JUMO thermoCOR

Portable measuring system for AMS2750 and CQI-9

Operating Manual

JUMO

98705000T90Z001K000

V2.00/EN/00696071

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Warning symbols

DANGER!

This symbol indicates that **personal injury from electrocution** may occur if the appropriate precautionary measures are not taken.

Note symbols

NOTE!

This symbol refers to **important information** about the product, its handling, or additional benefits.

READ THE DOCUMENTATION!

This symbol, which is attached to the device, indicates that the associated **documentation for the device** must be **observed**. This is necessary to identify the nature of the potential hazard, and to take measures to prevent it.

2 Introduction

2.1 Intended use

The described device is designed for SAT and TUS tests in an industrial environment as specified in the technical data. Other uses beyond those defined are not viewed as intended uses. The device has been manufactured in compliance with applicable standards and directives as well as the applicable safety regulations. Nevertheless, improper use may lead to personal injury or material damage.

To avoid danger, only use the device:

- For the intended use
- When in good order and condition
- When taking the technical documentation provided into account

Risks resulting from the application may arise, e.g. as the result of missing safety provisions or wrong settings, even when the device is used properly and as intended.

DANGER!

The device is operated at a mains voltage up to 240 V.

This poses the risk of electrocution.

▶ Do not open the device. Only use the supplied power supply cable.

2.2 Qualification of personnel

This document contains the necessary information for the intended use of the device to which it relates.

It is intended for staff with technical qualifications who have been specially trained and have the appropriate knowledge in the field of measurement technology.

The appropriate level of knowledge and the technically fault-free implementation of the safety information and warnings contained in the technical documentation provided are prerequisites for risk-free mounting, installation, and startup as well as for ensuring safety when operating the described modules. Only qualified personnel have the required technical knowledge to correctly interpret and implement the safety information and warnings contained in this document in specific situations.

2.3 Acceptance of goods, storage, and transport

2.3.1 Checking the delivery

- Ensure that the packaging and its contents are undamaged
- Check the delivery for completeness against the packing slip and order details
- Inform the supplier immediately if there is any damage
- Store damaged parts until clarification is received from the supplier

2.3.2 Important information about storage and transport

- Store the device in a dry, clean environment, observe the admissible environmental influences (see "Technical data")
- Protect the device from shock during transport
- The original packaging offers optimal protection for storage and transport

2.3.3 Returning goods

In the event of repair, return the complete device in clean condition.

Use the original packaging to return goods.

2.4 Identifying the device version

2.4.1 Nameplate

2.4.2 Order details

	(1)	Basic type
987050		1 measuring system with 12 thermocouple inputs, 4 universal analog inputs, USB host interface, LAN interface, system bus interface
	(2)	**Version**
8		Standard with default settings
9		Customer-specific configuration (specifications in plain text)
	(3)	**National language**
1		German (default setting)
2		English (default setting)
	(4)	**Voltage supply**
33		AC 100 to 240 V +10/-15 %, 48 to 63 Hz

	(1)		(2)	(3)		(4)
Order code		/			-	
Order example	987050	/	8	1	-	33

2.4.3 Scope of delivery

1 measuring system in the ordered version
1 operating manual
1 DAkkS calibration certificate
1 mains connection cable, length 3 m
1 trolley

2.4.4 Accessories

Description	Part no.
PCA3000/PCC JUMO software package (for evaluation of the measuring values and for creating test reports)	00431884
USB 2.0 flash drive (2 GB)[a]	00505592
Introduction package 1 (renting possible between two weeks and three months, independent execution of all tests by the customer)	00695210
Introduction package 2 (renting for one month, one day support by a JUMO employee; plus travel expenses, overnight stay, and materials)[b]	00691237
Maintenance package for 12 months (recalibration, firmware update, functional tests, loan device for the duration of the maintenance, phone support)	00691238
Comprehensive carefree package: The tests and all related tasks up to the creation of the test reports are carried out by JUMO for the customer.	00695628

[a] The USB flash drive indicated has been tested and is designed for industrial applications. No liability is assumed for other brands.

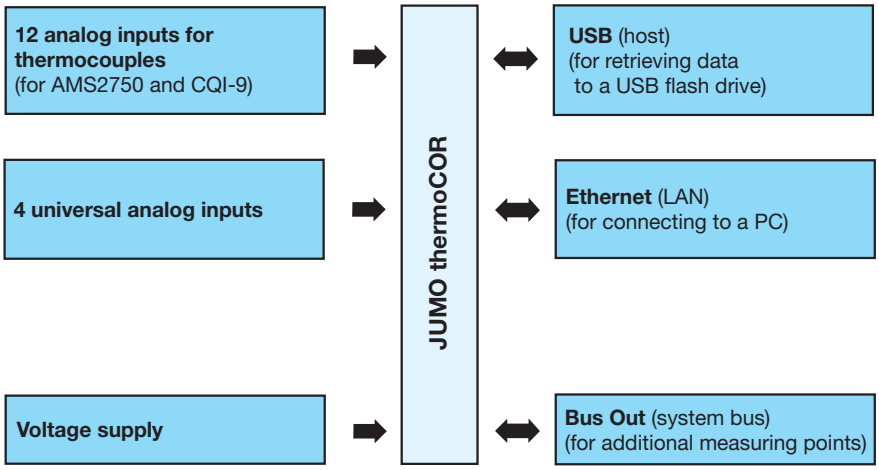
[b] The package can only be ordered once per customer.

