**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

### 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 alphanumericical form.

### 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

### Power supply

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

### Interface

- 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

### Display / Operation

- Display: 5.5” TFT color display, 320 x 240 pixels, 256 colors
- Operation: rotary knob or touchpad analog inputs or 3 analog inputs and 8 binary inputs/outputs

### Inputs via interface

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)

### Power supply

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

### 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
## Technical data

### Analog inputs

#### Thermocouple

<table>
<thead>
<tr>
<th>Designation</th>
<th>Type</th>
<th>Standard</th>
<th>Meas. range</th>
<th>Accuracy¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fe-CuNi</td>
<td>L</td>
<td>DIN 43 710</td>
<td>-200 to +900 °C</td>
<td>±0.1 %</td>
</tr>
<tr>
<td>Fe-CuNi</td>
<td>J</td>
<td>EN 60 584</td>
<td>-200 to +1200 °C</td>
<td>±0.1% from -100 °C</td>
</tr>
<tr>
<td>Cu-CuNi</td>
<td>U</td>
<td>DIN 43 710</td>
<td>-200 to +600 °C</td>
<td>±0.1 % from -150 °C</td>
</tr>
<tr>
<td>NiCr-Ni</td>
<td>T</td>
<td>EN 60 584</td>
<td>-270 to +400 °C</td>
<td>±0.1 % from -150 °C</td>
</tr>
<tr>
<td>NiCr-CuNi</td>
<td>K</td>
<td>EN 60 584</td>
<td>-200 to +1372 °C</td>
<td>±0.1 % from -80 °C</td>
</tr>
<tr>
<td>NiCrSi-NiSi</td>
<td>E</td>
<td>EN 60 584</td>
<td>-200 to +1000 °C</td>
<td>±0.1 % from -80 °C</td>
</tr>
<tr>
<td>NiCrSi-NiSi</td>
<td>N</td>
<td>EN 60 584</td>
<td>-100 to +1300 °C</td>
<td>±0.1 % from -80 °C</td>
</tr>
<tr>
<td>Pt10Rh-Pt</td>
<td>S</td>
<td>EN 60 584</td>
<td>0 to +1768 °C</td>
<td>±0.1 5%</td>
</tr>
<tr>
<td>Pt13Rh-Pt</td>
<td>R</td>
<td>EN 60 584</td>
<td>0 to 1768 °C</td>
<td>±0.15%</td>
</tr>
<tr>
<td>Pt30Rh-Pt6Rh</td>
<td>B</td>
<td>EN 60 584</td>
<td>0 to 1820 °C</td>
<td>±0.15% from 400 °C</td>
</tr>
<tr>
<td>W3Re/W26Re</td>
<td>D</td>
<td></td>
<td>0 to 2495 °C</td>
<td>±0.15% from 500 °C</td>
</tr>
<tr>
<td>W3Re/W26Re</td>
<td>C</td>
<td></td>
<td>0 to 2320 °C</td>
<td>±0.15% from 500 °C</td>
</tr>
<tr>
<td>Chromel-copel</td>
<td></td>
<td></td>
<td>-200 to +800 °C</td>
<td>±0.15 % from -80 °C</td>
</tr>
<tr>
<td>GOST R 8.585-2001</td>
<td></td>
<td></td>
<td>-200 to +1372 °C</td>
<td>±0.1 % from -80 °C</td>
</tr>
<tr>
<td>Chrome-alumel</td>
<td></td>
<td></td>
<td>0 to 1395 °C</td>
<td>±0.15 %</td>
</tr>
</tbody>
</table>

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 data 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

