

JUMO GmbH & Co. KG
 Delivery address: Mackenrodtstraße 14
 36039 Fulda, Germany
 Postal address: 36035 Fulda, Germany
 Phone: +49 661 6003-0
 Fax: +49 661 6003-607
 Email: mail@jumo.net
 Internet: www.jumo.net

JUMO Instrument Co. Ltd.
 JUMO House
 Temple Bank, Riverway
 Harlow, Essex, CM20 2DY, UK
 Phone: +44 1279 63 55 33
 Fax: +44 1279 62 50 29
 Email: sales@jumo.co.uk
 Internet: www.jumo.co.uk

JUMO Process Control, Inc.
 6724 Joy Road
 East Syracuse, NY 13057, USA
 Phone: +1 315 437 5866
 Fax: +1 315 437 5860
 Email: info.us@jumo.net
 Internet: www.jumousa.com



Analog input module 4-channel

705020

Brief description

The analog input module 4-channel is equipped with four universal analog inputs that are electrically isolated from each other for thermocouples, RTD temperature probes, resistance transmitters, resistance/potentiometers, or standard signals (current or voltage) as well as one digital input (DC 0/24 V). The digitized input values/states are available in the system for further processing.

LEDs are used to indicate applied voltage supply, the module operating status, as well as the logical status of the digital input.

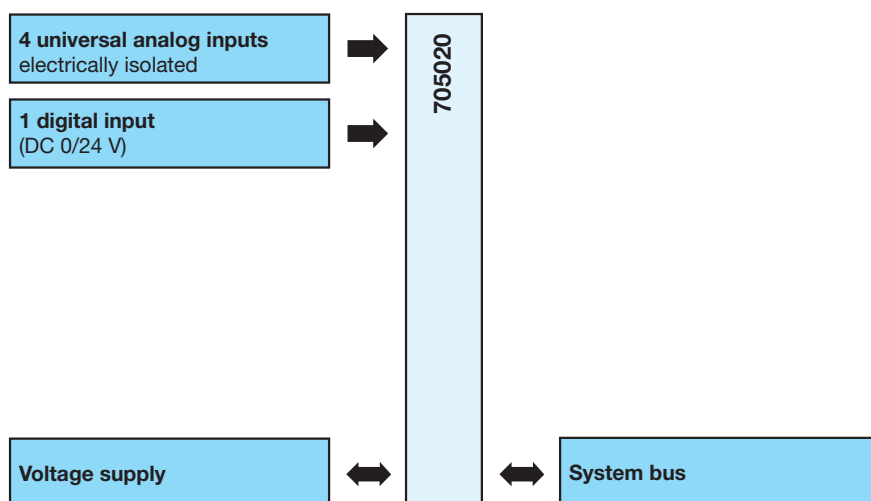
A setup program or the multifunction panel 840 can be used to comfortably configure the analog input module.

For service work, the module insert can be easily pulled out of the case at the front. The case including the bus PCB remains mounted on the DIN rail.



Type 705020/...

Block diagram



Features

- Four high-quality, universal analog inputs for thermocouples, RTD temperature probes, resistance transmitters, resistance/potentiometers, or standard signals
- All analog inputs are electrically isolated from each other
- Customer-specific linearization (up to 45 pairs of values or polynomial up to the 4th order)
- Limit value monitoring
- One digital input DC 0/24 V
- Automatic configuration after the module insert has been exchanged (hot swappable)
- Connection of the inputs at the front
- Removable terminal strips with Push-In technology
- Quick wiring of operating voltage and system bus due to easy module connection
- AMS2750/CQI-9 (extra code)

Approval/approval marks (see “Technical data”)



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Description

Limit value monitoring

For each analog input, two separate alarms (min/max alarm) can be activated; each alarm has its own limit value. Alarm type, event text, collective alarm, alarm suppression, and alarm delay are configurable.

Analog inputs

The four analog inputs are universal measuring inputs for RTD temperature probes, thermocouples, resistance transmitters, resistance/potentiometers, and standard signals (current, voltage). Linearizations for over 20 common measuring probes (RTD temperature probes, thermocouples) are saved. A measured value offset or a fine adjustment can be carried out to compensate for plant-specific deviations. Due to the measuring circuit monitoring, a measuring range that is too high or too low, probe/cable break, and probe/cable short circuit are detected – depending on the measuring element type – so that the system is switched to an operational safe status in the event of an error.

