JUMO LOGOSCREEN nt Paperless Recorder with TFT display and CompactFlash card

B 70.6580.4
Installation Instructions

08.06/00453822

Contents

Contents

1.1 Preface

Please read these Operating Instructions before commissioning the instrument. Keep the manual in a place that is accessible to all users at all times.

Please assist us to improve this operating manual, where necessary.

Your comments will be appreciated.

Phone: +49 661 6003-0
Fax: +49 661 6003-607
e-mail: mail@jumo.net

If any difficulties should arise during commissioning, you are asked not to carry out any manipulations that could endanger your rights under the instrument warranty!

Please contact the nearest subsidiary or the head office in such a case.

When returning modules, assemblies or components, the regulations of EN 61340-5-1 and EN 61340-5-2 “Protection of electronic devices from electrostatic phenomena” must be observed. Use only the appropriate **ESD** packaging for transport.

Please note that we cannot accept any liability for damage caused by ESD.

ESD=electrostatic discharge

1.2 Arrangement of the documentation

The documentation for this instrument is addressed to equipment manufacturers (OEMs) and users with appropriate technical expertise. It consists of the following parts:

Instrument documentation in printed form

B 70.6580.1 Operating Instructions

The operating instructions are an extract from the operating manual and cover the basic operation of the paperless recorder.

B 70.6580.4 Installation Instructions

The installation instructions describe the installation of the recorder and the connection of the supply and signal cables. The instructions also contain a list of the technical data.

Instrument documentation in the form of PDF files

The “Instrument documentation in the form of PDF files” is on the CD that is included in the delivery.

B 70.6580.0 Operating Manual

It contains information about commissioning, operation, parameterization and configuration on the instrument.

B 70.6580.1 Operating Instructions

The operating instructions are an extract from the operating manual and cover the basic operation of the paperless recorder.

B 70.6580.2.0 Interface Description (serial interfaces)

This provides information on the communication (RS232/RS485) with supervisory systems.

Interface Description (Ethernet interface)

This provides information on the connection of a paperless recorder to a company-internal network. This description is integrated into B 70.6580.2.0.

B 70.6580.2.3 Interface Description (PROFIBUS-DP interface)

This provides information on the connection of a paperless recorder to a PROFIBUS-DP system.

B 70.6580.4 **Installation Instructions**

The installation instructions describe the installation of the recorder and the connection of the supply and signal cables. The instructions also contain a list of the technical data.

B 70.6580.6 **Setup Program**

The manual describes the function of the setup program. The setup program is available as an option.

T 70.6580 **Data Sheet**

The data sheet contains general information, the order details and the technical data.

B 70.9701.0 **PC Evaluation software (PCA3000)**

The operating manual describes the operation and the features of the PC evaluation software.

PCA3000 serves to visualize and evaluate process data (measurement data, batch data, messages ...). The process data can be read in via the CompactFlash memory card, or made available through the PCC software.

B 70.9702.0 **PCA Communications software (PCC)**

The operating manual describes the operation and the features of the PCA Communications software.

PCC is responsible for the data transfer from the recorder to a PC, or to a network.

All documents are available for downloading at www.jumo.net

1.3 Typographical conventions

Warning signs

The signs for **Danger** and **Caution** are used in this manual under the following conditions:

Danger

This symbol is used when there may be **danger to personnel** if the instructions are ignored or not followed correctly!

Caution

This symbol is used when there may be **damage to equipment or data** if the instructions are ignored or not followed correctly!

Caution

This symbol is used where special care is required when handling **components liable to damage through electrostatic discharge**.

Note signs

Note

This symbol is used when your **special attention** is drawn to a remark.

Reference

This symbol refers to **further information** in other manuals, chapters or sections.

abc[1]

Footnote

Footnotes are remarks that **refer to specific points** in the text. Footnotes consist of two parts:

A marker in the text, and the footnote text.

The markers in the text are arranged as continuous superscript numbers.

Action instruction

*

This symbol indicates that an **action to be performed** is described.

The individual steps are marked by this asterisk, e.g.

* Rotate control knob

* Press control knob

2.1 Nameplate

Identification

Position The nameplate is glued onto the paperless recorder.

Contents It contains important information, such as:

Description	Designation on the nameplate	Example
Device type	Typ	706580/18-321-33/020
Sales No.	VARTN	70/00xxxxxx
Serial No.	F-Nr	0022969000005510006
Supply voltage		110 — 240V AC +10/-15%, 48 — 63Hz

Type Please check the type supplied against your order document. Refer to Chapter 2.2 “Type designation” for identification of the type.

VARTN The Sales No. provides an unambiguous definition of an article from the catalog. It is used in communication between the sales department and the customer.

F-Nr The serial number (F-Nr.) indicates the production date (year/week). The figures concerned are in positions 12, 13, 14, 15.

Example:

F-Nr 0022969000**0551**0006

This shows that the paperless recorder was manufactured in 2005, week 51.

