EY-IO 530: I/O module, digital and universal inputs, modu530

How energy efficiency is improved

SAUTER EY-modulo 5 technology: modular, fast and universal

Features

- Part of the SAUTER EY-modulo 5 system family
- Plug-in element for extending the modu524/525 automation station (AS)
- Receiving digital (alarm/status) and analogue inputs (Ni/Pt1000, U/I/R) in operational systems, e.g. in HVAC engineering
- 16 inputs
- Power supply of automation station (AS)
- Direct labelling on the front
- Can be equipped with a local indicating unit

EY-IO530F001

Technical data

Power supply		
	Power supply	From AS via I/O bus
	Power consumption[1]	≤ 1.6 VA/0.65 W
	Dissipated power	≤ 0.65 W
	Current consumption[2]	40 mA

Ambient conditions		
	Operating temperature	0...45 °C
	Storage and transport temperature	-25...70 °C
	Admissible ambient humidity	10...85% rh, no condensation

Inputs/outputs		
	Digital inputs	8 fixed assignment (alarm/status)
	Pulse counter	≤ 50 Hz
	Universal inputs	8
	Analogue	Ni1000/Pt1000, U/I/R, Pot
	Digital	DI (approx. 3 Hz)

Construction		
	Fitting	On DIN rail
	Dimensions W x H x D	42 × 170 × 115 mm
	Weight	0.29 kg

Interfaces and communication		
	Connection, modu6 (LOI)	6-pin, integrated
	Connection, I/O bus	12-pin, integrated
	Connection terminals	24 (0.5...2.5 mm²)

Standards and directives		
	Type of protection	IP30 (EN 60529)
	Protection class	I (EN 60730-1)
	Environment class	3K3 (IEC 60721)
CE conformity according to	EMC Directive 2014/30/EU	EN 61000-6-1, EN 61000-6-2, EN 61000-6-3, EN 61000-6-4

Overview of types

Type	Properties
EY-IO530F001	I/O module, digital and universal inputs, modu530

Accessories

Local operating and indicating units (LOI)

Type	Description
EY-LO630F001	16-LED indication, bi-colour

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[1] *Primary side of base station*

[2] *Supply via base station*

Description of operation

The modu530 I/O module is used to extend the modu524 and modu525 automation stations. It is used to receive digital (alarm/status) and analogue inputs (Ni/Pt1000, U/I/R) in operational systems, e.g. in HVAC engineering. It provides a total of 16 inputs, of which 8 are digital inputs and 8 universal inputs.

Intended use

This product is only suitable for the purpose intended by the manufacturer, as described in the "Description of operation" section.

All related product regulations must also be adhered to. Changing or converting the product is not admissible.

Engineering notes

The modu530 I/O module is generally comprised of two components: the baseplate in which the I/O bus system and the connection terminals are integrated and the actual I/O module electronics.

Fitting/assembly

The baseplate of the I/O module is fitted in a cabinet using a DIN rail (EN 60715) and connected on the side directly to the I/O bus of the AS or the extension modules. This work must only be carried out when the system is disconnected from the electrical supply.

The baseplate contains the "bus module", which is responsible for power supply and continuous communication. This ensures that faults due to a failure or partial defect in the electronic component do not affect the function of other downstream modules.

Removing/inserting the I/O electronics module from/to the baseplate is possible while the AS is in operation.

To ensure plant safety and to avoid any faults at inputs or outputs, the I/O electronics module should only be removed or inserted while the base station is switched off.

The return line of the Ni/Pt1000 sensors must be separated from the other inputs and outputs, i.e. separate GND terminals ⊥ must be used.

Labelling concept

The I/O module can be labelled with a paper insert in the front transparent cap. There are specially perforated label sheets available for this purpose.

The labelling is usually carried out using texts generated from CASE Suite, and the labels are printed on normal A4 paper using commercial printers.

Assigning modules to AS

The I/O electronics module is encoded for the hardware using pin inserts so that only the appropriate baseplate can be used. The AS detects whether a module baseplate is plugged into the I/O bus. The baseplate number and the assignment of module types for the I/O modules on the AS are defined with CASE Suite. This information is permanently stored in the AS.

