

WAGO I/O System 750/753

4-channel analog input; 0 ... 20 mA; single-ended

750-453



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Every conceivable measure has been taken to ensure the accuracy and completeness of this documentation. However, as errors can never be fully excluded, we always appreciate any information or suggestions for improving the documentation.

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1 Provisions

1.1 Scope of Applicability

This document applies to the following product:

🔗 **750-453** (4AI 0-20mA S.E.) 4-channel analog input; 0 ... 20 mA; single-ended.

From hardware version	07
From firmware version	04
Product detail page	🔗 www.wago.com/750-453

Note

Note applicable documents!

The complete operating instructions for the product consists of several, applicable documents. The product must only be installed and operated in accordance with the complete operating instructions. Knowledge of all applicable documents is required for proper use. You can find all documents and information on the product detail page.

Applicable document

📖 System Manual I/O System 750/753

- Provisions
- Safety
- Planning
- Transport and Storage
- Assembly and Disassembly
- Conductor Termination
- Decommissioning

2 Overview

This I/O module processes standard 0 ... 20 mA signals from the field range.

The I/O module has four input channels for field signals. The ground connections are available for all four channels on a common 0 V ground potential. This potential is not the 0 V field power of the power jumper contacts.

One red error LED per channel indicates measurement overrange.

The input signal is electrically isolated and transmitted with a resolution of 12 bits.

The internal power supply powers the module.

The potentials for the field level received via the power jumper contacts are electrically isolated and passed on to subsequent I/O modules, without being used themselves.

3 Properties

3.1 View

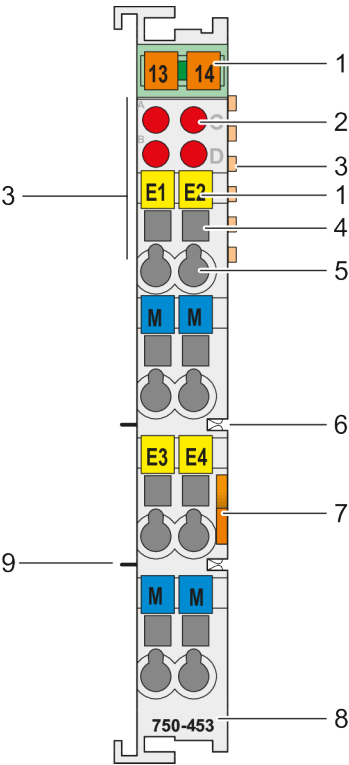


Figure 1: View

1	Slot for Mini-WSB (optional)	☐ System Manual I/O System 750/753
2	Status LEDs	🔗 Indicators [> 7]
3	Data contacts	☐ System Manual I/O System 750/753
4	Access to open the associated CAGE CLAMP® connection	☐ System Manual I/O System 750/753
5	CAGE CLAMP® connections	🔗 Wiring Interface [> 8] and ☐ System Manual I/O System 750/753
6	Power jumper contacts (spring)	🔗 Power Jumper Contacts [> 9] and ☐ System Manual I/O System 750/753
7	Release tab	☐ System Manual I/O System 750/753
8	Item number	🔗 Scope of Applicability [> 4]
9	Power jumper contacts (blade)	🔗 Power Jumper Contacts [> 9] and ☐ System Manual I/O System 750/753

3.2 Indicators

One red error LED per channel indicates measurement overrange.

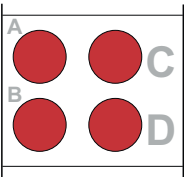


Figure 2: Indicators

Channel	Designation	LED	State	Function
1	Error AI 1	A	Off	Normal operation
			Red	Measurement above permissible range
2	Error AI 2	C	Off	Normal operation
			Red	Measurement above permissible range
3	Error AI 3	B	Off	Normal operation
			Red	Measurement above permissible range
4	Error AI 4	D	Off	Normal operation
			Red	Measurement above permissible range

3.3 Wiring Interface

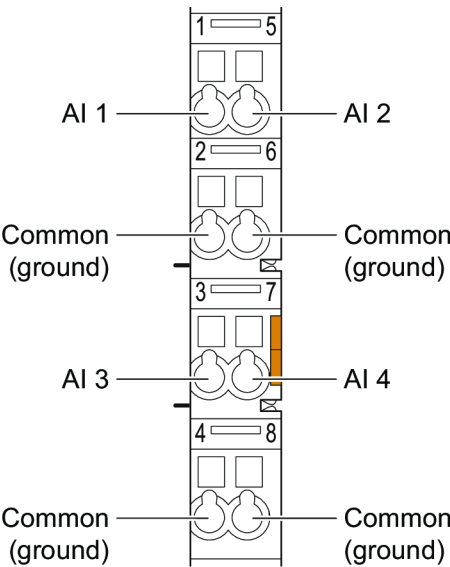


Figure 3: CAGE CLAMP® Connections

Channel	Designation	Connection	Function
1	AI 1	1	Analog input 1: signal
	Ground	2	Analog input: ground
2	AI 2	5	Analog input 2: signal
	Ground	6	Analog input: ground
3	AI 3	3	Analog input 3: signal
	Ground	4	Analog input: ground
4	AI 4	7	Analog input 4: signal
	Ground	8	Analog input: ground

3.4 Power Jumper Contacts

The potential for the field supply is fed in via the blade contacts and passed on via the spring contacts.

