

DATAVU 6

Paperless Recorder with Touchscreen Datasheet

At a glance

The DataVU 6 paperless recorder features a resistive touchscreen and an intuitive, icon-based operation and visualization concept that makes it very easy to use.

There are different versions of the DataVU 6 available for process data recording. These range from the device version without measuring input in which up to 24 process values are read (master) or received (slave) from external systems via Modbus, through to a device version with six measuring inputs (universal analog inputs), two analog outputs, 12 digital inputs, and 12 individually switchable digital inputs/outputs. In the version with FDA-compliant data recording all the requirements are met in accordance with 21 CFR Part 11.

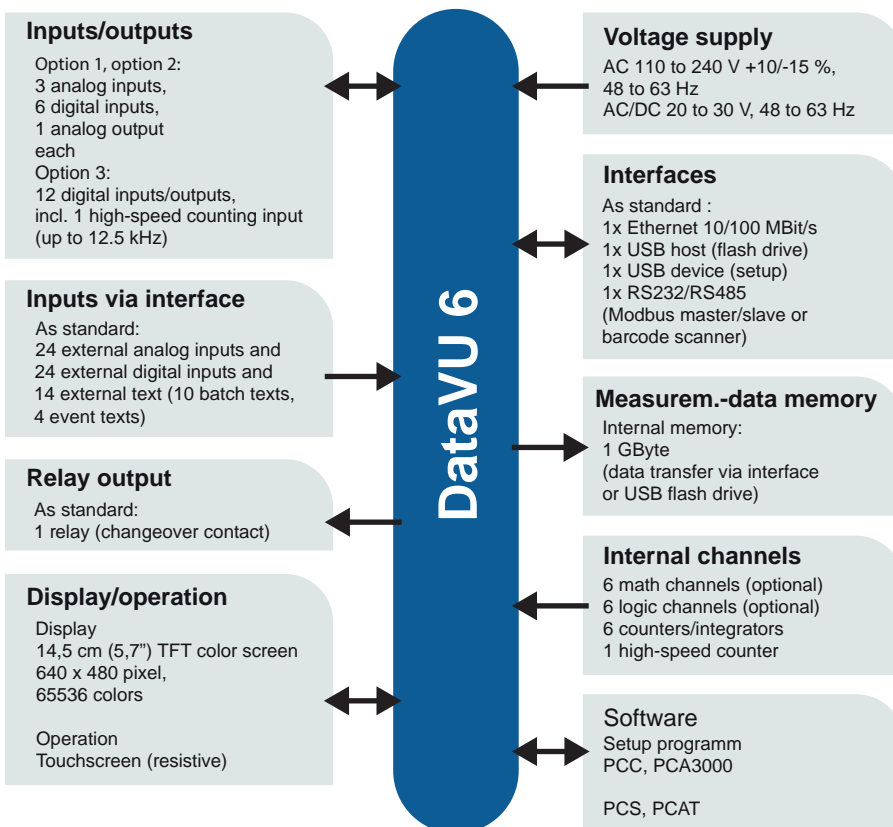
The DataVU 6 can display data using the default visualizations, such as curve diagram (vertical or horizontal), bar graph, text image (numerical), or digital diagram. For batch-related processes a special batch recording is available which allows the storage of additional information. In addition, users can create up to six individual process screens with up to 100 objects per process screen to fit their requirements using the setup program.

In addition to the setup program further powerful PC programs are available, e.g. for the evaluation of archived data and for the administration of access control.



Type 706520/ ...

Block diagram



Special features

- Intuitive touch operation
- Brilliant TFT touchscreen (640 x 480, 65536 colors)
- 1 GByte internal data memory
- Up to two analog outputs
- 24 external analog and digital channels via all interfaces (Modbus master/slave)
- Horizontal and vertical line graph
- Up to six customer-specific process screens
- Ethernet interface (standard)
- Integrated web server for online-visualization like at the device
- Batch report recording
- Batch control (start, stop, and texts) even via barcode scanner and interface
- Modbus master function (even with Modbus/TCP)
- Counters and integrators (six channels)
- Math and logic module (six channels each) as extra code
- Counter input (up to 12.5 kHz)
- Automatic data read-out via PCA Communication Software PCC
- Data recording compliant with FDA 21 CFR Part 11 (extra code)
- Manipulation detection by digital certificate (extra code)

Technical data

Analog inputs (options 1 and 2)