3.1 Brief description

The JUMO thermoCOR is a high-precision documenting test device with 12 analog inputs for thermocouples. The use of a specifically-designed integrated cold junction allows the device to meet the accuracy requirements of AMS2750 and CQI-9. It also has four universal analog inputs for connecting additional sensors such as RTD temperature probes. The JUMO thermoCOR's main benefits are the wide range of application possibilities and ease of operation. This is achieved by a large color touchscreen. The technology, housed in a robust case, makes JUMO thermoCOR the ideal test device.

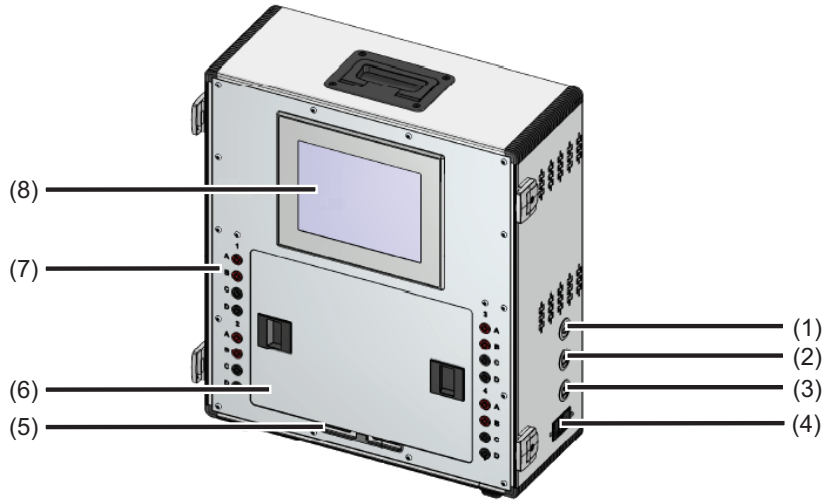
In addition, the JUMO thermoCOR communicates with the JUMO PCC/PCA3000 software, thus enabling paperless documentation of the calibration processes and integration with calibration management.

3.2 Block diagram

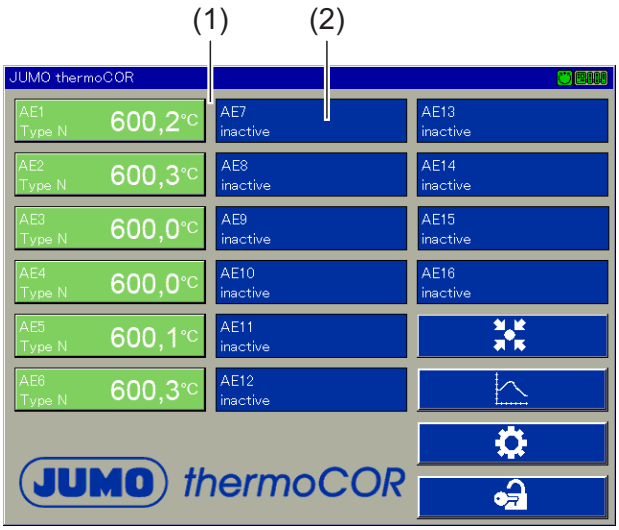


3 Description

3.3 Display, operating, and connection elements



(1) LAN interface (Ethernet)
(2) Bus Out (system bus)
(3) USB host interface
(4) Mains connector incl. switch and fuse
(5) Cable passage for thermal cables
(6) Connecting panel (thermocouple inputs 1 to 12)[1]
(7) Sockets for connecting further sensors (universal analog inputs 13 to 16)
(8) Multifunction panel screen (TFT touchscreen)

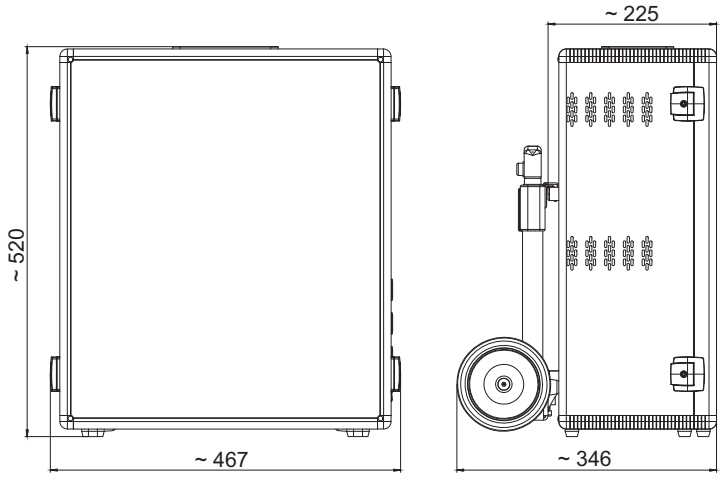


(1) TFT-touchscreen
(2) Button

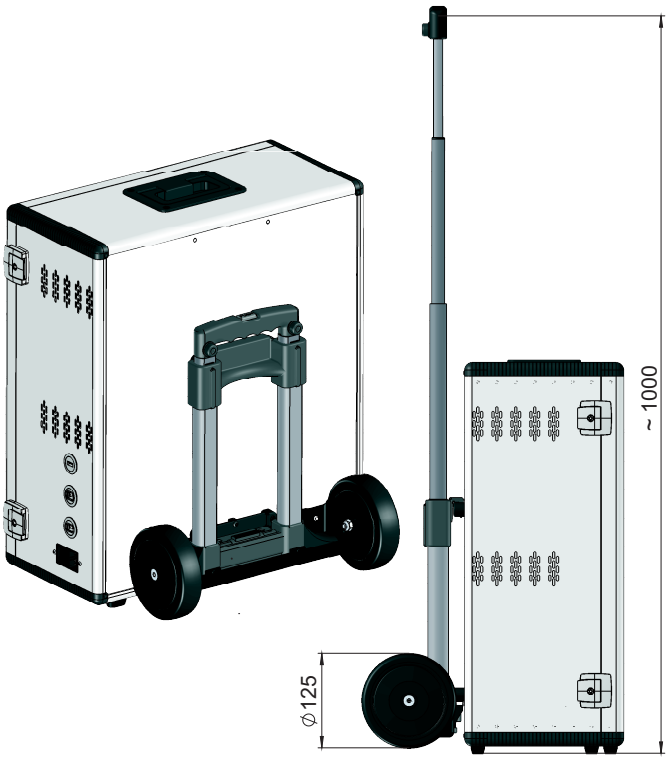
[1] The cover must be closed during operation.