Customer-specific linearization

A customer-specific linearization is also possible. The required linearization curve can be entered in the setup program using up to 45 pairs of values or a formula (polynomial up to the 4th order).

Digital input

In addition, a digital input DC 0/24 V is available. The signal status can be used in the system in a flexible manner.

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Technical data

Analog inputs

General information

Number	4
A/D converter	Dynamic resolution up to 16 bit

Thermocouples

Designation	Standard	Measuring range	Measuring accuracy ^a	Ambient temperature influence
Fe-CuNi "L"		-200 to +900 °C	≤ 0.1 % from -100 °C	300 ppm/K
Fe-CuNi "J"	DIN EN 60584	-200 to +1200 °C	≤ 0.1 % from -100 °C	300 ppm/K
Cu-CuNi "U"		-200 to +600 °C	≤ 0.1 % from -130 °C	300 ppm/K
Cu-CuNi "T"	DIN EN 60584	-200 to +400 °C	≤ 0.1 % from -150 °C	300 ppm/K
NiCr-Ni "K"	DIN EN 60584	-200 to +1372 °C	≤ 0.1 % from -80 °C	300 ppm/K
NiCr-CuNi „E"	DIN EN 60584	-200 to +1000 °C	≤ 0.1 % from -80 °C	300 ppm/K
NiCrSi-NiSi "N"	DIN EN 60584	-100 to +1300 °C	≤ 0.1 % from -80 °C	300 ppm/K
Pt10Rh-Pt "S"	DIN EN 60584	-50 to 1768 °C	≤ 0.15 % from 20 °C	300 ppm/K
Pt13Rh-Pt "R"	DIN EN 60584	-50 to 1768 °C	≤ 0.15 % from 50 °C	300 ppm/K
Pt30Rh-Pt6Rh "B"	DIN EN 60584	0 to 1820 °C	≤ 0.15 % from 400 °C	300 ppm/K
W5Re-W26Re „C"		0 to 2320 °C	≤ 0.15 % from 500 °C	300 ppm/K
W3Re-W25Re "D"		0 to 2495 °C	≤ 0.15 % from 500 °C	300 ppm/K
W3Re-W26Re		0 to 2400 °C	≤ 0.15 % from 500 °C	300 ppm/K
Chromel-Copel	GOST 8.585-2001	-200 to +800 °C	≤ 0.15 % from -80 °C	300 ppm/K
Chromel-Alumel	GOST 8.585-2001	-200 to +1372 °C	≤ 0.10 % from -80 °C	300 ppm/K
PLII (Platinel II)		0 to 1395 °C	≤ 0.10 % from -80 °C	300 ppm/K
Linear		0 to 75 mV	≤ 0.1 %	300 ppm/K
Cold junction		Pt100 internal		
Cold junction accuracy		± 1 K		

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

RTD temperature probe

Designation	Standard	Measuring range	Measuring accuracy ^a	Ambient temperature influence
Pt100 2-wire circuit 3-wire/4-wire circuit	DIN EN 60751	-200 to +850 °C	≤ 0.15 % ≤ 0.05 %	50 ppm/K
Pt500 2-wire circuit 3-wire/4-wire circuit	DIN EN 60751	-200 to +850 °C	≤ 0.30 % ≤ 0.15 %	50 ppm/K
Pt1000 2-wire circuit 3-wire/4-wire circuit	DIN EN 60751	-200 to +850 °C	≤ 0.20 % ≤ 0.08 %	50 ppm/K
Ni 100 2-wire circuit 3-wire/4-wire circuit	DIN 43760	-60 to +250 °C	≤ 0.36 % ≤ 0.24 %	50 ppm/K
Pt100 2-wire circuit 3-wire/4-wire circuit	JIS 1604	-200 to +650 °C	≤ 0.20 % ≤ 0.06 %	50 ppm/K