<table>
<thead>
<tr>
<th>Designation</th>
<th>Standard</th>
<th>Connection circuit</th>
<th>Meas. range</th>
<th>Accuracy¹</th>
<th>Meas. curr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pt100</td>
<td>EN 60 751</td>
<td>2/3-wire, 4-wire</td>
<td>-200 to +100 °C</td>
<td>±0.5 °C</td>
<td>= 250 µA</td>
</tr>
<tr>
<td></td>
<td>(TC = 3.85 * 10⁻³ °C)</td>
<td></td>
<td>-200 to +850 °C</td>
<td>±0.8 °C</td>
<td>= 250 µA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-200 to +850 °C</td>
<td>±0.5 °C</td>
<td>= 250 µA</td>
</tr>
<tr>
<td>Pt100</td>
<td>JIS 1604</td>
<td>2/3-wire, 4-wire</td>
<td>-200 to +100 °C</td>
<td>±0.5 °C</td>
<td>= 250 µA</td>
</tr>
<tr>
<td></td>
<td>(TC = 3.917 * 10⁻³ °C)</td>
<td></td>
<td>-200 to +650 °C</td>
<td>±0.8 °C</td>
<td>= 250 µA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-200 to +650 °C</td>
<td>±0.5 °C</td>
<td>= 250 µA</td>
</tr>
<tr>
<td>Pt100</td>
<td>GOST 6651-94 A.1</td>
<td>2/3-wire, 4-wire</td>
<td>-200 to +100 °C</td>
<td>±0.5 °C</td>
<td>= 250 µA</td>
</tr>
<tr>
<td></td>
<td>(TC = 3.91 * 10⁻³ °C)</td>
<td></td>
<td>-200 to +850 °C</td>
<td>±0.8 °C</td>
<td>= 250 µA</td>
</tr>
<tr>
<td>Material</td>
<td>Reference</td>
<td>Connection Circuit</td>
<td>Measurement Range</td>
<td>Resolution</td>
<td>Lead Current</td>
</tr>
<tr>
<td>-----------</td>
<td>-----------</td>
<td>--------------------</td>
<td>-------------------</td>
<td>------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Pt500</td>
<td>EN 60 751</td>
<td>2/3-wire, 4-wire</td>
<td>-200 to +100 °C</td>
<td>±0.5 °C</td>
<td>≈ 250 µA</td>
</tr>
<tr>
<td>Pt1000</td>
<td>EN 60 751</td>
<td>2/3-wire, 4-wire</td>
<td>-200 to +850 °C</td>
<td>±0.9 °C</td>
<td>≈ 100 µA</td>
</tr>
<tr>
<td>Ni 100</td>
<td>DIN 43 760</td>
<td>2/3-wire, 4-wire</td>
<td>-200 to +100 °C</td>
<td>±0.4 °C</td>
<td>≈ 250 µA</td>
</tr>
<tr>
<td>Pt50</td>
<td>ST RGW 1057 1985</td>
<td>2/3-wire, 4-wire</td>
<td>-200 to +1100 °C</td>
<td>±0.9 °C</td>
<td>≈ 250 µA</td>
</tr>
<tr>
<td>Cu 50</td>
<td>(TC = 4.26 * 10⁻³ 1/°C)</td>
<td>2/3-wire, 4-wire</td>
<td>-50 to +100 °C</td>
<td>±0.5 °C</td>
<td>≈ 250 µA</td>
</tr>
<tr>
<td>Cu 100</td>
<td>GOST 6651-94 A.4</td>
<td>2/3-wire, 4-wire</td>
<td>-50 to +200 °C</td>
<td>±0.9 °C</td>
<td>≈ 250 µA</td>
</tr>
</tbody>
</table>

**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

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1 The linearization accuracy refers to the maximum measuring range. The linearization accuracy is reduced with short spans.
### Resistance transmitter and potentiometer

<table>
<thead>
<tr>
<th>Designation</th>
<th>Meas. range</th>
<th>Accuracy</th>
<th>Meas. curr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistance transmitter</td>
<td>up to 4000 Ω</td>
<td>±4 Ω</td>
<td>≈ 100 µA</td>
</tr>
<tr>
<td>Potentiometer</td>
<td>&lt; 400 Ω</td>
<td>±400 mΩ</td>
<td>≈ 250 µA</td>
</tr>
<tr>
<td></td>
<td>≥ 400 Ω to 4000 Ω</td>
<td>±4 Ω</td>
<td>≈ 100 µA</td>
</tr>
</tbody>
</table>

**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 data and electrical isolation

**Resolution**
- >14 bit

---

### Input for DC voltage, DC current

<table>
<thead>
<tr>
<th>Basic range</th>
<th>Accuracy</th>
<th>Input resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>-12 to +112 mV</td>
<td>±100 µV</td>
<td>R_L ≥ 1 MΩ</td>
</tr>
<tr>
<td>-10 to +210 mV</td>
<td>±240 µV</td>
<td>R_L ≥ 470 kΩ</td>
</tr>
<tr>
<td>-1.5 to +11.5 V</td>
<td>±6 mV</td>
<td>R_L ≥ 470 kΩ</td>
</tr>
<tr>
<td>-0.12 to +1.12 V</td>
<td>±1 mV</td>
<td>R_L ≥ 470 kΩ</td>
</tr>
<tr>
<td>-1.2 to +1.2 V</td>
<td>±2 mV</td>
<td>R_L ≥ 470 kΩ</td>
</tr>
<tr>
<td>-11.2 to +11.2 V</td>
<td>±12 mV</td>
<td>R_L ≥ 470 kΩ</td>
</tr>
</tbody>
</table>