General information

Quantity	0, 3, or 6
Connector number (back of device)	7 to 9, 11 to 13

Thermocouples

Description	Type	Standard	ITS	Measuring range	Accuracy ^a
Fe-CuNi	"L"	DIN 43710	ITPS-68	-200 to +900 °C	≤ 0.25 %
Fe-CuNi	"J"	IEC 60584-1	ITS-90	-210 to +1200 °C	≤ 0.25 % from -100 °C
Cu-CuNi	"U"	DIN 43710	ITPS-68	-200 to +600 °C	≤ 0.25 % from -100 °C
Cu-CuNi DIN	"T"	IEC 60584-1	ITS-90	-270 to +400 °C	≤ 0.25 % from -150 °C
NiCr-Ni DIN	"K"	IEC 60584-1	ITS-90	-270 to +1372 °C	≤ 0.25 % from -80 °C
NiCr-CuNi	"E"	IEC 60584-1	ITS-90	-270 to +1000 °C	≤ 0.25 % from -80 °C
NiCrSi-NiSi	"N"	IEC 60584-1	ITS-90	-270 to +1300 °C	≤ 0.25 % from -80 °C
Pt10Rh-Pt	"S"	IEC 60584-1	ITS-90	-50 to 1768 °C	≤ 0.25 % from 20 °C
Pt13Rh-Pt	"R"	IEC 60584-1	ITS-90	-50 to 1768 °C	≤ 0.25 % from 50 °C
Pt30Rh-Pt6Rh	"B"	IEC 60584-1	ITS-90	0 to 1820 °C	≤ 0.25 % from 400 °C
W5Re/W26Re	"C"	ASTM E230M-11	ITS-90	0 to 2315 °C	≤ 0.25 % from 500 °C
W3Re/W25Re	"D"	ASTM E1751M-09	ITS-90	0 to 2315 °C	≤ 0.25 % from 500 °C
W5Re/W20Re	"A1"	GOST R 8.585-2001	ITS-90	0 to 2500 °C	≤ 0.25 % from 500 °C
Chromel-Copel	"L"	GOST R 8.585-2001	ITS-90	-200 to +800 °C	≤ 0.25 % from -80 °C
Chromel-Alumel		GOST R 8.585-2001	ITS-90	-270 to 1372 °C	≤ 0.25 % from -80 °C
Ambient temperature influence					
		≤ 100 ppm/K			
Smallest measuring span					
		Type L (Fe-CuNi), J, U, T, K, E, N, Chromel-Alumel: 100 K Type S, R, B, C, D, A1, Chromel-Copel: 500 K			
Measuring range start/end					
		Freely programmable within the limits in steps of 0.1 K			
Cold junction					
		Internal (Pt100) or external (constant)			
Reference point accuracy (internal)					
		± 1 K			
Reference point temperature (external)					
		-30 to +85 °C (adjustable)			
Sampling rate					
		3 or 6 channels: 125 ms			
Input filter					
		Digital filter, 2nd order; filter constant can be set from 0 to 100.0 s			
Galvanic isolation					
		See "Galvanic isolation"			
Base measuring range					
		20 to 70 mV			

^a The accuracy value refers to the maximum measuring range. Small measuring ranges lead to reduced linearization accuracy.

RTD temperature probe

Description	Standard	ITS	Connection type	Measuring range	Accuracy ^a	Measuring current
Pt50	IEC 751: 2008	ITS-90	2-/3-/4-wire	-200 to +850 °C	≤ 0.1 %	500 µA
Pt100	IEC 751: 2008	ITS-90	2-/3-/4-wire	-200 to +850 °C	≤ 0.1 %	500 µA
Pt500	IEC 751: 2008	ITS-90	2-/3-/4-wire	-200 to +850 °C	≤ 0.1 %	100 µA
Pt1000	IEC 751: 2008	ITS-90	2-/3-/4-wire	-200 to +850 °C	≤ 0.1 %	100 µA
Pt100	JIS 1604		2-/3-/4-wire	-200 to +650 °C	≤ 0.1 %	500 µA
Pt50	GOST 6651-2009 A.2	ITS-90	2-/3-/4-wire	-200 to +850 °C	≤ 0.1 %	500 µA
Pt100	GOST 6651-2009 A.2	ITS-90	2-/3-/4-wire	-200 to +850 °C	≤ 0.1 %	500 µA
Cu50	GOST 6651-2009 A.3	ITS-90	2-/3-/4-wire	-180 to +200 °C	≤ 0.4 %	500 µA
Cu100	GOST 6651-2009 A.3	ITS-90	2-/3-/4-wire	-180 to +200 °C	≤ 0.4 %	500 µA
Ni100	DIN 43760	ITPS-68	2-/3-/4-wire	-60 to +250 °C	≤ 0.2 %	500 µA
Ni100	GOST 6651-2009 A.5	ITPS-68	2-/3-/4-wire	-60 to +180 °C	≤ 0.2 %	500 µA
Ambient temperature influence						
		≤ 50 ppm/K				
Smallest measuring span						
		15 K				
Sensor lead wire resistance						
		Max. 10 Ω per lead for two-wire circuit Max. 30 Ω per lead for three/four-wire circuit				
Measuring range start/end						
		Freely programmable within the limits in steps of 0.1 K				
Sampling rate						
		3 or 6 channels: 125 ms				
Input filter						
		Digital filter, 2nd order; filter constant can be set from 0 to 100.0 s				
Galvanic isolation						
		See "Galvanic isolation"				