2 Identifying the instrument version

2.2 Type designation

	Basic type
706580/	Paperless recorder with Ethernet, Setup and RS232/RS485 interface and RS232 interface (to connect a barcode reader) and one relay

		Basic type extensions
		Software
0		No software package
1		With software package (setup program, PC Evaluation software PCA3000, PCA Communications software PCC)
		Language for instrument texts
	8	Factory setting (English/German)
	9	Set to customer specification

1	2	3	Module slots
			Slot 1 (bottom)
0			not used
2			3 analog inputs and 8 binary inputs/outputs
3			6 analog inputs
			Slot 2 (middle)
	0		not used
	2		3 analog inputs and 8 binary inputs/outputs
	3		6 analog inputs
			Slot 3 (top)
		0	not used
		1	6 relay outputs
		2	3 analog inputs and 8 binary inputs/outputs
		3	6 analog inputs

	Supply
33	100 — 240V AC +10/-15%, 48 — 63Hz
25	20—30V AC/DC, 48 — 63Hz (under development)

	Extra codes
020	Lithium battery for memory buffering
021	Storage capacitor (instead of extra code 020)
260	Math and logic module
267	Profibus-DP interface (under development)
350	Universal carrying case TG-35

706580/			-			-		/		,...[1]	(Order code)
706580/	1	8	-	3	2	1	-	33	/	020	(Order example)

1. List extra codes in sequence, separated by commas.

2.3 Standard accessories

- 1 Installation Instructions B 70.6580.4
- 1 Operating Instructions B 70.6580.1
- 4 mounting brackets
- 1 panel seal
- 1 CD with detailed operating instructions and supplementary documentation (see Chapter 1.2 “Arrangement of the documentation”)

2.4 Accessories

- Setup program
  Sales No. 70/00468991
- PC Evaluation software (PCA3000)
  Sales No. 70/00431882
- PCA Communications software (PCC)
  Sales No. 70/00431879
- PC interface with TTL/RS232 converter and adapter (socket)
  Sales No. 70/00350260
- PC interface USB/TTL converter with adapter (socket) and adapter (pins)
  Sales No. 70/00456352

2 Identifying the instrument version

3.1 Installation site and climatic conditions

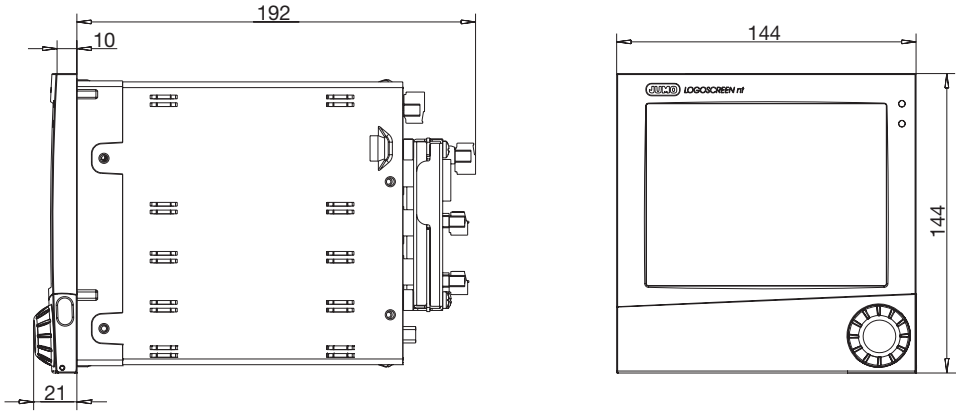
The installation site should be as free as possible from vibration. Electromagnetic fields, such as those caused by motors, transformers etc. should be avoided as far as possible.

The ambient temperature at the site can be 0 to 50 °C, at a relative humidity of ≤75 %, no condensation.

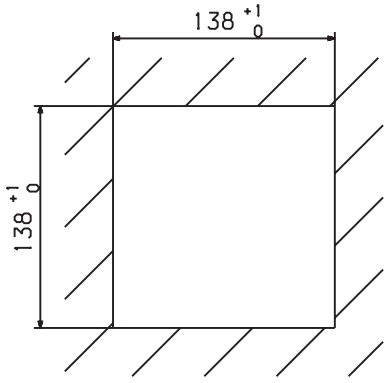
⇨ Chapter 4.1 “Installation notes”