**Shortest span**
- 5 mV

**Range start/end**
- freely programmable within the limits in 0.01 mV 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 data 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

<table>
<thead>
<tr>
<th></th>
<th>Short-circuit</th>
<th>Break</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermocouple</td>
<td>not detected</td>
<td>detected</td>
</tr>
<tr>
<td>Resistance thermometer</td>
<td>detected</td>
<td>detected</td>
</tr>
<tr>
<td>Resistance transmitter</td>
<td>not detected</td>
<td>detected</td>
</tr>
<tr>
<td>Potentiometer</td>
<td>not detected</td>
<td>detected</td>
</tr>
<tr>
<td>Voltage ≤ ± 210 mV</td>
<td>not detected</td>
<td>detected</td>
</tr>
<tr>
<td>Voltage &gt; ± 210 mV</td>
<td>not detected</td>
<td>not detected</td>
</tr>
<tr>
<td>Current</td>
<td>not detected</td>
<td>not detected</td>
</tr>
</tbody>
</table>

### Binary inputs/outputs (option)

<table>
<thead>
<tr>
<th>Number or output</th>
<th>Configurable as input or output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td>8, 16 or 24, depending on the device version, to DIN VDE 0411, Part 500; max. 25 Hz, max. 32 V</td>
</tr>
<tr>
<td></td>
<td>Configurable as input or output</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Input</th>
<th>logic &quot;0&quot;: -3 to +5 V (input current max. ±1 mA), logic &quot;1&quot;: 12 to 30 V (2.5 mA ≤ input current ≤ 5 mA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-speed input</td>
<td>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</td>
</tr>
<tr>
<td>- task</td>
<td>count function, e. g. for flow measurement</td>
</tr>
<tr>
<td>- counting frequency</td>
<td>10 kHz</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Output</th>
<th>Open-collector output, switches relative to positive voltage, logic &quot;0&quot;: transistor is inhibited (max. permissible voltage across switching transistor 30 V, max. leakage current 0.1 mA), logic &quot;1&quot;: transistor is switched on (max. voltage across switching transistor 1.6 V, max. current 50 mA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- type</td>
<td></td>
</tr>
<tr>
<td>- level</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Outputs</th>
<th>Changeover (SPDT), 3 A, 230 V AC¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 relay (standard)</td>
<td></td>
</tr>
<tr>
<td>6 relays (option)</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Connector</th>
<th>Quantity</th>
<th>Protocol Options</th>
<th>Baud Rate Options</th>
<th>Connector Type</th>
<th>External Inputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS232/RS485 (connector 7)</td>
<td>Qty. 1, switchable between RS232 and RS485</td>
<td>Modbus master, Modbus slave and barcode reader</td>
<td>9600, 19200, 38400</td>
<td>SUB-D</td>
<td>via the Modbus master/slave function, 24 analog and 24 binary</td>
</tr>
<tr>
<td>RS232 for barcode reader (connector 2)</td>
<td>Qty. 1</td>
<td>Modbus master, Modbus slave and barcode reader</td>
<td>9600, 19200, 38400</td>
<td>SUB-D</td>
<td>via the Modbus master/slave function, 24 analog and 24 binary</td>
</tr>
</tbody>
</table>

### 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 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) for connecting to the (master) computer

### Screen

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution / size</td>
<td>320 x 240 pixels / 5.5”</td>
</tr>
<tr>
<td>Type / number of colors</td>
<td>TFT color screen / 256 colors</td>
</tr>
<tr>
<td>Screen refresh rate</td>
<td>&gt; 150 Hz</td>
</tr>
<tr>
<td>Brightness setting</td>
<td>adjustable on instrument</td>
</tr>
<tr>
<td>Screen saver (switch-off)</td>
<td>Via timer or control signal</td>
</tr>
</tbody>
</table>
### Electrical data