^a The accuracy value refers to the maximum measuring range. Small measuring ranges lead to reduced linearization accuracy.

Resistance transmitter and resistor/potentiometer

Description	Measuring range	Accuracy ^a	Measuring current
Resistance transmitter	0 to 4000 Ω	≤ 0.1 %	100 μA
Resistance/potentiometer	0 to 400 Ω	≤ 0.1 %	500 μA
	0 to 4000 Ω	≤ 0.1 %	100 μA
Ambient temperature influence	≤ 100 ppm/K		
Connection type	Resistance transmitter: Three-wire circuit Resistance/potentiometer: Two/three/four-wire circuit		
Smallest measuring span	60 Ω		
Sensor lead wire resistance	Max. 10 Ω per cable for two-wire and three-wire circuits		
Resistance values	Freely programmable within the limits in steps of 0.1 Ω		
Sampling rate	3 or 6 channels: 125 ms		
Input filter	Digital filter, 2nd order; filter constant can be set from 0 to 100.0 s		
Galvanic isolation	See "Galvanic isolation"		

^a The linearization accuracy value refers to the maximum measuring range. Small measuring ranges lead to reduced linearization accuracy.

Voltage, current (standard signals)

Description	Measuring range	Accuracy ^a	Input resistance or burden voltage
Voltage	0 to 70 mV	≤ 0.1 %	> 500 kΩ
	0 to 10 V	≤ 0.05 %	> 500 kΩ
	-10 to +10 V	≤ 0.05 %	> 500 kΩ
	-1 to +1 V	≤ 0.08 %	> 500 kΩ
	0 to 1 V	≤ 0.08 %	> 500 kΩ
Current	4 to 20 mA	≤ 0.1 %	< 2 V
	0 to 20 mA	≤ 0.1 %	< 2 V
Ambient temperature influence	≤ 100 ppm/K		
Smallest measuring span	Voltage: 5 mV Current: 0.5 mA		
Measuring range start/end	Voltage: Freely programmable within the limits in steps of 0.01 mV Current: Freely programmable within the limits in steps of 0.01 mA		
Deviation below/above the measuring range	According to NAMUR recommendation NE 43 (only current input 4 to 20 mA)		
Sampling rate	3 or 6 channels: 125 ms		
Input filter	Digital filter, 2nd order; filter constant can be set from 0 to 100.0 s		
Galvanic isolation	See "Galvanic isolation"		

^a The accuracy value refers to the maximum measuring range. Small measuring ranges lead to reduced linearization accuracy.

Measuring circuit monitoring

The device response in the event of a fault is configurable.

Measuring probe	Probe break	Short-circuit	Polarity
Thermocouple	is detected	is not detected	is detected in certain conditions ^a
RTD temperature probe	is detected	is detected	is not detected
Resistance transmitter	is detected	is not detected	is not detected
Resistance/potentiometer	is detected	is not detected	is not detected
Voltage 0 to 70 mV	is detected	is not detected	is detected
Voltage 0 to 10 V	is not detected	is not detected	is detected
Voltage -10 to +10 V	is not detected	is not detected	is not detected
Voltage 0 to 1 V	is detected	is not detected	is detected
Voltage -1 to +1 V	is detected	is not detected	is not detected
Current 0 to 20 mA	is not detected	is not detected	is not detected
Current 4 to 20 mA	is detected	is detected	is detected

^a dependent on the set characteristic line

Digital inputs (options 1 and 2)

Quantity	0, 6, or 12
Connector number (back of device)	6 and 10
Input	
Level	Logic level "0": < 3.5 V; logic level "1": > 10 V
Sampling rate	125 ms (max. counting frequency: 8 Hz)
Potential-free contact	R_{ON} : < 1 k Ω ; R_{OFF} : > 50 k Ω (use of the auxiliary voltage 24 V)
Auxiliary voltage	DC 24 V +10/-15 %, max. 50 mA per option