3.4 Dimensions

Case with removable trolley



Trolley with handle extended



4 Electrical connection

4.1 Connection instructions

DANGER!

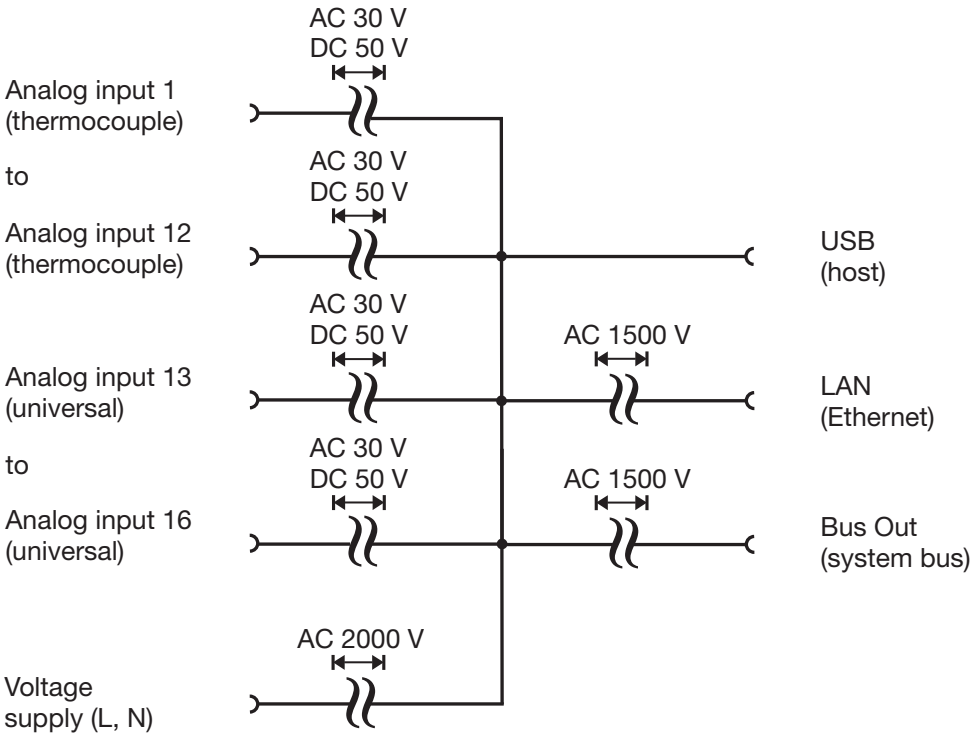
The device is operated at a mains voltage up to 240 V.

This poses the risk of electrocution.

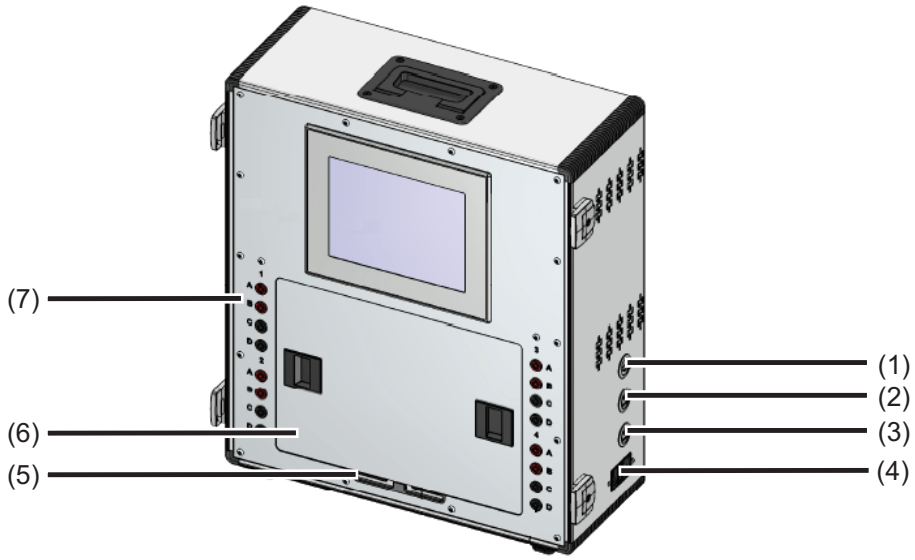
▶ Do not open the device. Only use the supplied power supply cable.

- The connection of the probe lines must only be carried out by qualified personnel.
- Before connecting the probe lines, it must be ensured that the acting person is electrostatically discharged (by touching grounded metallic parts, for example).
- The device is not suitable for use in potentially explosive areas.
- The device is equipped with interchangeable safety fuses (see technical data). Any faulty fuses must be replaced with the same type of fuse. Disconnect all poles of the device from the mains voltage beforehand (remove the mains plug)!
- The removable mains cable must not be replaced with an insufficiently dimensioned cable.