3.2 Mounting

Views

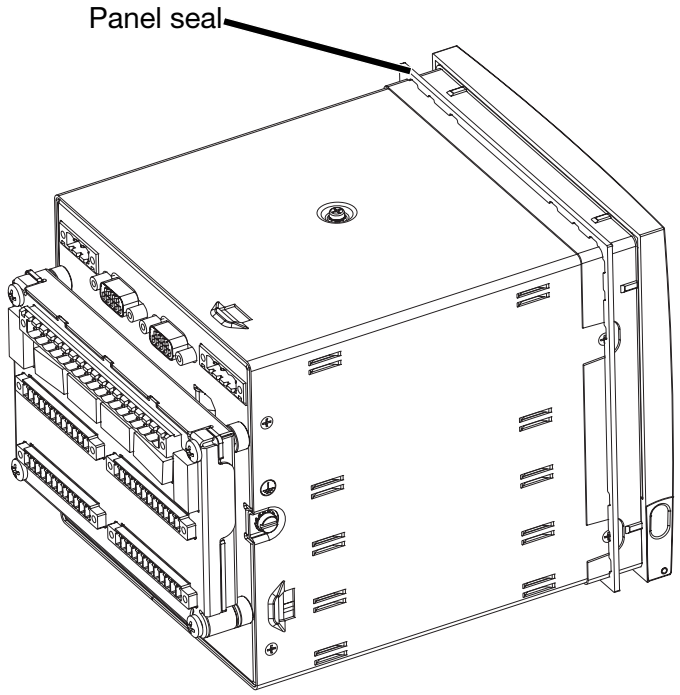


Panel cut-out

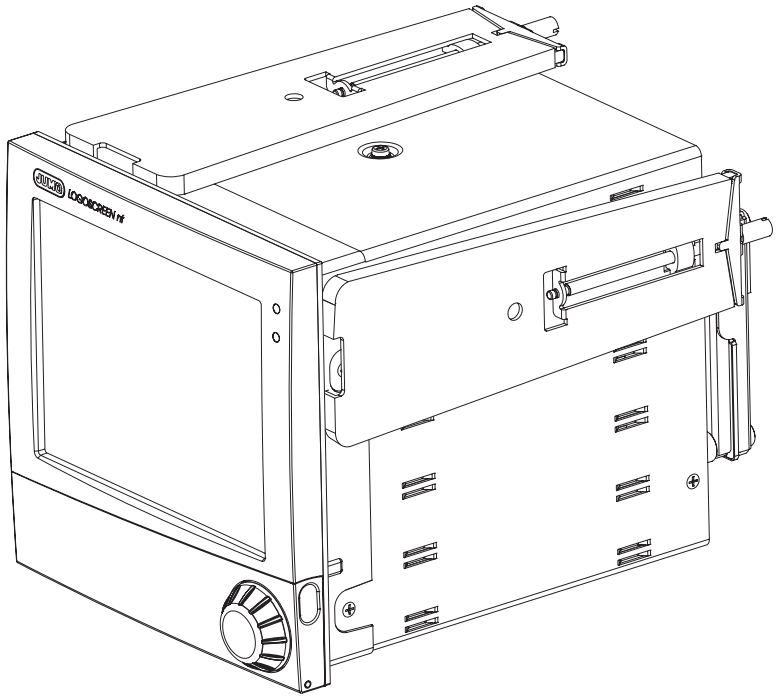


Mounting in a panel

* Fit panel seal (IP65 seal).



* Insert the paperless recorder from the front into the panel cut-out.
* From behind the panel, hook the four mounting brackets into the grooves on the sides of the housing. The flat faces of the mounting brackets must lie against the housing.
* Push the mounting brackets up against the back of the panel and tighten them evenly.



4.1 Installation notes

- The choice of cable, the installation and the electrical connection must conform to the requirements of VDE 0100 “Regulations on the Installation of Power Circuits with Nominal Voltages below 1000V” or the appropriate local regulations.
- Work inside the instrument must only be carried out to the extent described and, like the electrical connection, only by qualified personnel.
- The instrument must be disconnected on both poles from the electrical supply if contact with live parts is possible while work is carried out.
- Electromagnetic compatibility (EMC) conforms to the standards and regulations cited in the technical data.

  ⇨ Chapter 6 “Technical data”
- Run input, output and supply cables separately and not parallel to one another.
- All input and output cables without connection to the mains supply must be arranged as twisted and screened cables. Earth the screen on the instrument side to the earth potential.
- Earth the instrument at the PE terminal to the protective earth conductor. This cable must have the same cross-section as that used for the supply cables. Earthing cables must be wired in a star configuration to a common earth point that is connected to the protective earth conductor of the electrical supply. Do not loop earthing cables, i.e. do not run them from one instrument to another.
- Do not connect any additional loads to the supply terminals of the instrument.
- The device is not suitable for use in areas with an explosion hazard (**Ex** areas).
- Inductive loads close to the instrument, such as contactors or solenoid valves, should have RC modules fitted for interference suppression.
- The supply to the instrument must be provided with additional fusing. Depending on the supply voltage, the following fuse values apply:

  20 — 30V AC/DC, 48 — 63Hz : fuse 2A slow-blow

  100 — 240V AC +10/-15%, 48 — 63Hz : fuse 1.6A slow-blow

  An instrument fuse is already built into the device itself:

  20 — 30V AC/DC, 48 — 63Hz : fuse 1.6A slow-blow

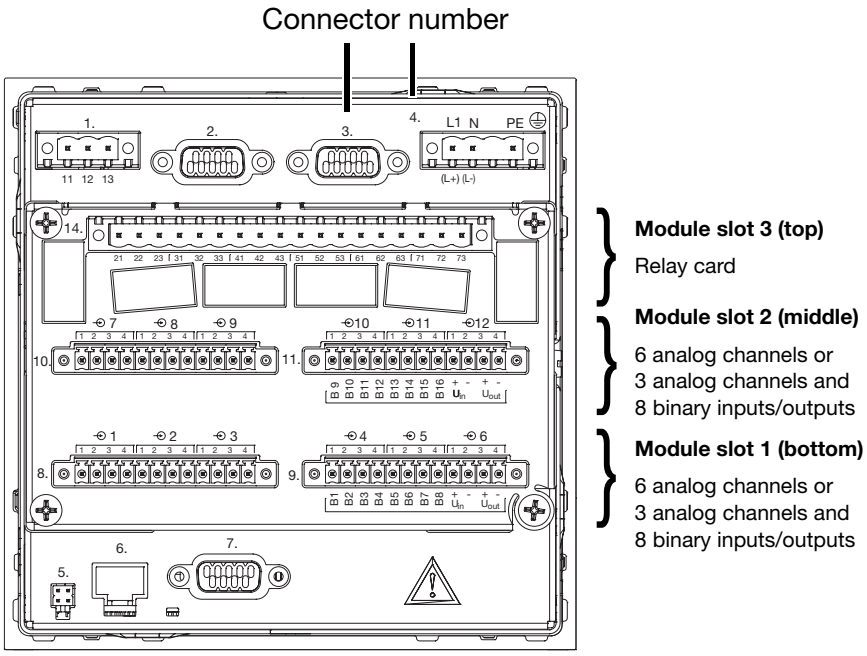
  100 — 240V AC +10/-15%, 48 — 63Hz : fuse 1.25A slow-blow