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage (switch-mode PSU)</td>
<td>100 - 240 V AC +10/-15 %, 48 - 63 Hz or 20 - 30 V AC/DC, 48 - 63 Hz (ELV)</td>
</tr>
<tr>
<td>Electrical safety</td>
<td></td>
</tr>
<tr>
<td>Protection class I</td>
<td>to EN 61 010, Part 1, August 2002</td>
</tr>
<tr>
<td>Test voltages (type test)</td>
<td>overvoltage category II, pollution degree 2</td>
</tr>
<tr>
<td>- mains supply circuit to meas. circuit</td>
<td>terminal for PE conductor</td>
</tr>
<tr>
<td>- mains supply circuit to housing (protective conductor)</td>
<td>with AC supply: 2.3 kV/50 Hz, 1 min,</td>
</tr>
<tr>
<td>- measuring current circuits to meas. current and housing</td>
<td>with AC/DC supply: 2.3 kV/50 Hz, 1 min,</td>
</tr>
<tr>
<td>- electrical isolation between analog inputs</td>
<td>with AC supply: 2.3 kV/50 Hz, 1 min,</td>
</tr>
<tr>
<td>Supply voltage error</td>
<td>500 V/50 Hz, 1 min</td>
</tr>
<tr>
<td>Power consumption</td>
<td>up to 30 V AC and 50 V DC</td>
</tr>
<tr>
<td>Data backup</td>
<td>CompactFlash memory card</td>
</tr>
<tr>
<td>Electrical connection</td>
<td></td>
</tr>
<tr>
<td>- mains supply and relays</td>
<td>at rear through pluggable screw terminals, 5.08 mm raster, max. conductor cross-section ≤ 2.5 mm² or 2x 1.5 mm² with ferrules at rear through pluggable screw terminals, 3.81 mm raster, max. conductor cross-section ≤ 1.3 mm²</td>
</tr>
<tr>
<td>- analog and binary inputs</td>
<td></td>
</tr>
</tbody>
</table>

### Environmental influences

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature range</td>
<td>0 to +50 °C</td>
</tr>
<tr>
<td>Ambient temperature effect</td>
<td>0.03 %/°C</td>
</tr>
<tr>
<td>Storage temperature range</td>
<td>-20 to +60 °C</td>
</tr>
<tr>
<td>Climatic conditions</td>
<td>≤ 75% relative humidity, no condensation</td>
</tr>
<tr>
<td>EMC</td>
<td>EN 61 326-1</td>
</tr>
<tr>
<td>- interference emission</td>
<td>Class A - only for industrial use -</td>
</tr>
<tr>
<td>- immunity to interference</td>
<td>to industrial requirements</td>
</tr>
</tbody>
</table>

### Housing

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing front</td>
<td>zinc die-casting, optionally in stainless steel (option)</td>
</tr>
<tr>
<td>Housing type</td>
<td>housing for flush-panel mounting to IEC 61 554, in stainless steel</td>
</tr>
<tr>
<td>Bezel size</td>
<td>144 mm x 144 mm to IEC 61 554</td>
</tr>
<tr>
<td>Depth behind panel</td>
<td>193 mm (incl. terminals)</td>
</tr>
<tr>
<td>Panel cut-out</td>
<td>138⁺¹⁰ mm x 138⁺¹⁰ mm to IEC 61 554</td>
</tr>
<tr>
<td>Panel thickness</td>
<td>2 - 40 mm</td>
</tr>
<tr>
<td>Housing mounting</td>
<td>in panel to DIN 43 834</td>
</tr>
<tr>
<td>Operating position</td>
<td>unrestricted, but taking into account the viewing angle of the screen, horizontally ±65°, vertically +40° to -65°</td>
</tr>
<tr>
<td>Enclosure protection</td>
<td>to EN 60 529 Category 2, front IP65, rear IP20</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 3.5 kg</td>
</tr>
<tr>
<td>Mark of conformity</td>
<td>Testing laboratory</td>
</tr>
<tr>
<td>--------------------</td>
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</tr>
<tr>
<td>c UL us</td>
<td>Underwriters Laboratories</td>
</tr>
</tbody>
</table>
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 f, & , | , ^, 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:

Example: Rotate control knob to the left.
Press control knob.
Result: The menu for the alarm and event list is called up.

Example: Rotate control knob to the left.
Press control knob.
Result: The menu for the alarm and event list is closed again.

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)
Visualization on the instrument

**Operator level**

- Selection of visualization

**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

**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

**Numerical 1ch presentation**

- 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

**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

**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

**Process image**

- Freely configurable presentation (through the setup program) of analog and binary signals with background pictures
- One process image for each group

**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 6 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 recorder

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 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.