4.2 Galvanic isolation



4.3 Connection elements



(1) LAN interface (Ethernet)
(2) Bus Out (system bus)
(3) USB host interface
(4) Mains connector incl. switch and fuses
(5) Cable passage for thermal cables
(6) Connecting panel (thermocouple inputs 1 to 12)[1]
(7) Sockets for connecting further sensors (universal analog inputs 13 to 16)

Connecting panel without a cover:

[1] The cover must be closed during operation.

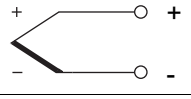
4 Electrical connection

4.4 Connection diagram

4.4.1 Analog inputs

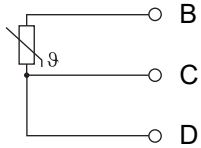
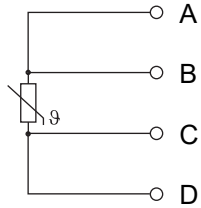
Inputs 1 to 12

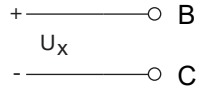
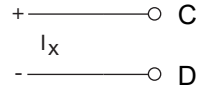
Only thermocouples can be connected to inputs 1 to 12.

Thermocouple	Symbol and terminal designation
Types: See technical data	

Inputs 13 to 16

RTD temperature probes (Pt100) and standard signals can be connected to inputs 13 to 16.

RTD temperature probe	Symbol and terminal designation
Pt100, three-wire circuit	
Pt100, four-wire circuit	

Standard signal	Symbol and terminal designation
Voltage DC 0(2) to 10 V	
Voltage DC 0 to 1 V	
Current DC 0(4) to 20 mA	

5.1 Operating concept

NOTE!

After being switched on, the requires need to 20 minutes to initialize and warm up. Only after this period is the overview screen displayed.

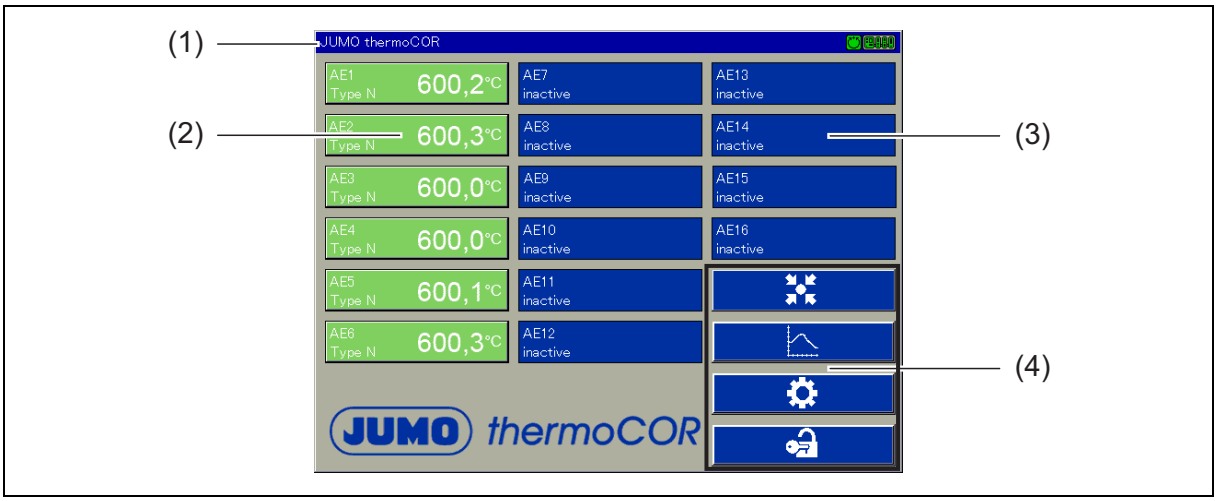
The device is operated by touching the screen (TFT-touchscreen).

The overview screen (process screen) appears after the initialization and warm-up phase. This shows the active and inactive analog inputs. The colored areas are also active buttons that can be used to configure the respective input.

The additional functions can also be called up via buttons that are labeled with corresponding symbols.

The status and title line at the top edge of the screen include additional information about the status of the device. The device name or the title of the respective operator screen and, as applicable, alarm messages are also displayed.

In the event of an alarm, an additional button is shown that can be used to acknowledge the alarm.



(1) Status and title line
(2) Active analog input (green)
(3) Inactive analog input (blue)
(4) Other functions

NOTE!

The buttons of the overview screen must be touched for at least 1 second to invoke a reaction.

NOTE!

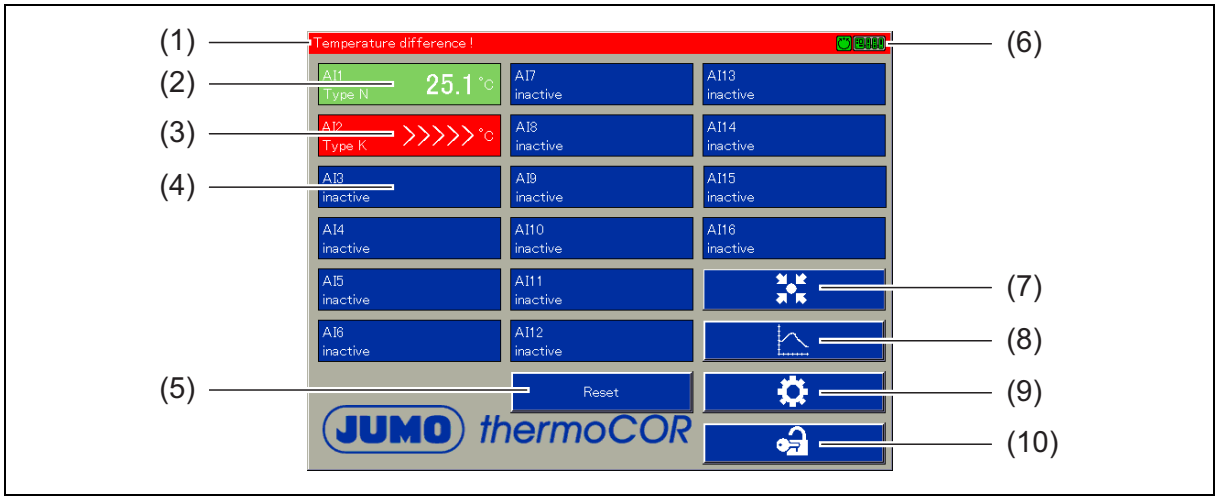
Do not use any objects that are sharp or have sharp edges, otherwise the screen may be scratched.