LED indicator/function

The I/O module is equipped with a system LED that indicates the operating statuses as follows:

System LED

I/O bus LED	Status	Description
No designation	Continuous green light	Module in operation
	Flashing green or red	Module not ready for operation
	Alternating green - red - off	Lamp test active (indicator type priority)
	No indicator	No power supply

Digital inputs (DI fixed)

Number of inputs	8 (DI fixed)
Type of inputs	Potential-free contacts with ground connection Opto-coupler Transistor (open collector)
Pulse counter	≤ 50 Hz
Protection against external voltage	±30 V/24 V~ (without destruction)
Max. output current	1.2 mA to ground
Refresh rate	100 ms

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The binary information is connected between one of the input terminals (d0...d7) and the ground. The module applies a voltage of approximately 13 V to the terminal. If a contact is open, this corresponds to an INACTIVE state (bit = 0). If a contact is closed, there is an ACTIVE state (bit = 1) and 0 V is applied, giving a current of approximately 1 mA. Short-term changes of at least 20 ms between the queries of the station are stored temporarily and processed in the next cycle.

Every input can be defined individually as an alarm or a status by setting software parameters.

The digital inputs can be displayed with a local indicating unit (e.g. modu630 accessory).

Pulse counter (CI with DI)

At the digital inputs, counter inputs of potential-free contacts, opto-couplers or transistors with an open collector can be connected. The maximum pulse frequency may be 50 Hz. To ensure that switching contacts are recorded correctly, a debounce time of 5 ms is used. Pulses can be captured on the falling or rising edge, or on both edges. The minimum pulse duration should be four times the debounce time.

Universal inputs

Number of inputs	8 (UI)
Type of inputs (software coding)	Ni1000 (DIN 43760)
	Pt1000 (EN 60751)
	Voltage measurement (U)
	Current measurement (I), channels u8, u9 only!
	Potentiometer input (Pot)
	Resistance (R)
	Digital input (DI)
Protection against external voltage	
Ni/Pt/U/R/Pot/DI	± 30 V / 24 V~ (without destruction)
I (channels u8, u9)	+12 V / -0.3 V (without destruction)
Refresh rate	
Channels u8, u12	100 ms
Channels u9, u10, u11, u13, u14, u15	500 ms
For temperature measurement (independent of channel)	≤ 3 s
Resolution	14 bits
Measuring ranges	
Voltage (U)	0 (2)...10 V, 0 (0.2)...1 V
Current (I)	0 (4)...20 mA
Potentiometer (Pot)	0...1 (100%) with 3-wire connection (1...100 kΩ)
Reference	U_{ref} 1.23 V (terminal no. 22) load max. 10 mA
Resistance (R)	200...2500 Ω
Temperature Ni1000 Pt1000	-50...+150 °C -50...+150 °C
Digital input	Potential-free contacts with ground connection Opto-coupler, transistor (open collector) approx. I_{out} = 1.2 mA
Pulse counter	≤ 3 Hz

Temperature measurement (Ni/Pt)

The Ni/Pt1000 sensors are connected using two wires between one of the input terminals for universal inputs (channel u8...u15) and a ground terminal. The inputs require no calibration and can be used directly. Line resistance of 2 Ω is pre-compensated as standard. With the correct line resistance of 2 Ω (cable cross-section 1.5 mm²), the power cable (wire) may be no more than 85 m. Larger line resistances can be compensated by the software. The measurement current is pulsed to ensure that the sensor is not heated (I_{meas} approx. 0.3 mA).

Voltage measurement (U)

The voltage to be measured is connected between an input terminal for universal inputs (channel u8...u15) and a ground terminal. The signal must be potential-free. The measuring ranges with or

without offset 0 (0.2)...1 V or 0 (2)...10 V are selected through the software. The internal resistance R_i of the input (load) is 9 MΩ.

Current measurement (I)

The current can only be measured at two inputs. The current to be measured is connected at one of the two input terminals for universal inputs (channel u8, u9) and a ground terminal. The current signal must be potential-free. The measuring ranges with or without offset 0 (4)...20 mA are selected via the software. The maximum input current must be limited to 50 mA; the internal resistance R_i is < 50 Ω.

Potentiometer measurement (Pot)

The potentiometer is connected between an input terminal for universal inputs (channel u8...u15), a ground terminal and the terminal U_{ref} (reference voltage). The reference output is not short circuit-proof. To avoid overloading the reference output, the overall resistance of all connected potentiometers may not drop below 123 Ω (max. 10 mA load). For a stable, interference-free measurement, a potentiometer value of ≤ 10 kΩ is recommended.

> **Note**
> To maintain measuring accuracy, ground connections should always be connected to the same type of input.
> For an optimum connection, we recommend connecting one ground terminal of the I/O module directly with the AS or each appropriate cabinet terminal.

Digital inputs (DI with UI)

The AS also records binary information with the universal inputs. The information (alarm/status) is connected between an input terminal (u8...u15) and a ground terminal. The station applies a voltage of approximately 13 V to the terminal. If a contact is open, this usually corresponds to an INACTIVE state (bit = 0). If a contact is closed, there is an ACTIVE state (bit = 1) and 0 V is applied, giving a current of approximately 1 mA. Short-term changes of at least 20 ms between the station queries are saved briefly and processed at the next cycle.