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Designation	Standard	Measuring range	Measuring accuracy ^a	Ambient temperature influence
Pt50 2-wire circuit 3-wire/4-wire circuit	GOST 6651-94	-200 to +1100 °C	≤ 0.30 % ≤ 0.06 %	50 ppm/K
Pt100 2-wire circuit 3-wire/4-wire circuit	GOST 6651-94	-200 to +850 °C	≤ 0.15 % ≤ 0.05 %	50 ppm/K
Cu50 2-wire circuit 3-wire/4-wire circuit	GOST 6651-94	-50 to +200 °C	≤ 0.80 % ≤ 0.60 %	200 ppm/K
Cu100 2-wire circuit 3-wire/4-wire circuit	GOST 6651-94	-50 to +200 °C	≤ 0.80 % ≤ 0.50 %	200 ppm/K
KTY11-6 2-wire circuit 3-wire/4-wire circuit		-50 to +150 °C	≤ 1 % ≤ 0.24 %	50 ppm/K
Sensor lead resistance		Max. 30 Ω per lead with a 3-wire and 4-wire circuit Max. 10 Ω per lead with a 2-wire circuit		
Measuring current		Pt100 approx. 250 μA, Pt500, and Pt1000 approx. 100 μA; not constant		
Lead compensation		Not required for 3-wire and 4-wire circuit. For a 2-wire circuit, the lead resistance can be compensated in the software by correcting the process value.		

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

Standard signals

Designation	Measuring range	Measuring accuracy ^a	Ambient temperature influence
Voltage Input resistance $R_E > 500 \text{ k}\Omega$ Input resistance $R_E > 100 \text{ k}\Omega$	DC 0(2) to 10 V DC 0 to 1 V	≤ 0.05 %	100 ppm/K
Current (voltage drop ≤ 2 V)	DC 0(4) to 20 mA	≤ 0.05 %	100 ppm/K
Resistance transmitter	min. 100 Ω, max. 4 kΩ	± 4 Ω	100 ppm/K
Resistance/potentiometer	< 400 Ω 400 Ω to 4 kΩ	± 0.4 Ω ± 4 Ω	50 ppm/K 50 ppm/K

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

Measuring circuit monitoring

In the event of an error the digitized output values move to a defined status.

Measuring element	Out of range	Probe/cable short circuit	Probe/cable break
Thermocouple	Is detected	Is not detected	Is detected
RTD temperature probe	Is detected	Is detected	Is detected
Voltage 2 to 10 V 0 to 10 V 0 to 1 V	Is detected Is detected Is detected	Is detected Is not detected Is not detected	Is detected Is not detected Is not detected
Current 4 to 20 mA 0 to 20 mA	Is detected Is detected	Is detected Is not detected	Is detected Is not detected
Resistance transmitter	Is detected	Is not detected	Is detected
Resistance/potentiometer	Is detected	Is detected	Is detected

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Digital input

Number	1
Input signal	DC 0/24 V (PLC level; logical "0" = -3 to +5 V; logical "1" = +15 to +30 V)

Electrical data

Voltage supply	
Connection	Lateral (feed via base unit or router module)
Voltage	DC 24 V +25/-20 %
Residual ripple	5 %
Current consumption	130 mA (at DC 19.2 V)
Power consumption	3 W
Inputs (terminals 1 to 18)	
Connection	At the front (removable terminal strips with Push-In technology)
Conductor cross section on terminals 1 to 18	
Wire or strand without ferrule	Min. 0.14 mm ² , max. 1.5 mm ²
Strand with ferrule	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
Stripping length on terminals 1 to 18	9 mm
Electrical safety	Acc. to DIN EN 61010-1:2020 Overvoltage category III, pollution degree 2
Electromagnetic compatibility	Acc. to DIN EN 61326-1:2022
Interference emission	Class A – only for industrial use –
Interference immunity	Industrial requirements ^a

^a During EMC interference, the measuring accuracy of the analog inputs may be reduced to +/- 1 %.

Case and ambient conditions

Case type	Plastic case for DIN rail mounting in the control cabinet (indoor use); DIN rail acc. to DIN EN 60715, 35 mm x 7.5 mm x 1 mm
Dimensions (W x H x D)	22.5 m x 103.6 m x 101.5 m (without connection elements)
Weight	Approx. 140 g
Protection rating	IP 20, acc. to DIN EN 60529
Ambient temperature range	-20 to +55 °C
Storage temperature range	-40 to +70 °C
Resistance to climatic conditions	Relative humidity ≤ 90 % annual average without condensation (climatic class 3K3 acc. to DIN EN 60721-3-3 with extended temperature and humidity range)
Site altitude	Up to 2000 m above sea level
Mechanical ambient conditions ^a	Classification acc. to DIN EN 60721-3-3, table 6, class 3M2

^a Test conditions are listed in the System Descripton B 705000.8.