5 Operation

5.2 Operation and configuration

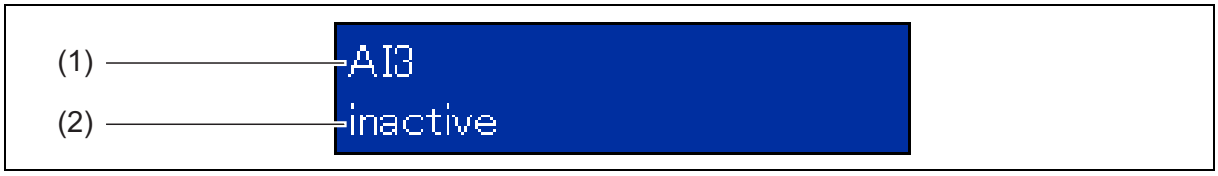
5.2.1 Overview

Overview screen



(1) Alarm (temperature difference exceeded)
(2) Active input (with designation, sensor type, and measured value)
(3) Active input with error
(4) Inactive input
(5) Acknowledge alarm
(6) Status display
(7) Call up menu for batch recording
(8) Call up curve image
(9) Call up settings menu
(10) Call up menu for user log-in

Inactive input (blue)



(1) Name (brief description) of the input
(2) Status: inactive (not configured)

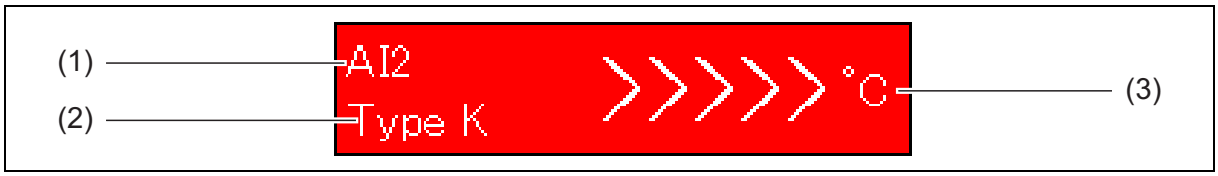
Activate input Touch button to open the settings menu for the input (previous user log-in may be necessary).

Active input (green)

(1) Name (brief description) of the input
(2) Linearization (sensor type)
(3) Current temperature of the input

Change configuration or de-activate input Touch button to open the settings menu for the input (previous user log-in may be necessary).

Active input with error (red)

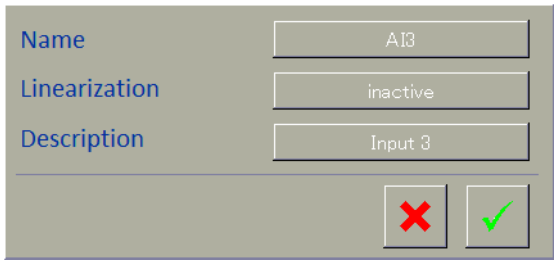


(1) Name (brief description) of the input
(2) Linearization (sensor type)
(3) Error (here: measuring range overflow)

5.2.2 Thermocouple inputs

Activate input

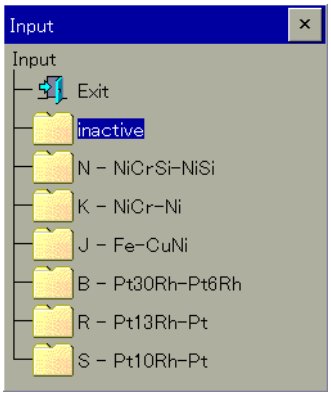
	Touch the button on the overview screen to open the menu.



Name	Brief description of the input (editable)
Linearization	Select thermocouple type (input is activated)
Designation	Full designation of the input (editable)
	Cancel (changes are discarded)
	Adopt changes

Touch respective button to adjust settings.

Supported linearizations



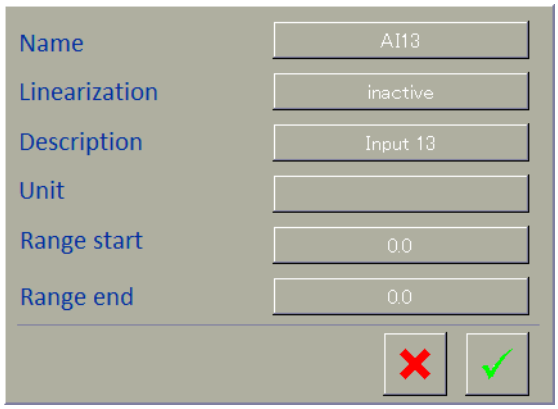
Back	Leave settings menu without changes
Inactive	Deactivate input
Linearization (thermocouple type)	Activate input with the selected linearization

The respective menu item must be touched for the selection.