Digital inputs/outputs (option 3)

Quantity	0 or 12
Connector number (back of device)	14 and 15
Input or output	Individually configurable as input or output
Input	
Level	Logic level "0": < 3.5 V; logic level "1": > 10 V
Sampling rate	125 ms (max. counting frequency: 8 Hz)
Potential-free contact	R_{ON} : < 1 k Ω ; R_{OFF} : > 50 k Ω (use of the auxiliary voltage 24 V)
High-speed input	Input 1
Function	Counts each positive edge of the input signal
Max. counting frequency	12.5 kHz
Mark-to-space ratio	30 to 70 % (high-pulse \geq 30 μ s, low-pulse \geq 30 μ s)
Accuracy in flow measurement	0.5 % of measured value; ambient temperature influence: 50 ppm/K
Output	
Output signal	DC 0/24 V +10/-15 %; galvanically isolated
Current	Max. 40 mA per output, max. 100 mA on the whole
Auxiliary voltage	DC 24 V +10/-15 %, max. 100 mA (incl. current of digital outputs)

Analog outputs (options 1 and 2)

Quantity	0, 1, or 2
Connector number (back of device)	6 and 10
Voltage	
Output signal	DC 0 to 10 V
Load resistance	> 500 Ω
Current	
Output signal	DC 0(4) to 20 mA
Load resistance	< 450 Ω
Accuracy	0.5 %
Ambient temperature influence	150 ppm/K

Relay

Quantity	1
Connector number (back of device)	4
Relay (changeover contact)	
Switching capacity	3 A at AC 230 V, resistive load
Contact life	30,000 switching operations at rated load

Interfaces

RS232/RS485	
Quantity	1 (can be switched between RS232 and RS485)
Connector type	SUB-D 9-pin (socket)
Baud rate	9600, 19200, 38400, 115200
Data format	8/1n, 8/1e, 8/1o
Protocol	Modbus RTU as master or slave; barcode scanner
Application	Communication with Modbus master/slave, connection of a barcode scanner
External inputs	Via Modbus master/slave functionality: 24 analog and 24 digital inputs, 10 batch texts, 4 event texts
Ethernet	
Quantity	1
Connector type	RJ45 (socket)
Transfer rate	10 Mbit/s, 100 Mbit/s
Protocol	IPv4; TCP, UDP; DHCP, DNS, HTTP, SMTP, SNMP, Modbus/TCP
Application	Communication with PC (setup program, data archiving, web server), email server, SNMP server, and Modbus master/slave
External inputs	Via Modbus master/slave functionality: 24 analog and 24 digital inputs, 10 batch texts, 4 event texts
Max. cable length	100 m
USB host	
Quantity	1 (on front with cover)
Connector type	A (socket)
Standard	USB 2.0 (high speed)
Application	Exclusively for connecting a USB flash drive (FAT16/FAT32; see accessories)
Max. load current	100 mA
USB device	
Quantity	1 (on the back)
Connector type	Micro-B (socket)
Standard	USB 2.0 (high speed)
Application	To connect to a PC (setup program, PCC/PCA3000)
Max. cable length	5 m

Screen

Type	TFT color screen/touchscreen (resistive) ^a
Size	14.5 cm (5.7")
Resolution	640 × 480 pixels (VGA)
Number of colors	65536
Frame rate	60 Hz (type)
Brightness setting	Adjustable on the device
Screen saver (switch-off)	After waiting period or control signal

^a TFT color screens can have pixel errors due to technological and/or production-related reasons. Four pixel errors are deemed acceptable for this paperless recorder. They do not constitute an assertion for warranty claims.