Approval/approval marks

Approval mark	Testing agency	Certificate/certification number	Inspection basis	Valid for
c UL us	Underwriters Laboratories	E201387	UL 61010-1 (3. Ed.), CAN/CSA-22.2 No. 61010-1 (3. Ed.)	all types
DNV GL	DNV GL	TAA000016N	Class Guideline DNVGL-CG-0339	all types; a power supply unit with DNV GL or GL type approval is required (e.g. type 705090)

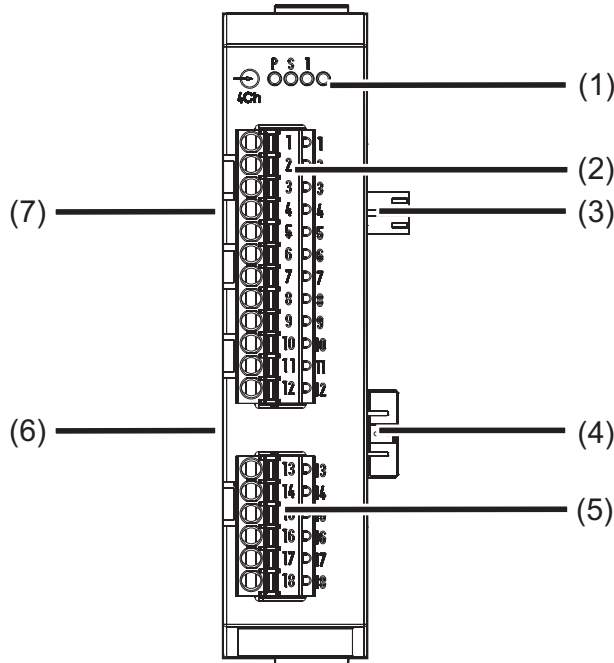
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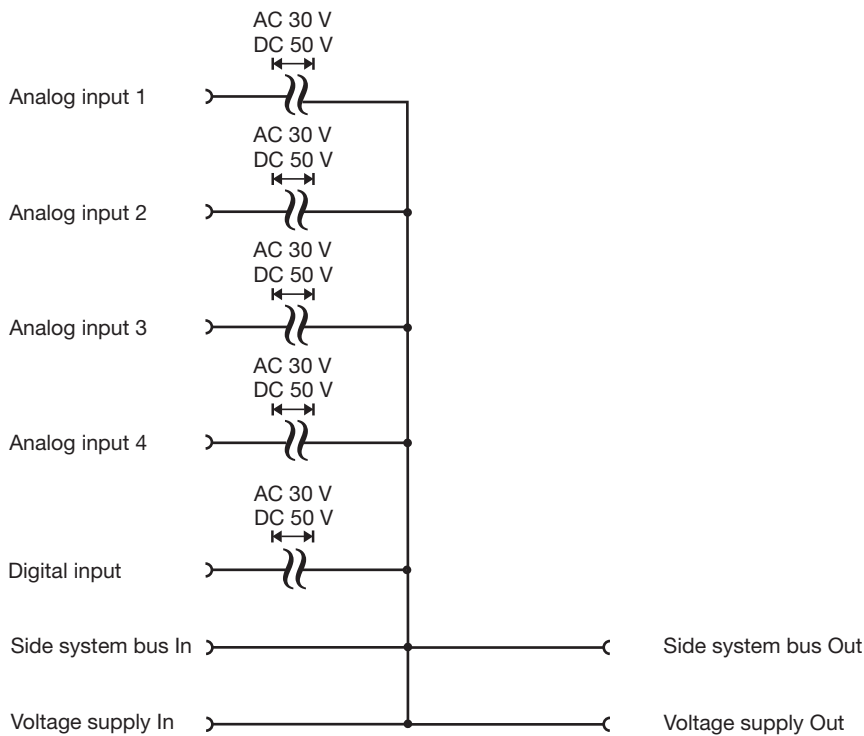


Display and connection elements



- (1) Status displays (LED)
 P = Voltage supply
 S = Status
 1 = Digital input
 (LED is lit: Active)
- (2) Analog input 1 to 3
- (3) Voltage supply Out, DC 24 V
- (4) Side system bus Out
- (5) Analog input 4;
 digital input
- (6) Side system bus In
- (7) Voltage supply In, DC 24 V

Electrical isolation



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Connection diagram

The connection diagram included in the data sheet provides initial information about the connection options. Only use the installation 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