<table>
<thead>
<tr>
<th></th>
<th>USB Host/Device</th>
<th>RS232 RS485</th>
<th>Ethernet</th>
<th>PROFIBUS-DP</th>
<th>External CF card</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read current measurement data</td>
<td>yes (device only)</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Write current measurement data</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Read out stored measurement data</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Read/write configuration</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Write user list</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
</tr>
</tbody>
</table>
Connection diagram
Rear view with pluggable screw terminals

Instrument variant 1

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 2

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.
<table>
<thead>
<tr>
<th>Terminal assignment</th>
<th>Connector</th>
<th>Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Supply</strong></td>
<td>Connector 4</td>
<td><img src="image1" alt="Diagram" /></td>
</tr>
<tr>
<td>Supply as on nameplate</td>
<td>L1 (L+)</td>
<td><img src="image2" alt="Diagram" /></td>
</tr>
<tr>
<td></td>
<td>N (L-)</td>
<td><img src="image3" alt="Diagram" /></td>
</tr>
<tr>
<td></td>
<td>PE</td>
<td><img src="image4" alt="Diagram" /></td>
</tr>
<tr>
<td><strong>Analog inputs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thermocouple</td>
<td></td>
<td><img src="image5" alt="Diagram" /></td>
</tr>
<tr>
<td>RTD in 2-wire circuit</td>
<td></td>
<td><img src="image6" alt="Diagram" /></td>
</tr>
<tr>
<td>RTD in 3-wire circuit</td>
<td>Connectors 8 to 11</td>
<td><img src="image7" alt="Diagram" /></td>
</tr>
<tr>
<td>RTD in 4-wire circuit</td>
<td>Connectors 8 to 11 (input 1 to 12) for instrument variant 1</td>
<td><img src="image8" alt="Diagram" /></td>
</tr>
<tr>
<td>Resistance transmitter</td>
<td></td>
<td><img src="image9" alt="Diagram" /></td>
</tr>
<tr>
<td>Potentiometer in 2-wire circuit</td>
<td>or Connectors 8 to 13 (input 1 to 18) for instrument variant 2</td>
<td><img src="image10" alt="Diagram" /></td>
</tr>
<tr>
<td>Potentiometer in 3-wire circuit</td>
<td></td>
<td><img src="image11" alt="Diagram" /></td>
</tr>
<tr>
<td>Potentiometer in 4-wire circuit</td>
<td></td>
<td><img src="image12" alt="Diagram" /></td>
</tr>
<tr>
<td>Voltage input 0 - 1 V</td>
<td></td>
<td><img src="image13" alt="Diagram" /></td>
</tr>
<tr>
<td>Voltage input 0 - 10 V</td>
<td></td>
<td><img src="image14" alt="Diagram" /></td>
</tr>
<tr>
<td>Current input</td>
<td></td>
<td><img src="image15" alt="Diagram" /></td>
</tr>
</tbody>
</table>
## Binary inputs/outputs

Configuration (through the setup program or on the instrument) defines which are binary inputs and which are outputs.

### B1 … B8

- **voltage-controlled**
  - LOW = -3 to +5 V DC
  - LOW = 12 to 30 V DC
- **internal power supply** 24 V/60 mA \( (U_{\text{in}}) \)

### Connector 9

- only on modules with 3 analog inputs
- B1 binary input/output 1
- …
- B8 binary input/output 8
- \( U_{\text{in}}^+ \) external power supply
- \( U_{\text{in}}^- \) ground
- \( U_{\text{out}}^+ \) +24 V internal power supply
- \( U_{\text{out}}^- \) 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

- **voltage-controlled**
  - LOW = -3 to +5 V DC
  - LOW = 12 to 30 V DC
- **internal power supply** 24 V/60 mA \( (U_{\text{in}}) \)

### Connector 11

- only on modules with 3 analog inputs
- B9 binary input/output 9
- …
- B16 binary input/output 16
- \( U_{\text{in}}^+ \) external power supply
- \( U_{\text{in}}^- \) ground
- \( U_{\text{out}}^+ \) +24 V internal power supply
- \( U_{\text{out}}^- \) 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_{in})