4 Electrical connection

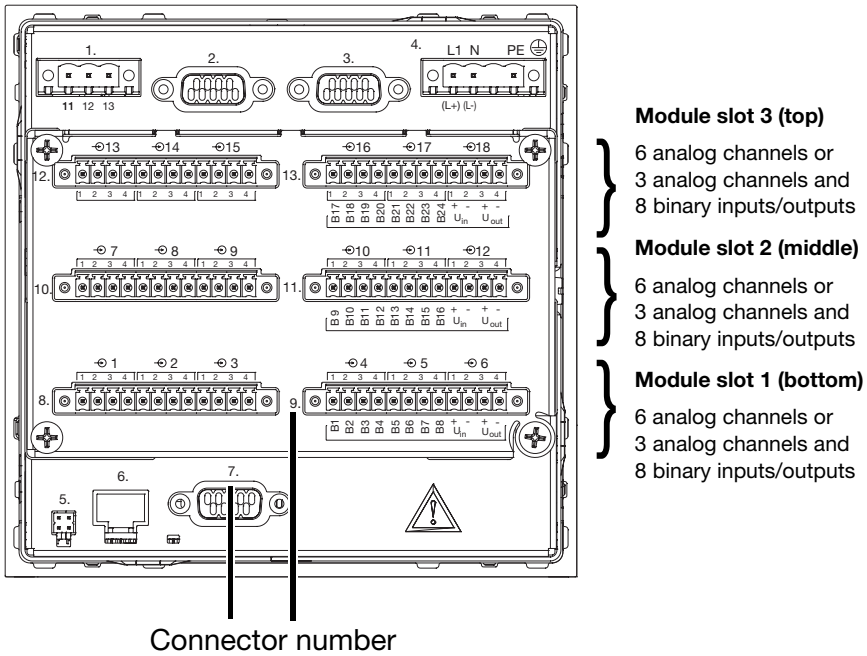
4.2 Procedure

* Make the electrical connection as per Chapter 4.4 “Connection diagram”.
* Apply strain relief for the connecting cables, if necessary.

Instrument variant 1



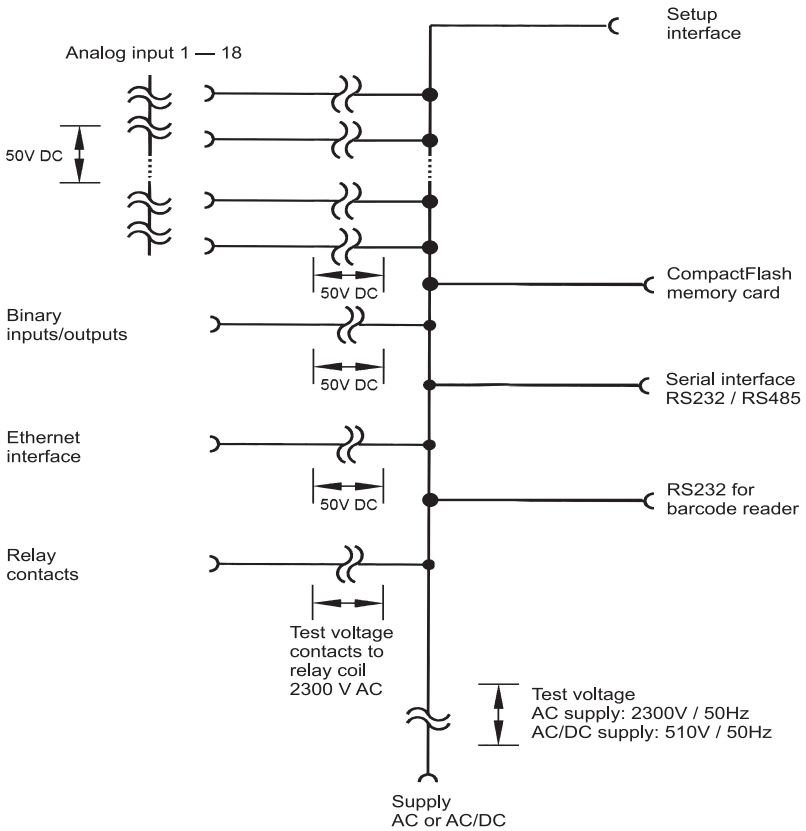
Instrument variant 2



Connector summary

Connector/slot	Function
1	Relay output
2	RS232 for barcode reader
3	PROFIBUS-DP
4	Supply voltage
5	Setup interface
6	Ethernet
7	RS232 and RS485
8	Analog input
9	Analog input or binary inputs/outputs
10	Analog input
11	Analog input or binary inputs/outputs
12	Analog input
13	Analog input or binary inputs/outputs
14	Relay card (for instrument variant 1)