Every input can be defined individually as an alarm or a status through software parameter setting. The digital inputs can be displayed with a local indicating unit (e.g. modu630 accessory).

At the universal inputs, meter inputs of potential-free contacts, opto-couplers or transistors with an open collector can be connected.

Technical specifications of the inputs and outputs

Universal input	Measuring range	Resolution	Precision **a** x measuring span + **b** x measured value	
Ni/Pt1000	-50…+150 °C	< 0.05 K	±0.5%	±0.5%
U (0/0.2...1 V)	0.02...1.1 V	< 0.1 mV	±0.5%	±0.5%
U (0/2...10 V)	0.15...10.2 V	< 1mV	±0.5%	±0.5%
I (0/4...20 mA)	0.5...22 mA	< 0.02 mA	±1%	±2%
R	200...2500 Ω	< 0.1 Ω	±0.2%	±1%
Pot (≥ 1 kΩ)	2...100%	< 0.5%	±1%	±1%

Example of calculating the accuracy: Measured value 20 °C. Measuring span: -50 °C + 150 °C = 200K

Precision = a x measuring span + b x measured value = ±0.5% x 200K ±0.5% x 20 °C = ±1K ±0.1K = ±1.1K

Binary input	Universal input (UI)	Digital input (DI)
Switching threshold inactive "0"	> 3 V	> 4 V
Switching threshold active "1"	< 1.5 V	< 2.5 V
Switching hysteresis	> 0.4 V	> 0.4 V
Pulse counter	≤ 3 Hz	≤ 50 Hz

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Channel and terminal assignment

Description modu530	Channel	Schematic	Terminals	
			Signal	**GND**
Digital input Pulse counter (CI)	0	d0	1	3, 5, 7, 9
	1	d1	2	
	2	d2	4	
	3	d3	6	
	4	d4	8	
	5	d5	10	
	6	d6	11	
	7	d7	12	
Universal input (Ni/Pt1000/U/I/R/Pot) Current signal only on channels 8, 9 or terminals 13, 14	8	u8	13	16, 18, 20
	9	u9	14	
	10	u10	15	
	11	u11	17	
	12	u12	19	
	13	u13	21	
	14	u14	23	
	15	u15	24	
Reference voltage 1.23 V		Ref	22	

Connection of local operating unit

The I/O module can be complemented with a modu630 local indicating unit to allow digital inputs to be displayed directly. The function corresponds to the standard EN ISO 16484-2:2004 for local over-ride and indication devices. The unit can be installed and removed during operation (hot-pluggable) without affecting functions of the AS or the I/O module.

modu630 contains 16 indicators in the form of bi-colour LEDs. Each input can be defined individually whether it is used as an alarm or a status input. An alarm is generally indicated in red when the contact is open; a status is generally green when the contact is closed.

Detailed information/functions of the LED actuation options can be seen in data sheet PDS 92.081 EY-LO6**.
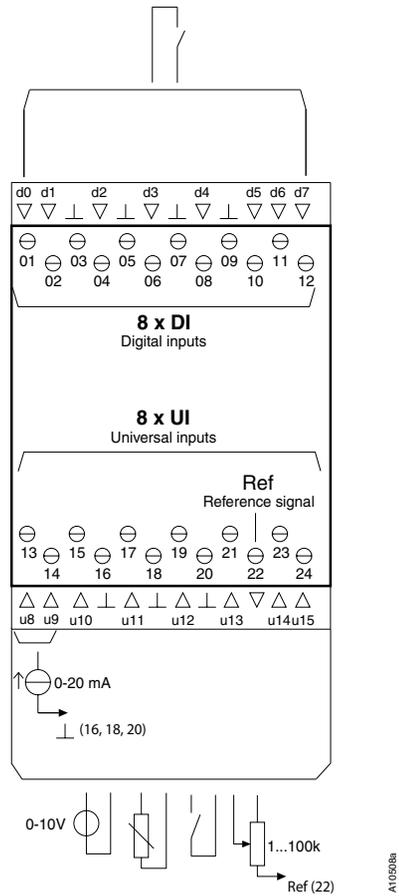
If an incompatible operating unit is connected, this status is indicated by the flashing of all LEDs (red and yellow). There is no risk of the I/O module being destroyed.

Disposal

When disposing of the product, observe the currently applicable local laws.

More information on materials can be found in the Declaration on materials and the environment for this product.

Connection diagram

A10508a

Dimension drawing

M11416

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