5.2.3 Universal analog inputs

Activate input

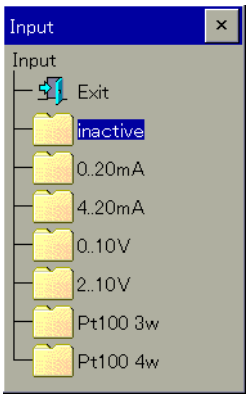
	Touch the button on the overview screen to open the menu.



Name	Brief description of the input (editable)
Linearization	Select standard signal or Pt100 (input is activated)
Designation	Full designation of the input (editable)
Unit	Unit of measured value (editable)
Scaling start	Start value of measuring range or display range (depending on the linearization)
Scaling end	End value of measuring range or display range (depending on the linearization)
	Cancel (changes are discarded)
	Adopt changes

Touch respective button to adjust settings.

Supported linearizations



Back	Leave settings menu without changes
Inactive	Deactivate input
Linearization (standard signal or Pt100)	Activate input with the selected linearization

The respective menu item must be touched for the selection.

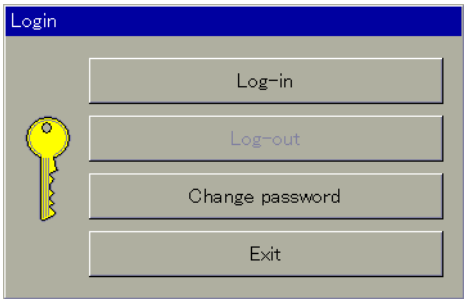
Scaling

If an RTD temperature probe (Pt100) is being used, the measuring range can be limited by scaling.

The measured values is scaled for a current or voltage signal and the display range is thus defined (example for scaling from 0 to 100: 0 mA corresponds to 0, 20 mA corresponds to 100).

5.2.4 User log-on

	Touch the button on the overview screen to open the menu.

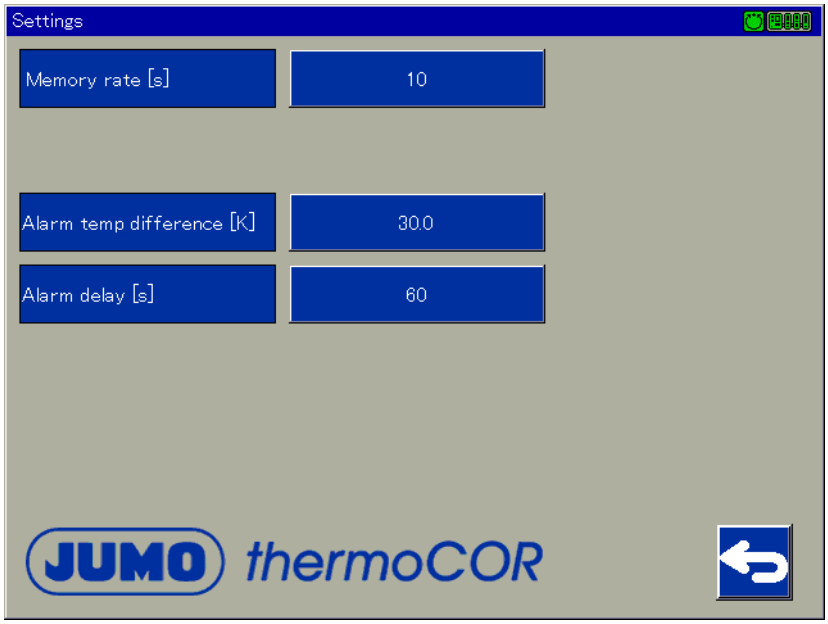


Logon	Open window for user selection
Logoff	Log off user
Change password	Open window for user selection and password entry
Back	Leave menu without changes

	After successfully logging on, the symbol on the button changes. To logoff, touch the button in order to open the menu for the user logoff or password change. Functions for user management are available in this menu if the logged in user has the corresponding rights.

5.2.5 Settings

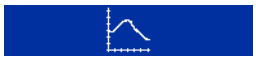
	Touch the button on the overview screen to open the menu.

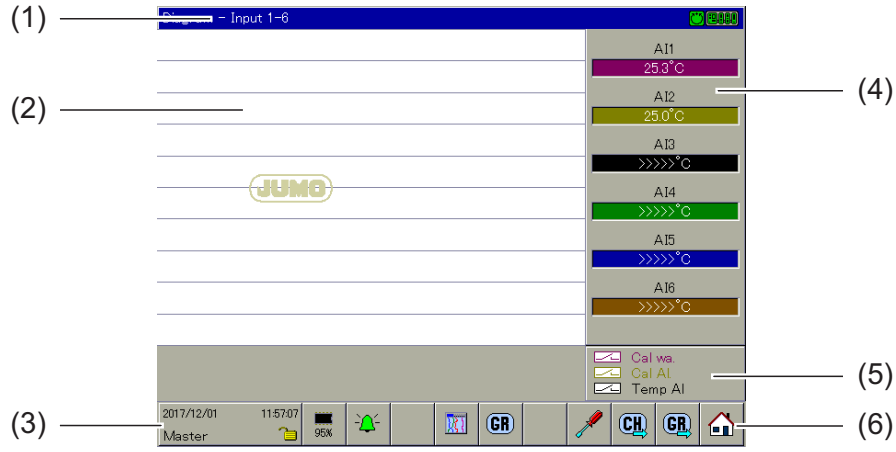


Memory cycle	Time interval in which the measured values for the inputs are stored (storage cycle). Setting range [s]: 10 to 120 The average value of the measured values of the respective input are formed and saved without the memory cycle.
Alarm temperature difference	Temperature difference that leads to an alarm triggering (alarm display in the status and title line). Setting range [K]: 0 to 100 The temperature difference between the input with the lowest temperature and the input with the highest temperature is significant (only active thermocouple inputs).
Alarm delay	Delay time for alarm triggering Setting range [s]: 0 to 120
	Back to the overview screen

Touch respective button (right side) to adjust settings.