For additional information on the Power Jumper Contacts, please see [System Manual I/O System 750/753](#).

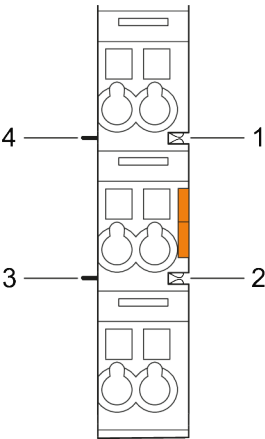


Figure 4: Power Jumper Contacts

No.	Type
1	Groove with spring contact
2	
3	Blade contact
4	

Arrangement in the Bus Node

For mechanical arrangement of the I/O module, the previous component must have at least 2 open grooves for accommodating the blade contacts.

For electrical compatibility requirements see Section [Circuit Diagram \[► 10\]](#).

3.5 Circuit Diagram

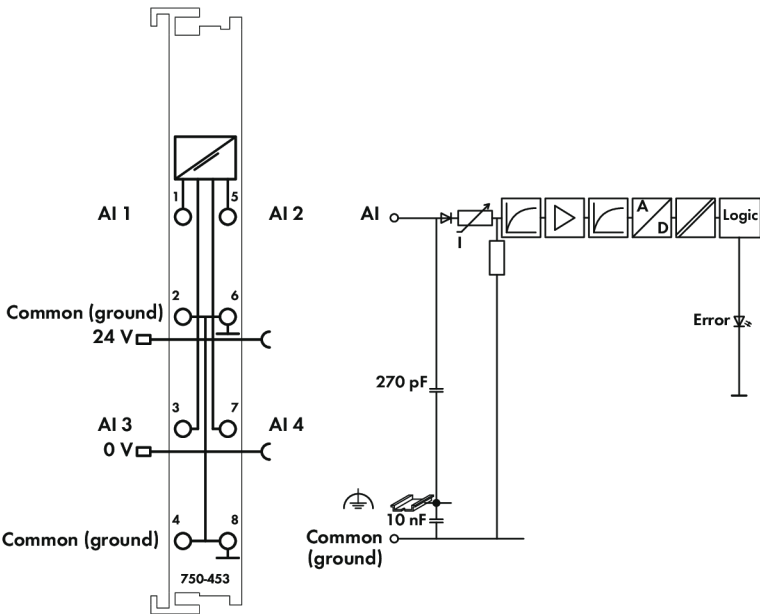


Figure 5: Circuit Diagram

For information on the system power supply, please see [System Manual I/O System 750/753](#).

4 Functions

4.1 Signal Processing

The I/O module provides one status byte (8 bits) and one data word (16 bits) per channel.

Whether the status byte can be read out via the fieldbus depends on how diagnostic information is transmitted by the corresponding fieldbus or the head station used. In any case, the status byte can be read out via the service interface of the head station using the WAGO-I/O-CHECK commissioning tool.

The I/O module captures the input current range 0 mA ... 20 mA with a resolution of 12 bits.

The measured value is given in two's complement representation, and the numerical value is mapped to bits B15 ... B4 of the data word (bit 15 is the sign bit). Bits B3 and B2 are reserved and can take a value of 0 or 1. Bits B1 and B0 contain diagnostic information.

In the event of measurement overrange, the I/O module transmits the next displayable measured value and sets B0 and B1 to a value of 1.

Simplified Interpretation of the Measured Value

A simpler way to obtain the measured value is to interpret the entire data word as a 16-bit integer value. The measurement range is then scaled to the numerical value range from 0x0000 to 0x7FFF. The decimal places of the resulting analog value corresponding to the lower four bits, however, must be ignored.

