxD/TxD-P 5 DGND 6 VP 8 RxD/TxD-P	Receive/Transmit Data-Pos. B conductor Ground for data transmission Supply voltage-Pos. Receive/Transmit Data-Neg. A conductor

USB host interface for connecting memory sticks	Connector 5	The recorder without stainless steel front also has a USB host interface on the front panel, connected in parallel. The two interfaces cannot both be operated at the same time.
Ethernet RJ45 socket connector	Connector 6	1 TX+ Transmit Data + 2 TX- Transmit Data - 3 RX+ Receive Data + 6 RX- Receive Data -
RS232 9-pin SUB-D socket connector (switchable to RS485)	Connector 7	2 RxD Receive Data 3 TxD Transmit Data 5 GND Ground
RS485 9-pin SUB-D socket connector (switchable to RS232)	Connector 7	3 TxD+/RxD+ Transmit/Receive Data + 5 GND Ground 8 TxD-/RxD- Transmit/Receive Data -
USB host interface for connecting a PC	Connector15	The recorder without stainless steel front also has a USB device interface on the front panel, connected in parallel. The two interfaces cannot both be operated at the same time.

Overview of the electrical isolation
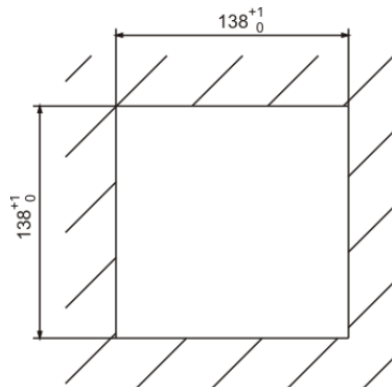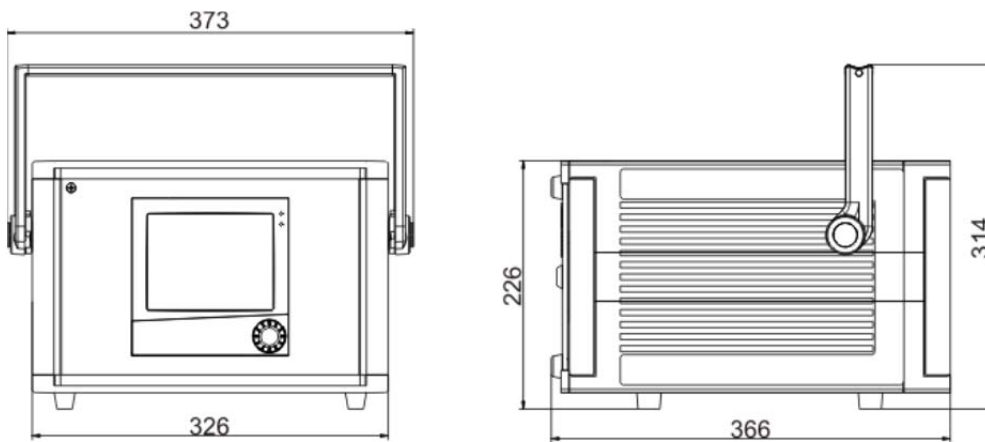