4.3 Overview of the electrical isolation



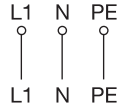
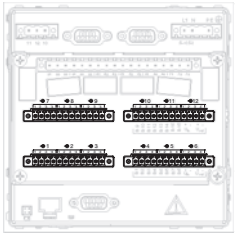
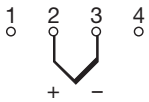
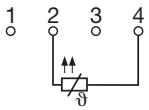
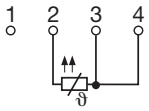
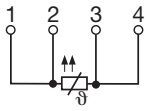
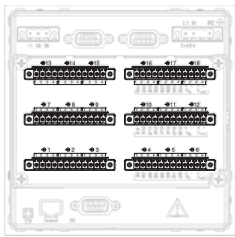
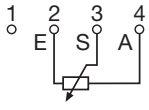
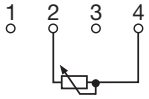
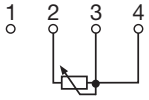
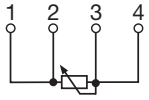
4 Electrical connection

4.4 Connection diagram

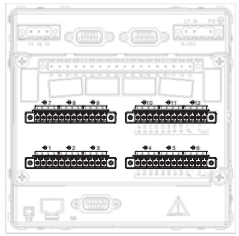
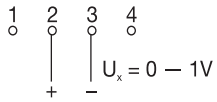
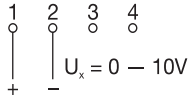
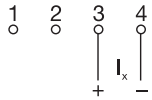
The electrical connection must only be carried out by specialist personnel.

Back panel ⇨ Chapter 4.2 “Procedure”

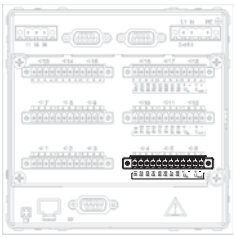
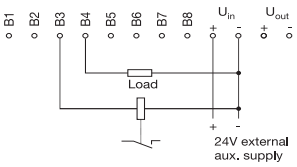
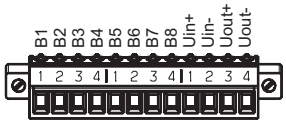
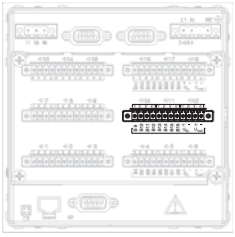
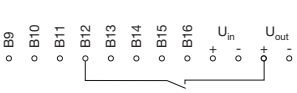
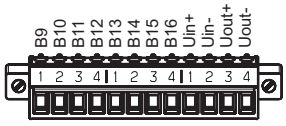
Connections

	Terminal assignment	Connector	Diagram
Supply voltage	Supply voltage as on nameplate	Connector 4 L1 (L+) N (L-) PE 	
Analog inputs	Thermocouple	Connectors 8 to 11 (input 1 — 12) for instrument variant 1 	
	RTD 2-wire circuit		
	RTD 3-wire circuit		
	RTD 4-wire circuit		
	Resistance transmitter E = end S = slider A = start	or connectors 8 to 13 (input 1 — 18) for instrument variant 2 	
	Potentiometer in 2-wire circuit		
	Potentiometer in 3-wire circuit		
	Potentiometer in 4-wire circuit		

Analog inputs

Terminal assignment	Connector	Diagram
Voltage input 0 — 1V	Connectors 8 to 11 (input 1 — 12) for instrument variant 1  or connectors 8 to 13 (input 1 — 18) for instrument variant 2 	
Voltage input 0 — 10V		
Current input		

Binary inputs/ outputs

Terminal assignment	Connector	Diagram
☞ The configuration in the instrument or in the setup program defines whether it is a binary input or binary output.		
B1 … B8 voltage-controlled LOW = -3 to +5V DC HIGH = 12 to 30V DC B1 Binary input/output 1 B2 Binary input/output 2 B3 Binary input/output 3 B4 Binary input/output 4 B5 Binary input/output 5 B6 Binary input/output 6 B7 Binary input/output 7 B8 Binary input/output 8 U_{in}+ external auxiliary supply (non-stabilized) U_{in}- ground for external auxiliary supply U_{out}+ +24V auxiliary supply U_{out}- ground for auxiliary supply	Connector 9 only for modules with 3 analog inputs 	 Example: Connecting a load to binary output 4 (B4) and a solid-state relay to binary output 3 (B3) requires an external auxiliary supply. Diagram of the connector: 
B9 … B16 voltage-controlled LOW = -3 to +5V DC HIGH = 12 to 30V DC B9 Binary input/output 9 B10 Binary input/output 10 B11 Binary input/output 11 B12 Binary input/output 12 B13 Binary input/output 13 B14 Binary input/output 14 B15 Binary input/output 15 B16 Binary input/output 16 U_{in}+ external auxiliary supply U_{in}- ground for external auxiliary supply U_{out}+ +24V auxiliary supply U_{out}- ground for auxiliary supply	11 only for modules with 3 analog inputs 	 Example: Binary input 12 (B12) is operated from the internal power supply. Diagram of the connector: 