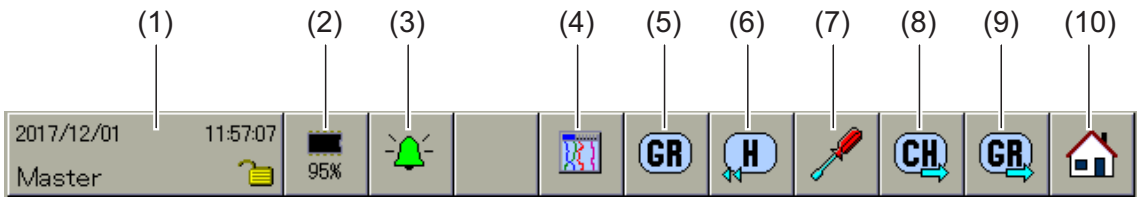
5.2.6 Curve image

	Touch the button on the overview screen to open the curve presentation.



(1) Name of the displayed group
(2) Area for curve presentation (display starts with batch start)
(3) Function selection (touch buttons)
(4) Numerical measured value display
(5) Contact display of calibration warning, calibration alarm, and temperature alarm
(6) Back to the overview screen

Function selection



(1) Device manager (function depend on the rights of the logged in user)
(2) Memory manager (functions for extracting data with a USB flash drive; here: display of the available, internal memory space)
(3) Open alarm and event lists
The color of the symbol indicates faults (yellow) and alarms (red).
(4) Select operator screen, enter comment (the comment is entered in the event list and the batch report)
(5) Select group
(6) Call up memory display (history)
(7) Configure diagram display
(8) Channel rotation (channels of the group are displayed individually)
(9) Group rotation
(10) Back to the overview screen

5 Operation

Symbols in the status and title line

	Sampling rate (10 ms) and operating mode (batch recording is active)
	Extracting the recording data through PCA Communication Software (PCC)
	Internal CPU in RUN status (normal status)
	Internal CPU in STOP status (in the event of an error, please contact JUMO Service)
	System is working normally
	System error (if communication with CPU is interrupted, please contact JUMO Service)
	System error (if communication with CPU is interrupted, please contact JUMO Service)

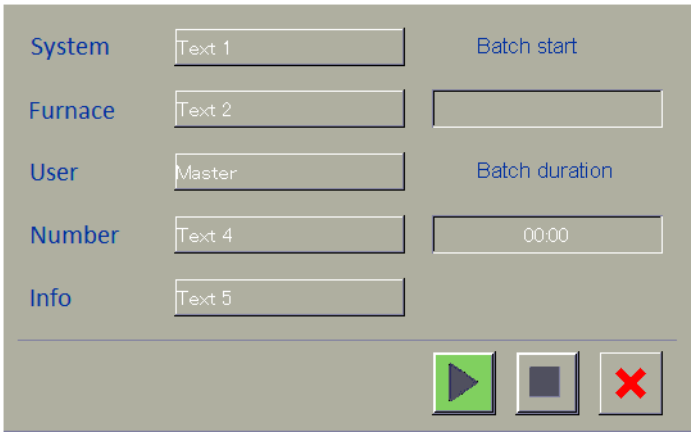
Group allocation

The analog inputs are divided into three groups.

Name of the group	Analog inputs
Input 1 - 6	Thermocouple inputs 1 to 6
Input 7 - 12	Thermocouple inputs 7 to 12
Input 13 - 16	Universal analog inputs 13 to 16

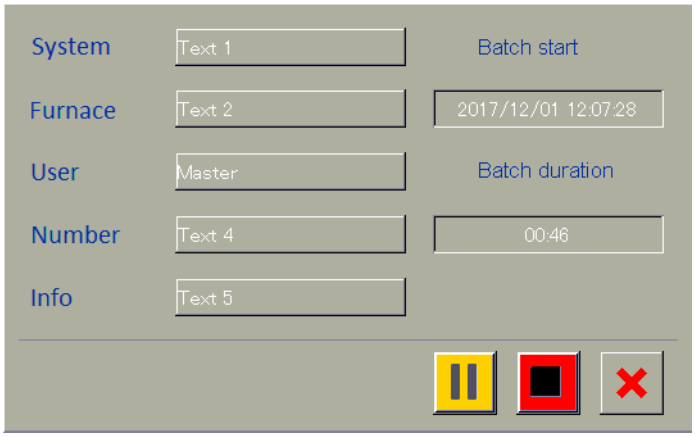
5.2.7 Batch recording

	Touch the button on the overview screen to open the menu.



Plant	Text entry: plant designation
Furnace	Text entry: furnace designation
Tester	Name of logged on user (no entry option)
Number	Text entry: batch number
Info	Text entry: batch information
	Start batch recording (or continue after interruption)
	End batch recording (button active after starting or stopping batch recording)
	Leave menu without any further action (back to the overview screen)

	The overview screen is shown once the batch has successfully started. The button on the overview screen is now green, and the symbol indicates that batch recording is running. Touch the button to open the menu again.