4.2 Process Image

Table 1: Process Image of the I/O Module – Examples of Process Values

Input Current 0 ... 20 mA	Numerical Value					Status Byte Hex.	LED Error AI 1 ... 4
	Binary			Hex. ³⁾	Dec. ³⁾		
	Measured Value B15 ... B4	Reserved ¹⁾ B3, B2	Diagnostics ²⁾ B1, B0				
0.0	'0000.0000.0000.	00	00'	0x0000	0	0x00	Off
2.5	'0001.0000.0000.	XX	00'	0x1000	4,096	0x00	Off
5.0	'0010.0000.0000.	XX	00'	0x2000	8,192	0x00	Off
7.5	'0011.0000.0000.	XX	00'	0x3000	12,288	0x00	Off
10.0	'0100.0000.0000.	XX	00'	0x4000	16,384	0x00	Off
12.5	'0100.1111.1111.	XX	00'	0x4FF0	20,464	0x00	Off
15.0	'0101.1111.1111.	XX	00'	0x5FF0	24,560	0x00	Off
17.5	'0110.1111.1111.	XX	00'	0x6FF0	28,656	0x00	Off
18.0	'0111.0011.0011.	XX	00'	0x7330	29,488	0x00	Off
20.0	'0111.1111.1111.	XX	00'	0x7FF0	32,752	0x00	Off
>~21.0	'0111.1111.1111.	11	11'	0x7FFF	32,767	0x42	On

¹⁾ Bits B3 and B2 are reserved and can each take a value of 0 or 1.

Exception: Diagnostics are pending; in that case, their value is fixed.

²⁾ Indicates whether the measurement range has been exceeded.

³⁾ The measured value depends on the reserved bits B3 and B2. In this example, X = 0 was assumed.

5 Planning

This section provides helpful information for planning the use of the product in a node.

5.1 Compatibility

The I/O module can be operated on all head stations of the WAGO I/O System 750/753 with the exception of the economy variants 750-320, 750-323, 750-324 and 750-327.

5.2 Aids

The status byte can be read out via the service interface of the head station using the WAGO-I/O-CHECK commissioning tool.

You can obtain the WAGO-I/O-CHECK under Item No. [759-302](#). The description is available on the website at www.wago.com.

5.3 Connection Example

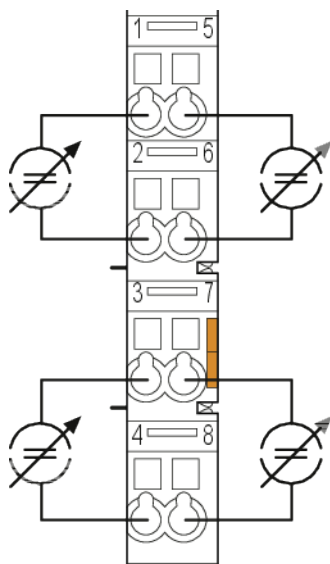


Figure 6: Connection Example

6 Appendix

6.1 Technical Data, Approvals, Guidelines and Standards

Note

Subject to changes!

Please also observe the further product documentation! You can generate the current datasheet at any time at: [> www.wago.com](https://www.wago.com) /<item number>.

See also

 Data sheet 750-453 [► 14]

This analog input module processes standard 0–20 mA signals.
 The input signal is electrically isolated and is transmitted with a resolution of 12 bits.
 The internal system supply powers the module.
 The input channels of the module have a common ground potential.

Technical data

Number of analog inputs	4
Total number of channels (module)	4
Signal type	Current
Signal type (current)	0 ... 20 mADC
Sensor connection	4 x (2-wire)
Input voltage (max.)	32 V
Signal characteristics	Single-ended
Resolution [bit]	12 bits
Input resistance (max.)	100 Ω
Data width	4 x 16-bit data; 4 x 8-bit control/status (optional)
Conversion time (typ.)	10 ms
Measurement error (reference temperature)	25 °C
Measurement error, deviation (max.) from the upper-range value	0.1 %
Temperature error (max.) of the upper-range value	0.01 %/K
Supply voltage (system)	5 VDC; via data contacts
Current consumption (5 V system supply)	65 mA
Supply voltage (field)	24 VDC (-25 ... +30 %); via power jumper contacts (power supply via blade contact; transmission (field side supply voltage only) via spring contact)
Isolation	500 V system/field
Indicators	LED (A-D) red: Error AI 1 ... AI 4
Number of incoming power jumper contacts	2
Number of outgoing power jumper contacts	2
Current carrying capacity (power jumper contacts)	10 A

Connection data

Connection technology: inputs/outputs	8 x CAGE CLAMP®
Connectable conductor materials	Copper
Connection type 1	Inputs/outputs
Solid conductor	0.08 ... 2.5 mm² / 28 ... 14 AWG
Fine-stranded conductor	0.08 ... 2.5 mm² / 28 ... 14 AWG
Strip length	8 ... 9 mm / 0.31 ... 0.35 inches

Physical data

Width	12 mm / 0.472 inches
Height	100 mm / 3.937 inches
Depth	69.8 mm / 2.748 inches
Depth from upper-edge of DIN-rail	62.6 mm / 2.465 inches