<table>
<tr><th></th><th>Terminal assignment</th><th>Connector</th><th>Diagram</th></tr>
<tr><td>Binärein-/
-ausgänge</td><td>B17 … B24

voltage-controlled
LOW = -3 to +5V DC
HIGH = 12 to 30V DC

B17 Binary input/output 17
B18 Binary input/output 18
B19 Binary input/output 19
B20 Binary input/output 20
B21 Binary input/output 21
B22 Binary input/output 22
B23 Binary input/output 23
B24 Binary input/output 24

U_{in}+ external auxiliary supply
U_{in}- ground for external auxiliary supply
U_{out}+ +24V auxiliary supply
U_{out}- ground for auxiliary supply</td><td>Connector 13

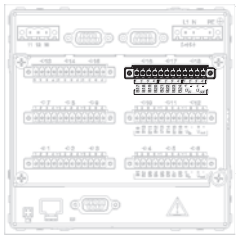
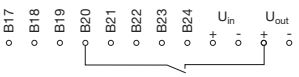
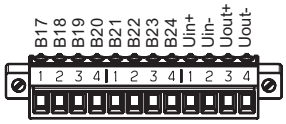
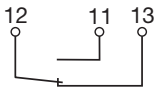
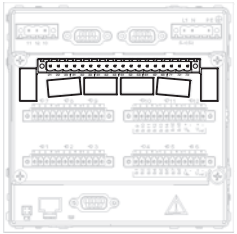
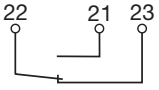
only for instrument variant 2 and on modules with 3 analog inputs
  </td><td> 
Example:
Binary input 20 (B20) is operated from the internal power supply.

Diagram of the connector:
  </td></tr>
<tr><td>Relay outputs</td><td>Relay 1 - alarm
changeover (SPDT)</td><td>Connector 1
  </td><td>  </td></tr>
<tr><td></td><td>Relay 2
changeover (SPDT)</td><td rowspan="6">Connector 14

only for instrument variant 1
  </td><td>  </td></tr>
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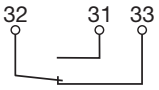
changeover (SPDT)</td><td>  </td></tr>
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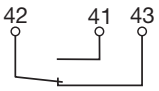
changeover (SPDT)</td><td>  </td></tr>
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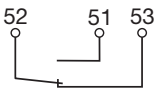
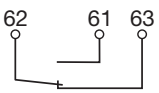
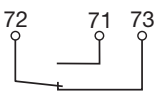
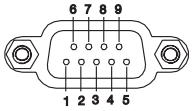
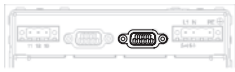
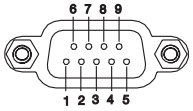
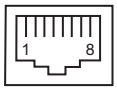
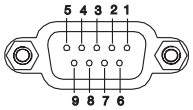
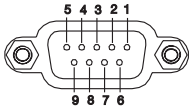
changeover (SPDT)</td><td>  </td></tr>
<tr><td></td><td>Relay 6
changeover (SPDT)</td><td>  </td></tr>
<tr><td></td><td>Relay 7
changeover (SPDT)</td><td>  </td></tr>
</table>

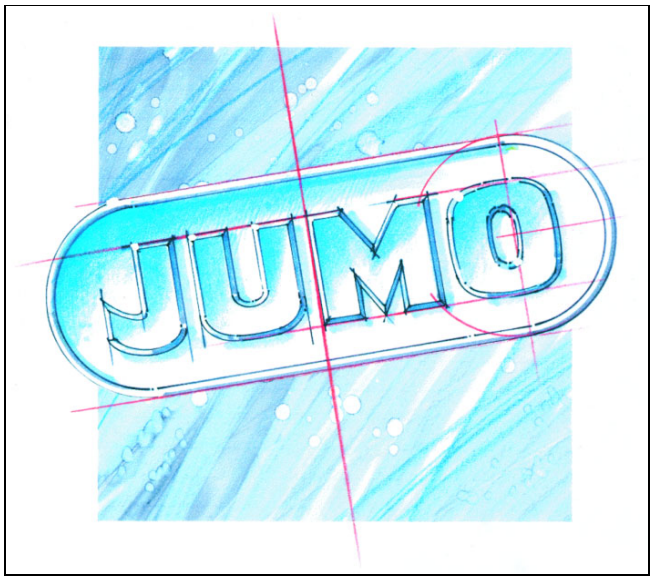
4 Electrical connection

Interfaces

Terminal assignment	Connector	Diagram
RS232C for barcode reader 9-pin SUB-D socket connector 2 RxD receive data 3 TxD transmit data 5 GND ground	Connector 2 	
PROFIBUS-DP 9-pin SUB-D socket connector (extra code) 3 RxD/TxD-P B conductor Receive/transmit data positive 5 DGND Data transmission ground 6 VP supply voltage positive 8 RxD/TxD-N A conductor Receive/transmit data negative	Connector 3 	
Setup interface The recorder also has a setup interface on the front panel, connected in parallel. The two interfaces cannot both be operated at the same time.	Connector 5 	
Ethernet RJ45 socket connector 1 TX+ transmit data + 2 TX- transmit data - 3 RX+ receive data + 6 RX+ receive data -	Connector 6 	
RS232C 9-pin SUB-D socket connector (switchable to RS485) 2 RxD receive data 3 TxD transmit data 5 GND ground	Connector 7 	
RS485 9-pin SUB-D socket connector (switchable to RS232) 3 TxD+/RxD+ Transmit/receive data + 5 GND ground 8 TxD-/RxD- Transmit/receive data -	Connector 7 	