Electrical data

Voltage supply	AC 110 to 240 V +10/-15 %, 48 to 63 Hz or AC/DC 20 to 30 V, 48 to 63 Hz (not in conjunction with extra code 970)
Electrical safety	According to DIN EN 61010-1 Overvoltage category II up to 300 V mains voltage, pollution degree 2
Protection rating	I with internal isolation from SELV
Power consumption AC 110 to 240 V AC/DC 20 to 30 V	< 45 VA < 30 VA
Data backup	Internal flash memory
Data buffering	Battery (operating life > 7 years); additionally, storage capacitor for buffering during battery change (buffer time approx. 6 minutes)
Clock	Battery-buffered real-time clock
Electrical connection	On the back via push-in spring-cage terminals
Conductor cross section Wire or strand without ferrule Strand with ferrule 2 × strand with twin ferrule with plastic collar Stripping length	At plug connector 4 and 5 (voltage supply and relay) Min. 0.2 mm ² , max. 2.5 mm ² Min. 0.25 mm ² , max. 2.5 mm ² Min. 0.5 mm ² , max. 1.5 mm ² (both strands with identical cross section) 10 mm
Conductor cross section Wire or strand without ferrule Strand with ferrule Stripping length	At plug connector 6 to 15 (inputs and outputs) Min. 0.14 mm ² , max. 1.5 mm ² Without plastic collar: min. 0.25 mm ² , max. 1.5 mm ² With plastic collar: min. 0.25 mm ² , max. 0.5 mm ² 9 mm
Voltage supply influence	< 0.1 % of the measuring range

Environmental influences

Ambient temperature range Storage Operation	-20 to +60 °C 0 to +50 °C; in conjunction with extra code 970: 0 to +40 °C
Site altitude	Up to 2000 m above sea level
Climatic environmental conditions Resistance to climatic conditions Storage Operation	According to DIN EN 60721-3 with extended temperature range ≤ 85 % rel. humidity without condensation According to class 1K2 According to class 3K3
Mechanical environmental conditions Storage Transport Operation	According to DIN EN 60721-3 According to class 1M2 According to class 2M2 According to class 3M3
Electromagnetic compatibility (EMC) Interference emission Interference immunity	According to DIN EN 61326-1 Class A – only for industrial use – Industrial requirements

Case

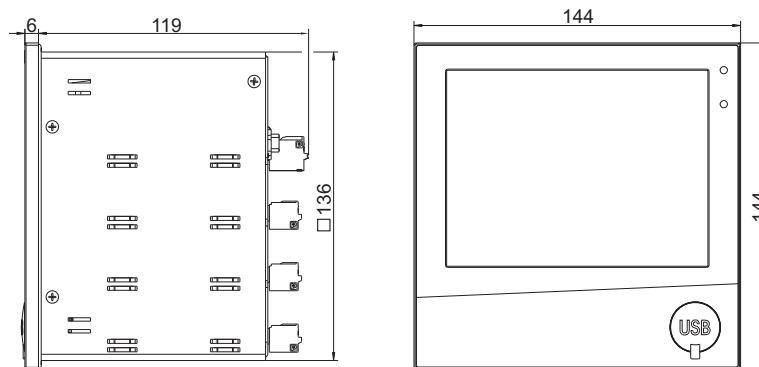
Case type	Flush-mounted case according to DIN IEC 61554 made of zinc-plated steel sheet (indoor use)
Case front	Made of diecast zinc with decor foil
Front frame dimensions	144 mm x 144 mm (front frame depth approx. 8 mm incl. seal)
Mounting depth	119 mm (incl. spring-cage terminals)
Panel cut-out	138 ^{+1.0} mm x 138 ^{+1.0} mm
Panel thickness	2 to 8 mm
Case fastening	In panel, using the four supplied mounting elements
Operating position	Any, with due consideration for the viewing angle of the screen, horizontal $\pm 50^\circ$, vertical $\pm 30^\circ$
Protection type	According to DIN EN 60529, IP65 on the front, IP20 on the back; in conjunction with extra code 970: IP20 with the carrying case open, IP20D with the carrying case closed
Weight	Max. 1.6 kg

Approvals/approval marks

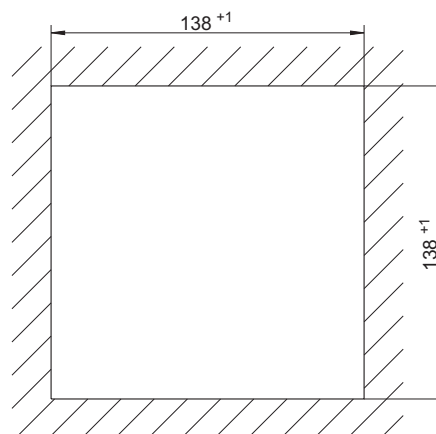
Approval mark	Testing agency	Certificates/certification numbers	Inspection basis	Valid for
c UL us	Underwriters Laboratories	E201387	UL 61010-1 (3rd Ed.), CAN/CSA-22.2 No. 61010-1 (3rd Ed.)	All types of the flush-mounted device; not in conjunction with extra code 970