Mechanical data	
Mounting type	DIN-35 rail
Pluggable connector	fixed

Material data	
Color	light gray
Housing material	Polycarbonate; polyamide 6.6
Fire load	1.289 MJ
Weight	51.2 g
Conformity marking	CE

Environmental requirements	
Ambient temperature (operation)	0 ... +55 °C
Ambient temperature (storage)	-40 ... +85 °C
Protection type	IP20
Pollution degree	2 per IEC 61131-2
Operating altitude	0 ... 2000 m / 0 ... 6562 ft
Mounting position	Horizontal left, horizontal right, horizontal top, horizontal bottom, vertical top and vertical bottom
Relative humidity (without condensation)	95 %
Vibration resistance	4g per IEC 60068-2-6
Shock resistance	15g per IEC 60068-2-27
EMC immunity to interference	per EN 61000-6-2, marine applications
EMC emission of interference	per EN 61000-6-4, marine applications
Exposure to pollutants	per IEC 60068-2-42 and IEC 60068-2-43
Permissible H ₂ S contaminant concentration at a relative humidity 75 %	10 ppm
Permissible SO ₂ contaminant concentration at a relative humidity 75 %	25 ppm

Product classification	
UNSPSC	32101602

Environmental Product Compliance	
CAS-No.	1303-86-2 1317-36-8 7439-92-1
REACH Candidate List Substance	Diboron trioxide Lead Lead monoxide
RoHS Compliance Status	Compliant,With Exemption
RoHS Exemption	6(c) 7(a) 7(c)-I 7(c)-II
SCIP notification number (Austria)	a01d8c65-9e17-440f-942c-cf41ac452f28
SCIP notification number (Belgium)	b4bd022d-b953-4409-b1cd-fa31095b6ad8
SCIP notification number (Bulgaria)	bddc24c3-e3e4-42d8-b1eb-bb53a97e3a45
SCIP notification number (Czech Republic)	3b25e7ec-cd2b-464e-a889-13643a954432
SCIP notification number (Denmark)	f159e111-b749-41b6-b1f8-587375ece41d
SCIP notification number (Finland)	08027ab9-be43-4066-b846-7da96f327aa3
SCIP notification number (France)	6aee7333-9f7a-4645-9adc-716e7ce02bf4
SCIP notification number (Germany)	f5d4a292-7bc1-4c18-a2d0-ad7d421f0bfb
SCIP notification number (Hungary)	4c7e26e4-62a4-4bdc-8c4f-6db98b7eb6d3
SCIP notification number (Italy)	0288fcc9-08be-4fa2-a264-6f468c1dceb3
SCIP notification number (Netherlands)	453442b1-c1f8-4a0b-8047-bdd797ed87db
SCIP notification number (Poland)	f3842347-4f18-47ea-a298-4c1a1588efd3
SCIP notification number (Romania)	46a56ff0-03e8-410d-8e57-737d1bf26941



Environmental Product Compliance

SCIP notification number (Sweden) 003615e9-7a51-467e-ae3-c1be3356348c

Approvals / Certificates

General approvals			Declarations of conformity and manufacturer's declarations		
Approval	Standard	Certificate Name	Approval	Standard	Certificate Name
EAC GZO Almaty Standart	TP TC 020/2011	EAC CoC 03083	EU-Declaration of Confor- mity WAGO GmbH & Co. KG	-	-
KC National Radio Research Agency	Article 58-2, Clause 3	MSIP-REM-W43-AIM750	UK-Declaration of Confor- mity WAGO GmbH & Co. KG	-	-

Approvals for marine applications

Approval	Standard	Certificate Name
ABS American Bureau of Ship- ping	-	22-2219060
BSH Bundesamt fuer See- schifffahrt und Hydrogra- phie	-	1104
BV Bureau Veritas S.A.	-	13453/E0 BV
DNV DNV GL SE	DNV-CG-0339,Aug.2021	TAA0000194
KR Korean Register of Ship- ping	-	KR HMB05880-AC001
LR Lloyds Register EMEA	-	LR22180952TA
PRS Polski Rejestr Statków	-	TE/1101/880590/23
RINA RINA Germany GmbH	-	ELE343521XG001

Approvals for hazardous areas

Approval	Standard	Certificate Name
ATEX TUEV Nord Cert GmbH	EN 60079-0	TUEV14ATEX148929X (II 3 G Ex ec IIC T4 Gc)
CCCEX CQST/CNEx	CNCA-C23-01	2020312310000213 (Ex ec IIC T4 Gc)
IECEX TUEV Nord Cert GmbH	IEC 60079-0	IECEX TUN 14.0035 X (Ex ec IIC T4 Gc)
INMETRO TÜV Rheinland do Brasil Ltda.	IEC 60079-0	TÜV 12.1297 X
UKEx WAGO GmbH & Co. KG	EN 60079-0	UKCA_WA GO22UKEX003X_ec

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