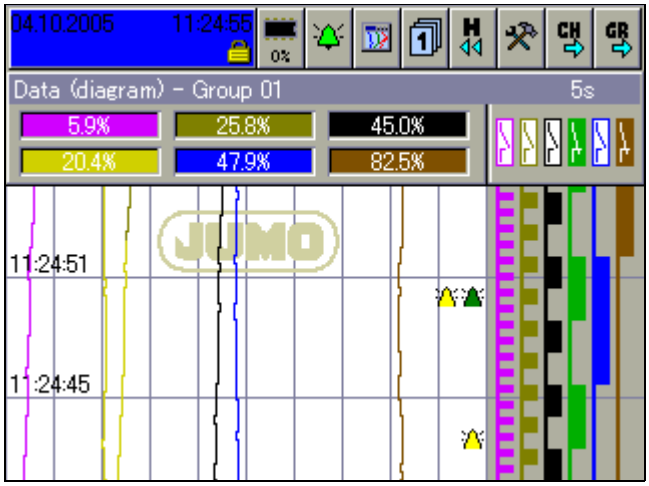
After the paperless recorder has been installed and wired up, it can be commissioned. After applying or switching on the supply voltage, the start-up screen will appear for a short time.

Start-up screen



The visualization will start automatically after the initialization phase.

Visualization



The paperless recorder is now in the recording phase.

Further steps

The recorder can be configured by an authorized person, either by using the control knob (rotating and pressing) or with the help of the PC setup program.

Further information about configuration can be found in the Operating Manual B 70.6580.0.

Finally, make another check that the connection, configuration and function of the recorder are all correct.

5 Functional test

Analog inputs

Thermocouple

Designation	Type	Standard	Meas. range	Accuracy[1]
Fe-Con	L	DIN 43 710	-200 to +900°C	±0.1 %
Fe-Con	J	EN 60 584	-200 to +1200°C	±0.1% from -100°C
Cu-Con	U	DIN 43 710	-200 to +600°C	±0.1 % from -150°C
Cu-Con	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-Con	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	±0.15%
Pt13Rh-Pt	R	EN 60 584	0 to 1768°C	±0.15%
Pt30Rh-Pt6Rh	B	EN 60 584	0 to 1820°C	±0.15% from 400°C
W3Re/W25Re	D		0 to 2495°C	±0.15% from 500°C
W5Re/W26Re	C		0 to 2320°C	±0.15% from 500°C
W3Re/W26Re			0 to 2400°C	±0.15% from 500°C
Chromel-alumel	GOST R 8.585-2001		-200 to +1372°C	±0.1 % from -80°C
Chromel-copel	GOST R 8.585-2001		-200 to +800°C	±0.15 % from -80°C
PLII (Platinel II)			0 to 1395°C	±0.15 %
Shortest span			Type L, J, U, T, K, E, N, chromel-alumel, PLII: 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: 125msec in total	
Input filter			2nd order digital filter; filter constant adjustable from 0 to 10.0sec	
Electrical isolation			see “Electrical data” on page 5 and “Overview of the electrical isolation” on page 15	
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 thermometers

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	≈ 250µA ≈ 250µA ≈ 250µA
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	≈ 250µA ≈ 250µA ≈ 250µA
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	≈ 250µA ≈ 250µA
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	≈ 100µA ≈ 100µA
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	≈ 100µA ≈ 100µA ≈ 100µA
Ni 100	DIN 43 760 (TC = $6.18*10^{-3}$ 1/°C)	2/3-wire, 4-wire	-60 to +180°C	±0.4°C	≈ 250µA
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	≈ 250µA ≈ 250µA ≈ 250µA ≈ 250µA
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	≈ 250µA ≈ 250µA ≈ 250µA ≈ 250µA