Dimensions

Device



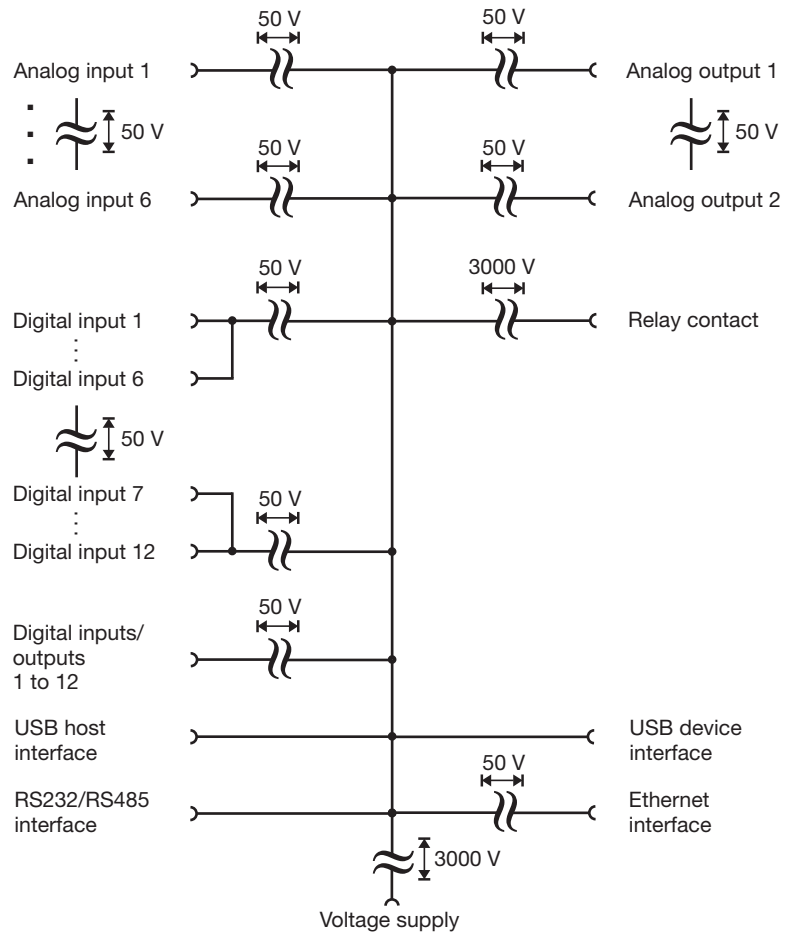
Panel cut-out



Side-by-side mounting

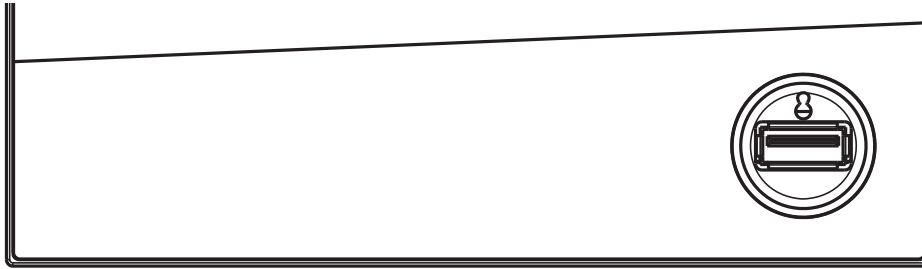
Spacing of panel cut-outs	Horizontal	Vertical
Minimum spacing	20 mm	20 mm
Recommended spacing (easier insertion of the mounting elements)	50 mm	50 mm