Batch start	Time when the batch recording was started.
Batch duration	Duration of batch recording
	Stop batch recording (determination and display of batch duration is not interrupted)
	End batch recording

	The overview screen is displayed after stopping batch recording. The button on the overview screen is now red, and the symbol indicates that batch recording has been stopped. Touch the button to open the menu again.
	The overview screen is displayed after ending batch recording. The button on the overview screen is now blue again with the original symbol. Touch the button to open the menu again and start further batch recording.

NOTE!

Only active inputs are recorded. A group that does not contain an active input is not recorded.

6.1 Analog inputs

Thermocouples (inputs 1 to 12 for AMS2750 and CQI-9)

Designation	Type	Standard	Measuring range	Measuring accuracy
Fe-CuNi	"J"	DIN EN 60584	-200 to +1200 °C	±0.6 K or ±0.1 %[a], from 0 °C
NiCr-Ni	"K"	DIN EN 60584	-200 to +1372 °C	±0.6 K or ±0.1 %[a], from 0 °C
NiCrSi-NiSi	"N"	DIN EN 60584	-100 to +1300 °C	±0.6 K or ±0.1 %[a], from 0 °C
Pt10Rh-Pt	"S"	DIN EN 60584	-50 to +1768 °C	±0.6 K or ±0.1 %[a], from 50 °C
Pt13Rh-Pt	"R"	DIN EN 60584	-50 to +1768 °C	±0.6 K or ±0.1 %[a], from 100 °C
Pt30Rh-Pt6Rh	"B"	DIN EN 60584	0 to 1820 °C	±0.6 K or ±0.1 %[a], from 500 °C

[a] The percentages stated are relative to the temperature displayed. The larger of the two values applies.

Ambient temperature influence	300 ppm/K
1-year measurement uncertainty (15 to 35 °C)	±0.15 K

RTD temperature probe (inputs 13 to 16)

Designation	Standard	Measuring range	Connection type	Measuring accuracy[a]
Pt100	DIN EN 60751	-200 to +850 °C	3/4 wire	≤ 0.05 %

[a] The accuracy values refer to the maximum measuring range. Smaller measuring spans reduce the linearization accuracy.

Ambient temperature influence	50 ppm/K
Sensor line resistance	Max. 30 Ω per line
Measuring current	Approx. 250 µA; not constant
Lead compensation	Not required

Standard signals (inputs 13 to 16)

Designation	Measuring range	Measuring accuracy[a]	Input resistance or burden voltage
Voltage	DC 0(2) to 10 V	≤ 0.05 %	> 500 kΩ
	DC 0 to 1 V	≤ 0.05 %	> 100 kΩ
Current	DC 0(4) to 20 mA	≤ 0.05 %	≤ 2 V

[a] The accuracy values refer to the maximum measuring range. Smaller measuring ranges lead to reduced linearization accuracy.

Ambient temperature influence	100 ppm/K

6 Technical data

Measuring circuit monitoring

In the event of a malfunction, the digitalized outputs assume defined states.

Measuring probe	Measuring range underflow	Measuring range overflow	Short-circuit (probe/line)	Break (probe/line)
RTD temperature probe	++	++	++	++
Thermocouple	++	++	---	++
Current 0 to 20 mA	++	++	---	---
Current 4 to 20 mA	++	++	++	++
Voltage 0 to 1 V	++	++	---	---
Voltage 0 to 10 V	++	++	---	---
Voltage 2 to 10 V	++	++	++	++
++ = is detected --- = is not detected				

6.2 Interfaces

USB host	
Connection	USB (socket type A)
Usage	Exclusively for connecting a USB flash drive
max.current	100 mA
Ethernet	
Connection	LAN (RJ45 socket)
Usage	For connecting the measuring system to a local network (for data archiving on a PC using PCC/PCA3000 software); direct connection to PC also possible
Protocols	TCP/IP, DHCP
Transfer rate	10 Mbit/s, 100 Mbit/s
System bus	
Connection	Bus out (RJ45 socket)
Usage	For connecting a further measuring system (slave)
Connecting cable	Network cable (patch or crossover cable), at least CAT5 (S/FTP)
Cable length	Up to 100 m

6.3 Display

Type	Touchscreen TFT color screen
Size	21.3 cm (8.4")
Resolution	640 x 480 pixels
Number of colors	256
Frame rate	> 150 Hz
Brightness	Can be set
Screen saver (shut-down)	Configurable waiting period

6.4 Electrical data

Voltage supply	AC 100 to 240 V +10/-15 %, 48 to 63 Hz
Power consumption	39.4 W
Device fuse	Fine wire fuse 2 × 5 A / 230 V slow
Electrical safety	Acc. to EN 61010-1 Overvoltage category II, pollution degree 2
Protection rating	I

6.5 Environmental influences

Ambient temperature range	
Storage	-20 to +60 °C
Operation	-10 to +45 °C
Resistance to climatic conditions	Relative humidity ≤ 90 % annual average without condensation (climate class 3K3 acc. to DIN EN 60721-3 with extended temperature and humidity range)
Site altitude	Max. 2000 m above sea level
Mechanical environmental influences	Classification acc. to DIN EN 60721-3-3, table 6, class 3M2
Electromagnetic compatibility (EMC)	According to DIN EN 61326-1
Interference emission	Class A – only for industrial use –
Interference immunity	Industrial requirements

6.6 Case

Case type	Case with removable lid (for indoor use)
Operating position	Any
Protection type	Acc. to DIN EN 60529, IP40
Dimensions	
Without trolley	Approx. 467 mm x 520 mm x 225 mm
With trolley (handle retracted)	Approx. 467 mm x 520 mm x 346 mm
Weight	20.5 kg

6 Technical data

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