6 Technical data

Designation	Standard	Connection circuit	Meas. range	Accuracy[1]	Meas. curr.
Cu 100	GOST 6651-94 A.1 (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	≈ 250µA ≈ 250µA ≈ 250µA ≈ 250µA
Connection circuit		2-, 3-, or 4-wire circuit			
Shortest span		15°C			
Sensor lead resistance		max. 30Ω per conductor for 3-wire/4-wire circuit max. 10Ω per conductor for 2-wire circuit			
Range start/end		freely programmable within the limits in 0.1°C steps			
Sampling cycle		channel 1 — 18: 125msec in total			
Input filter		2nd order digital filter; filter constant adjustable from 0 to 10sec			
Electrical isolation		see “Electrical data” on page 5 and “Overview of the electrical isolation” on page 15			
Resolution		> 14bit			
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]	Measuring current
Resistance transmitter	up to 4000Ω	±4Ω	≈ 100µA
Potentiometer	< 400Ω ≥ 400Ω to 4000Ω	±400 mΩ ±4Ω	≈ 100µA ≈ 250µA
Connection circuit	resistance transmitter: 3-wire circuit potentiometer: 2-/3-/4-wire circuit		
Shortest span	60Ω		
Sensor lead resistance	max. 30Ω per conductor for 4-wire circuit max. 10Ω per conductor for 2-/3-wire circuit		
Resistance values	freely programmable within the limits, in 0.1Ω steps		
Sampling cycle	channel 1 — 18: 125msec in total		
Input filter	2nd order digital filter; filter constant adjustable from 0 to 10.0sec		
Electrical isolation	see “Electrical data” on page 5 and “Overview of the electrical isolation” on page 15		
Resolution	> 14bit		

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 +112mV	±100µV	R_{IN} ≥ 1 MΩ
-10 to +210mV	±240µV	R_{IN} ≥ 470 kΩ
-1.5 to +11.5V	±6mV	R_{IN} ≥ 470 kΩ
-0.12 to +1.12V	±1mV	R_{IN} ≥ 470 kΩ
-1.2 to +1.2V	±2mV	R_{IN} ≥ 470 kΩ
-11 to +12V	±12mV	R_{IN} ≥ 470 kΩ
Shortest span	5mV	
Range start/end	freely programmable within the limits in 0.01 mV steps	
-1.3 to +22mA	±20µA	burden voltage ≤ 3V
-22 to +22mA	±44µA	burden voltage ≤ 3V
Shortest span	0.5mA	
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: 125msec in total	
Input filter	2nd order digital filter; filter constant adjustable from 0 to 10.0sec	
Electrical isolation	see “Electrical data” on page 5 and “Overview of the electrical isolation” on page 15	
Resolution	> 14bit	

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 ≤ ± 210mV	not detected	detected
Voltage > ± 210mV	not detected	not detected
Current	not detected	not detected

1. Programmable reaction of device, e.g. triggering alarm

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. 25Hz, max. 32V
Input	
- level	logic “0”: -3 to +5V (input current max. ±1mA), logic “1”: 12 — 30V (2.5mA ≤ input current ≤ 5mA)
- pulse width	min. 300msec
- sampling cycle (for recording)	1Hz
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
- pulse width	min. 300µs
- sampling cycle	10kHz
Output	
- type	open-collector output, switches relative to positive voltage
- level	logic “0”: transistor is inhibited (max. permissible voltage across switching transistor ≤ 30V, max. leakage current 0.1 mA) logic “1”: transistor is switched on (max. voltage across switching transistor ≤1.6V, max. current 50mA)
- sampling cycle	at least 1sec (1Hz)

Outputs

1 relay (ex-factory)	changeover (SPDT), 3A, 230V AC[1]
6 relays (option)	changeover (SPDT), 3A, 230V 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/salve 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/salve function, 24 analog and 24 binary
Ethernet (connector 6)	
- quantity	max. 1
- protocols	TCP, IP, HTTP, DHCP, SMTP, MODbusTCP
- baud rate	10Mbits/sec, 100Mbits/sec
- connector	RJ45
- data format	HTML

Screen

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

6 Technical data

Electrical data

Supply voltage (switch-mode PSU)	100 — 240V AC +10/-15%, 48 — 63Hz or 20 — 30V AC/DC, 48 — 63Hz
Electrical safety Protection class I Test voltages (type test) - mains supply circuit to measuring 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: 2.3kV/50Hz, 1min, with AC/DC supply: 510V/50Hz, 1min with AC supply: 2.3kV/50Hz, 1min, with AC/DC supply: 510V/50Hz, 1min 500V/50Hz, 1min up to 30V AC and 50V DC
Supply voltage error	< 0.1% of range span
Power consumption	approx. 30VA
Data backup	CompactFlash memory card
Electrical connection - mains supply and relays - analog and binary inputs	 at rear through pluggable screw terminals, 5.08mm raster, max. conductor cross-section ≤ 2.5mm^2 or 2x 1.5mm^2 with ferrules or at rear through pluggable and screwable terminal blocks (on request) at rear through pluggable screw terminals, 3.81mm raster, max. conductor cross-section ≤ 1.5mm^2 or at rear through pluggable and screwable terminal blocks (on request)

Environmental influences

Ambient temperature range	0 to +50°C
Ambient temperature effect	0.03%/°C
Storage temperature range	-20 to +60°C
Climatic conditions	≤ 75% relative humidity, no condensation
EMC - interference emission - immunity to interference	EN 61 326 Class A to industrial requirements

Housing

Housing front	zinc die-casting, optionally in stainless steel
Housing type	housing for flush-panel mounting to DIN 43 700, in stainless steel
Bezel size	144mm x 144mm
Depth behind panel	192mm (incl. terminals)
Panel cut-out	$138^{+1.0}$mm x $138^{+1.0}$mm
Panel thickness	2 — 40mm
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. 4kg

A

B

C

D

E

F

I

M

N

P

R

S

T

V

W

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