Connection	Input	Terminals	Symbol and terminal designation
Thermocouple	1 2 3 4	2 and 3 6 and 7 10 and 11 14 and 15	
RTD temperature probe 2-wire circuit	1 2 3 4	2 and 4 6 and 8 10 and 12 14 and 16	
RTD temperature probe 3-wire circuit	1 2 3 4	2 to 4 6 to 8 10 to 12 14 to 16	
RTD temperature probe 4-wire circuit	1 2 3 4	1 to 4 5 to 8 9 to 12 13 to 16	
Voltage DC 0(2) to 10 V	1 2 3 4	1 and 2 5 and 6 9 and 10 13 and 14	
Voltage DC 0 to 1 V	1 2 3 4	2 and 3 6 and 7 10 and 11 14 and 15	
Current DC 0(4) to 20 mA	1 2 3 4	3 and 4 7 and 8 11 and 12 15 and 16	
Resistance transmitter A = Start E = End S = Slider	1 2 3 4	2 to 4 6 to 8 10 to 12 14 to 16	
Resistance/potentiometer 2-wire circuit	1 2 3 4	2 and 4 6 and 8 10 and 12 14 and 16	
Resistance/potentiometer 3-wire circuit	1 2 3 4	2 to 4 6 to 8 10 to 12 14 to 16	

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Connection	Input	Terminals	Symbol and terminal designation
Resistance/potentiometer 4-wire circuit	1 2 3 4	1 to 4 5 to 8 9 to 12 13 to 16	

Digital input

Connection	Input	Terminals	Symbol and terminal designation
Digital input DC 0/24 V	1	17 and 18	

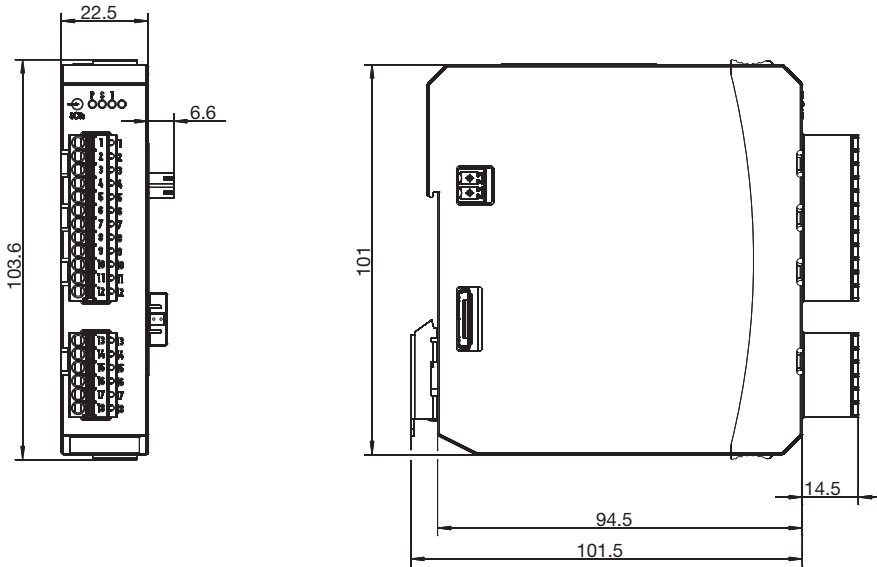
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Dimensions



Compatibility

JUMO mTRON T

See data sheet of the central processing unit
JUMO mTRON T:
Data sheet 705001

JUMO variTRON

See data sheet of the relevant central pro-
cessing unit JUMO variTRON:
Data sheet 70500x

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Order details

(1) Basic type	
705020	Analog input module 4-channel
(2) Voltage supply	
36	DC 24 V +25/-20 %
(3) DNV GL approval	
000	Without approval
062	With DNV GL approval ^a
(4) Extra codes	
000	Without extra code
879	AMS2750/CQI-9 ^b

^a The power supply unit used must also have a DNV GL or GL type approval (e.g. type 705090).

^b For the calibration certificate the channels to be checked are to be defined with the thermocouple type and the desired measuring points.

Order code / / ,
Order example 705020 / 36 / 000 , 000

Scope of delivery

1 analog input module, 4-channel
1 Installation Instructions

Stock versions

Order code	Part no.
705020/36/000,000	00566250