Galvanic isolation

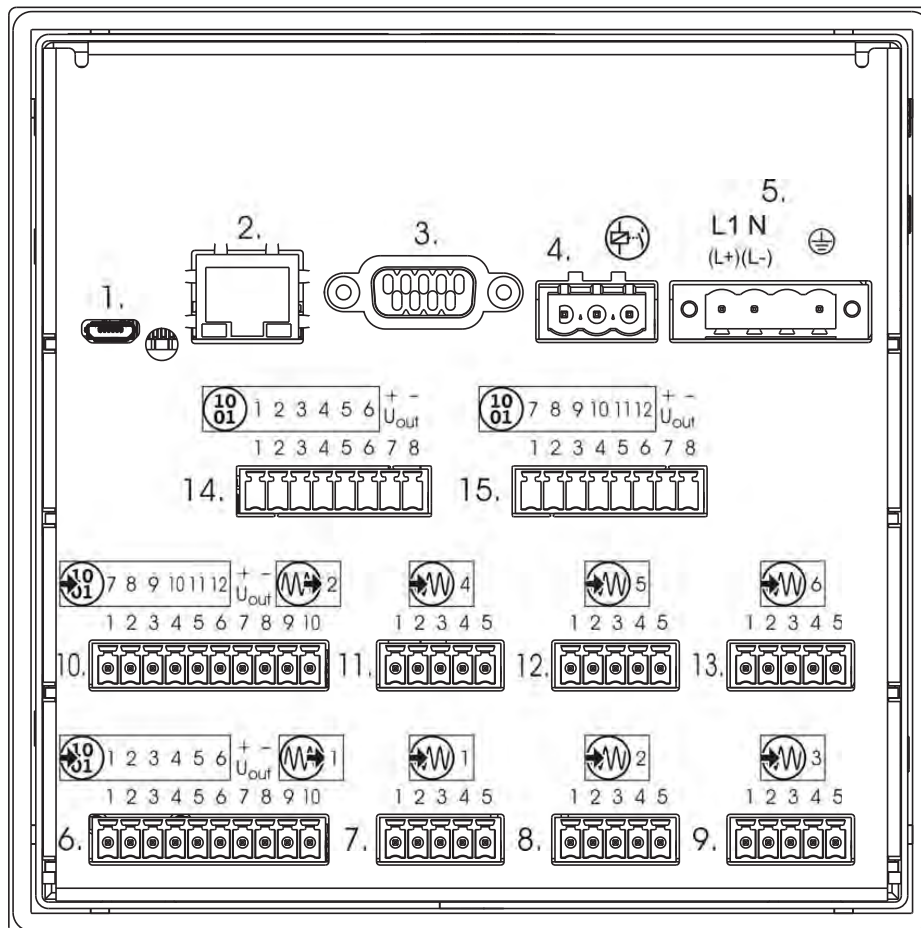


Connection elements

Front USB host interface (without cover)



Back connection elements



Connection element and assignment

1. USB device interface
3. RS232/RS485 interface
5. Voltage supply
7. Analog input 1
9. Analog input 3
11. Analog input 4
13. Analog input 6
15. Digital inputs/outputs 7 to 12

Connection element and assignment

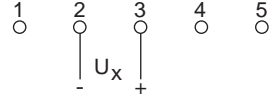
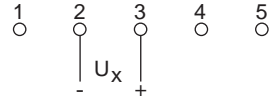
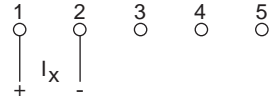
2. Ethernet interface
4. Relay
6. Digital inputs 1 to 6, analog output 1
8. Analog input 2
10. Digital inputs 7 to 12, analog output 2
12. Analog input 5
14. Digital inputs/outputs 1 to 6

Connection diagram

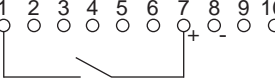
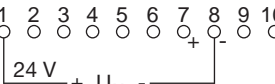
The connection diagram included in the data sheet provides initial information about the connection options. Only use the brief instructions or the operating manual for the electrical connection. The know-how and the correct technical implementation of the safety warnings/instructions contained in these documents are the prerequisite for the installation, electrical connection, and initial start as well as for the safety during operation.

Analog inputs 1 to 6 (options 1 and 2)

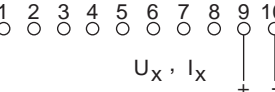
Measuring probe	Connection element / Assignment	Terminals and connection symbol
Thermocouple	7. / Analog input 1 8. / Analog input 2 9. / Analog input 3 11. / Analog input 4	
RTD temperature probe two-wire circuit	12. / Analog input 5 13. / Analog input 6	
RTD temperature probe three-wire circuit		
RTD temperature probe four-wire circuit		
Resistance transmitter		
Resistance/potentiometer two-wire circuit		
Resistance/potentiometer three-wire circuit		
Resistance/potentiometer four-wire circuit		
Voltage DC -10(0) to +10 V		

Measuring probe	Connection element / Assignment	Terminals and connection symbol
Voltage DC -1(0) to +1 V	7. / Analog input 1 8. / Analog input 2 9. / Analog input 3	
Voltage DC 0 to 70 mV	11. / Analog input 4 12. / Analog input 5 13. / Analog input 6	
Current DC 0(4) to 20 mA		

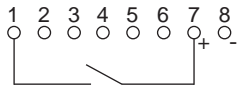
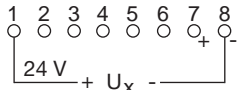
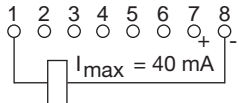
Digital inputs 1 to 12 (options 1 and 2)