<table>
<thead>
<tr>
<th>Connector 13</th>
</tr>
</thead>
<tbody>
<tr>
<td>only for instr. variant 2 and for modules with 3 analog inputs</td>
</tr>
</tbody>
</table>

| 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) |
|-----------------|

| Relay 2 | changeover (SPDT) |

| Relay 3 | changeover (SPDT) |

| Relay 4 | changeover (SPDT) |

| Relay 5 | changeover (SPDT) |

| Relay 6 | changeover (SPDT) |

| Relay 7 | changeover (SPDT) |

**Interfaces**

<table>
<thead>
<tr>
<th>RS232 for barcode reader</th>
</tr>
</thead>
<tbody>
<tr>
<td>9-pin SUB-D socket connector</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Connector 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 RxD</td>
</tr>
<tr>
<td>3 TxD</td>
</tr>
<tr>
<td>5 GND</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PROFIBUS-DP</th>
</tr>
</thead>
<tbody>
<tr>
<td>9-pin SUB-D socket connector (extra code)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Connector 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 RxD/TxD-P</td>
</tr>
<tr>
<td>5 DGND</td>
</tr>
<tr>
<td>6 VP</td>
</tr>
<tr>
<td>8 RxD/TxD-P</td>
</tr>
<tr>
<td>Receive/Transmit Data-Neg.</td>
</tr>
<tr>
<td>A conductor</td>
</tr>
</tbody>
</table>

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Ref DS-VU7-1-EN-0212
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<table>
<thead>
<tr>
<th>Feature</th>
<th>Connector</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>USB host interface</td>
<td>Connector 5</td>
<td>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.</td>
</tr>
</tbody>
</table>
| 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 | Connector 15 | 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

[Diagram of electrical isolation]

Dimensions
Recorder with die-cast zinc front

Recorder with stainless steel front (extra code)

Panel cut-out

Universal carrying case option - TG-35
## Ordering Information

### Base Unit

<table>
<thead>
<tr>
<th></th>
<th>VU7 - X - X - X - X - X - X</th>
</tr>
</thead>
</table>

#### INPUT SLOT 1
- none
- 3 Universal inputs and 8 DI/DO
- 6 Universal inputs

#### INPUT SLOT 2
- none
- 3 Universal inputs and 8 DI/DO
- 6 Universal inputs

#### INPUT SLOT 3
- none
- 3 Universal inputs and 8 DI/DO
- 6 Universal inputs

### Power Supply Options
- 100 - 240V AC, 48-63 Hz
- 20 - 30V AC/DC, 48-63 Hz

### Option 1
- Lithium battery for memory
- Lithium battery for memory + Math function module
- Lithium battery for memory + PROFIBUS DP interface
- Lithium battery for memory + Math function module + PROFIBUS DP interface
- Capacitor for memory buffering
- Capacitor for memory buffering + Math function module
- Capacitor for memory buffering + PROFIBUS DP interface
- Capacitor for memory buffering + Math function module + PROFIBUS DP interface

### Option 2
- Stainless steel front
- Universal carrying case

### Accessories

<table>
<thead>
<tr>
<th>Part Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DV5PCSETUP</td>
<td>Setup PC software</td>
</tr>
<tr>
<td>DYPCC</td>
<td>PCC Communication PC software</td>
</tr>
<tr>
<td>DVPCEVAL</td>
<td>PCA3000 Evaluation PC software</td>
</tr>
<tr>
<td>DVCF256</td>
<td>CF-card memory 256MB</td>
</tr>
<tr>
<td>DVCF1000</td>
<td>CF-card memory 1GB</td>
</tr>
</tbody>
</table>

### West Control Solutions – International Sales and Support

**CHINA**
Danaher Setra-ICG (Tianjin Co., Ltd., No. 28 Wei 5 Road, The Micro-Electronic Industry Park TEDA, Xiqing District, Tianjin 300385)
Tel: +86 22 8398 8098 Fax: +86 22 8398 8099
Sales Hotline: 400 666 1802
e-mail: EnquiriesChina@West-CS.com

**GERMANY**
PMA Prozes- und, Maschinen- Automation GmbH, Mirastrasse 8, 7D-34123 Kassel
Tel: +49 (561) 505-1307 Fax: +49 (561) 505-1710
e-mail: EnquiriesGermany@West-CS.com

**FRANCE**
Tel: +33 (1) 77 80 90 40 Fax: +33 (1) 77 80 90 50
e-mail: EnquiriesFrance@West-CS.com

**USA**
West Control Solutions
1675 Delany Road, Gurnee, IL 60031-1282
Tel: 800 866 6659 Fax: 847 782 5223
e-mail: InquiriesUSA@West-CS.com

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