Dimensions

193
10

144
144
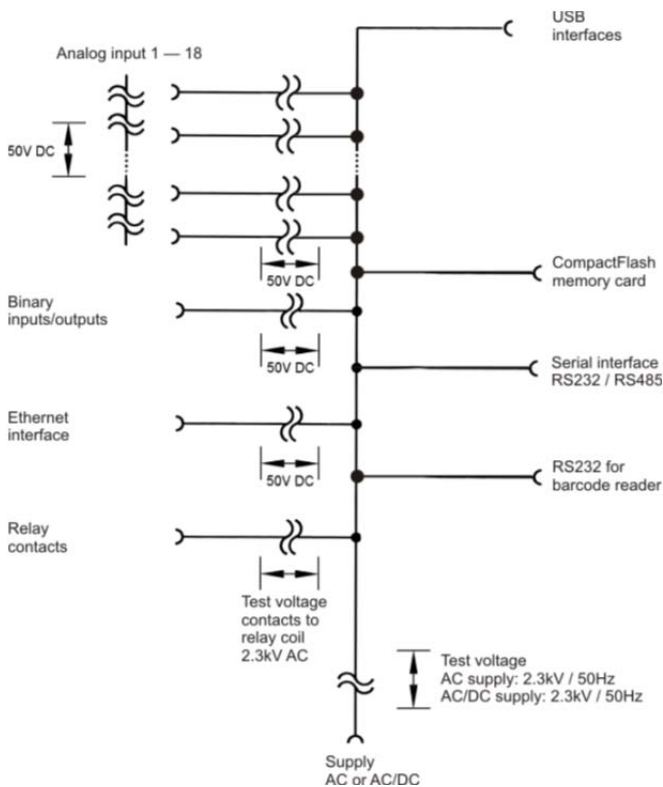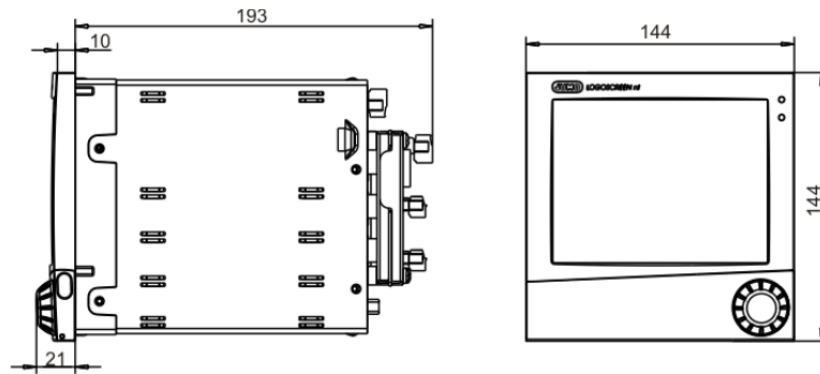
Recorder with die-cast zinc front

193
13,8

144
144
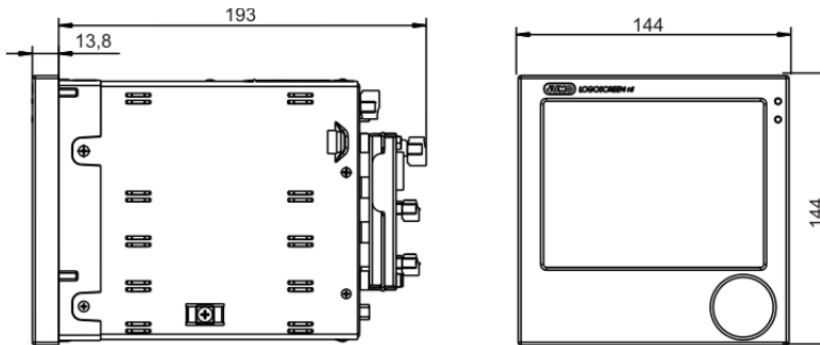
Recorder with stainless steel front (extra code

138_{0}^{+1}

138_{0}^{+1}

Panel cut-out

373

326

226

314

366

Universal carrying case option - TG-35

Ordering information

VU7 - X - X - X - X - X - X

Base Unit

INPUT SLOT 1

none	0
3 Universal inputs and 8 DI/DO	3
6 Universal inputs	6

INPUT SLOT 2

none	0
3 Universal inputs and 8 DI/DO	3
6 Universal inputs	6

INPUT SLOT 3

none	0
3 Universal inputs and 8 DI/DO	3
6 Universal inputs	6
6 Relay outputs	R

Power supply options

100 - 240V AC, 48-63 Hz	0
20 - 30V AC/DC, 48-63 Hz	1

Option 1

Lithium battery for memory		0
Lithium battery for memory + Math function module		1
Lithium battery for memory + PROFIBUS DP interface		2
Lithium battery for memory + Mathfunction module + PROFIBUS DP interface		3
Capacitor for memory buffering	Available on special request	4
Capacitor for memory buffering + Mathfunction module	Available on special request	5
Capacitor for memory buffering + PROFIBUS DP interface	Available on special request	6
Capacitor for memory buffering + Mathfunction module + PROFIBUS DP interface	Available on special request	7

Option 2

none		0
Stainless steel front		1
Universal carrying case	Available on special request	2

Accessories	**Part Code**
Setup PC software	DV7PCSETUP
PCC Communication PC software	DVPCC
PCA3000 Evaluation PC software	DVPCEVAL
CF-card memory 256MB	DVCF256
CF-card memory 1GB	DVCF1000

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