Version	Connection element.Terminal / Assignment	Terminals and connection symbol
Digital input DC 0/24 V, auxiliary voltage (output) DC 24 V (50 mA, per option)	6.1 / Digital input 1 6.2 / Digital input 2 6.3 / Digital input 3 6.4 / Digital input 4 6.5 / Digital input 5 6.6 / Digital input 6 6.7 / +24 V 6.8 / GND 10.1 / Digital input 7 10.2 / Digital input 8 10.3 / Digital input 9 10.4 / Digital input 10 10.5 / Digital input 11 10.6 / Digital input 12 10.7 / +24 V 10.8 / GND	 <p>Example: potential-free contact at input 1 and +24 V (auxiliary voltage)</p>  <p>Example: external voltage at input 1 and GND</p>

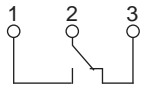
Analog outputs 1 and 2 (options 1 and 2)

Version	Connection element.Terminal / Assignment	Terminals and connection symbol
Analog output DC 0 to 10 V or DC 0(4) to 20 mA (configurable)	6.9 / Analog output 1 + 6.10 / Analog output 1 - 10.9 / Analog output 2 + 10.10 / Analog output 2 -	

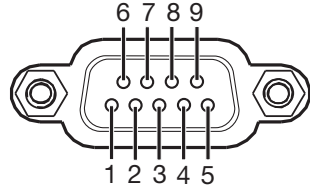
Digital inputs/outputs 1 to 12 (option 3)

Version	Connection element.Terminal / Assignment	Terminals and connection symbol
Digital input DC 0/24 V or digital output DC 0/24 V (individually switchable), auxiliary voltage (output) DC 24 V (100 mA, sum of the currents at the terminals 14.7 and 15.7)	14.1 / Digital input/output 1 14.2 / Digital input/output 2 14.3 / Digital input/output 3 14.4 / Digital input/output 4 14.5 / Digital input/output 5 14.6 / Digital input/output 6 14.7 / +24 V 14.8 / GND 15.1 / Digital input/output 7 15.2 / Digital input/output 8 15.3 / Digital input/output 9 15.4 / Digital input/output 10 15.5 / Digital input/output 11 15.6 / Digital input/output 12 15.7 / +24 V 15.8 / GND	 <p>Example: potential-free contact at input 1 and +24 V (auxiliary voltage)</p>  <p>Example: external voltage at input 1 and GND</p>  <p>Example: external relay at output 1 and GND (max. 40 mA per output, max. 100 mA on the whole)</p>
Note: Auxiliary voltage supply and digital outputs deliver together max. 100 mA at 24 V.		

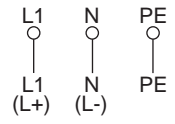
Relay

Version	Connection element.Terminal / Assignment	Terminals and connection symbol
Relay (changeover contact) (max. 3 A at AC 230 V, resistive load)	4.1 / Normally open contact (NO) 4.2 / Joint contact (C) 4.3 / Normally closed contact (NC)	

RS232/RS485 interface

Version	Connection element.Pin / Assignment	Connection element
RS232 9-pin SUB-D socket (switchable to RS485)	3.2 / RxD (received data) 3.3 / TxD (transmission data) 3.5 / GND (ground)	
RS485 9-pin SUB-D-socket (switchable to RS232)	3.3 / TxD+/RxD+ (transmission/received data +) 3.5 / GND (ground) 3.8 / TxD-/RxD- (transmission/received data -)	

Voltage supply

Version	Connection element.Terminal / Assignment	Terminals and connection symbol
AC 110 to 240 V +10/-15 %, 48 to 63 Hz or AC/DC 20 to 30 V, 48 to 63 Hz Observe order details!	5.L1 / Line conductor (for DC: positive terminal L+) 5.N / Neutral conductor (for DC: negative terminal L-) 5.PE / Protection conductor	

Ordering code

VU6 - X X - X X X - X X

Software packages

Unit without software package 0
 Setup program, USB cable, PC evaluation software 1

Setup

Factory defaults 0
 Customer specific settings 1

In- / Outputs Slot 1

None 0
 3 analog inputs, 6 digital inputs and 1 analog output 1

Option 2

0 None
 1 Math and logic module

Power supply options

0 110 - 240V AC, 48-63 Hz
 1 20 - 30V AC/DC, 48-63 Hz

In- / Outputs Slot 3

0 None
 1 12 digital inputs / outputs (individual configurable)

In- / Outputs Slot 2

0 None
 1 3 analog inputs, 6 digital inputs and 1 analog output



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