

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
- 16 inputs
- Power supply of modu525 automation station (AS)
- Pluggable element for extending the modu525 automation station
- Recording digital (alarm/status) and analogue inputs (Ni/Pt1000, U/I/R) in operational systems, e.g. in HVAC engineering
- Modular design (baseplate/electronics)
- Direct labelling on the front
- Can be equipped with a local indicating unit



EY-IO530F001

Technical data

Power supply

Power supply	From modu525 AS via I/O bus
Power consumption ¹⁾	≤ 1.6 VA/0.65 W
Power loss	≤ 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 top-hat rail
Dimensions W x H x D	42 × 170 × 115 mm
Weight	0.29 kg

Interfaces and communication

Connection for modu6 (LOI)	6-pin, integrated
Connection, I/O bus	12-pin, integrated
Connection terminals	24 (0.5...2.5 mm ²)

Standards and directives

Type of protection	IP 30 (EN 60529)
Protection class	I (EN 60730-1)
Environment class	3K3 (IEC 60721)

CE conformity as per	EMC directive 2004/108/EC	EN 61000-6-1, EN 61000-6-2, EN 61000-6-3, EN 61000-6-4
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Overview of types

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

¹⁾ On the primary side of modu525 base station (230V~)

²⁾ Supply via modu525 base station



Accessories

Local operating and indicating units (LOI)

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

Components

Type	Description
0920360003	24 V I/O module baseplate (pack of 3)
0929360530	Electronics module, modu530, 8 UI, 8 DI

Description of operation

Recording digital (alarm/status) and analogue inputs (Ni/Pt1000, U/I/R) in operational systems, e.g. in HVAC engineering

The I/O module has 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 documents 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 mounted in a cabinet using a top-hat rail (EN 60715) and connected on the side directly to the I/O bus of the modu525 AS or modules. This work must only be carried out in the de-energised state.

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 module electronics 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 module electronics should only be removed or inserted while the base station is switched off.

Labelling concept

The I/O module can be labelled with a paper insert in the frontal 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 module electronics are encoded on the hardware side using pin inserts so that only the appropriate baseplate can be used. The modu525 AS detects whether a module baseplate is plugged into the I/O bus. Baseplate number and 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 modes as follows:

System LED

LED I/O bus	Status	Indicator sequence	Description
No designation	Continuous green light	—————	Module in operation
	Pulsating green	o o o o o	Module not assigned with the base station
	Rapid pulsating red	oooooooooooooooooooo	AS in configuration, update or download
	Flashing red	o o o o o o o	Module incorrectly assigned or internal error
	Flashing red	o o o o o o o	AS in configuration, restart/download active
	Alternating green – red – off	oo oo oo oo oo	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 (100 ms scan rate)
Protection against external voltage	±30 V/24 V~ (without destruction)
Max. output current	1.2 mA to ground
Scan rate	100 ms

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

Pulse counters (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 up to 50 Hz. To ensure that switching contacts are recorded correctly, a debounce time of 5 ms is planned. Pulses can be captured on falling, rising or both switches. The minimum pulse time 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), channel u8, u9 only! Potentiometer input (Pot) Resistance (R) Digital input (DI)
Protection against external voltage	±30 V/24 V~ (without destruction)
Ni/Pt/U/R/Pot/DI I (channel u8, u9)	+12 V/-0.3 V (without destruction)
Scan rate 100 ms	Channels u8, u12
Scan rate 500 ms	Channels u9, u10, u11, u13, u14, u15
Resolution	14 bit
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...2,5 kΩ)
Reference	U _{ref} 1,23 V (terminal no. 22) > 1 kΩ, load max. 10 mA
Resistance (R)	200...2500 Ω
Temperature	
Ni1000	-50...+150 °C
Pt1000	-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 M Ω .

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). To avoid overloading the reference output, the lowest potentiometer value should not drop below 1 k Ω . The reference output is not short circuit-proof. The upper value of 2.5 k Ω is prescribed to guarantee a stable, fault-independent measurement.



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

At the universal inputs, counter 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	Accuracy of the measuring span plus 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	< 1 mV	±0.5%	0.5%
I (0/4...20 mA)	0.02...22 mA	< 0.02 mA	±1%	2%
R	200...2500 Ω	< 0.1 Ω	±0.2%	1%
Pot (> 1 k Ω)	1...100%	< 0.5%	±1%	1%
Binary input (0-I)	Universal input (UI)	Digital input (DI)		
Switching threshold active	> 3 V	> 4 V		
Switching threshold inactive	< 1.5 V	< 2.5 V		
Switching hysteresis	> 0.4 V	> 0.4 V		
Pulse counter	≤ 3 Hz	≤ 50 Hz		

Channel and terminal assignment

Description modu530	Channel	Schematic	Terminals	
			Signal	GND
Digital input	0	d0	1	
Pulse counter (CI)	1	d1	2	3
	2	d2	4	5
	3	d3	6	7
	4	d4	8	9
	5	d5	10	
	6	d6	11	13
	7	d7	12	15

Description modu530	Channel	Schematic	Terminals	
			Signal	GND
Universal input (Ni/Pt1000/U/I/R/Pot) Current signal only on channels 8, 9 or terminals 13, 14	8	u8	13	
	9	u9	14	
	10	u10	15	16
	11	u11	17	18
	12	u12	19	20
	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 (LOI) to allow digital inputs to be displayed directly. The function corresponds to the standard EN ISO 16484-2:2004 for local override and indicating units. The unit can be installed and removed during operation (hot-pluggable) without affecting functions of the AS or I/O module.

modu630 contains 16 indicators in the form of bi-colour LEDs. It can be defined individually for each input 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 the data sheet PDS 92.081 for EY-LO 6**.


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

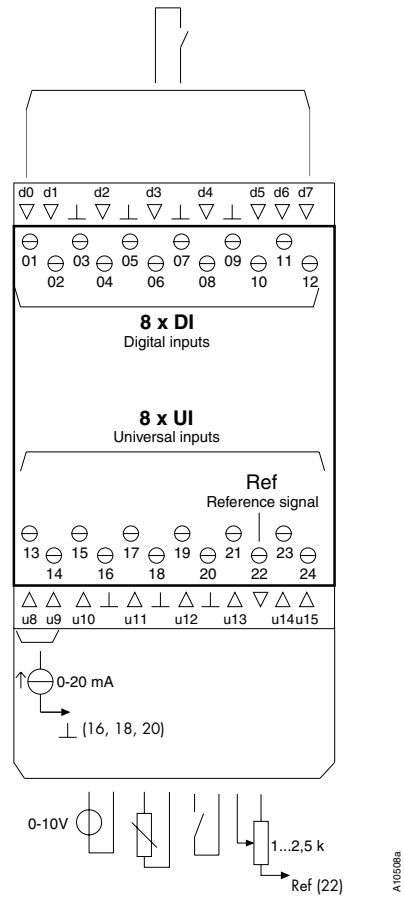
When disposing of the product, observe the currently applicable local laws.

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

Accessories

EY-LO630F001	Single unit used for indication of the data points of the modu530 I/O or modu525 AS		
	16 LEDs	LED indication, bi-colour, green/red (freely configurable for Event/Alarm)	

Connection diagram



Dimension drawing

