

## EY-IO 533: I/O module, universal, digital, S0 inputs, modu533

### 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
- Plug-in element for extending the modu525 automation station (AS)
- Power supply from modu525 AS
- Recording digital (alarm/status), analogue inputs (Ni/Pt1000, U/I/R) and counter signal S0 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-IO533F001

### Technical data

Power supply		
Power supply		From modu525 AS via I/O bus
Power consumption <sup>1)</sup>		≤ 2.9 VA/1.5 W
Power loss		≤ 1.5 W
Current consumption <sup>2)</sup>		100 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		
Universal inputs		8
Analogue		Ni1000/Pt1000, U/I(2x)/R, pot
Digital		DI (≤ 3 Hz)
Digital inputs		8 (≤ 50 Hz)
Fixed assignment		4
Meter inputs S0		4 (as per IEC 62053-31)
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 <sup>2</sup> )
Construction		
Fitting		On top-hat rail
Dimensions W x H x D		42 × 170 × 115 mm
Weight		0.29 kg
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
Overview of types		
Type	Properties	
EY-IO533F001	I/O module, universal, digital, S0 inputs, modu533	

<sup>1)</sup> On the primary side of modu525 base station (230 V~)

<sup>2)</sup> 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)
0929360533	Electronics module, modu533, 8 UI, 4 DI, 4 S0

### Description of operation

The modu533 I/O module is used for recording digital (alarm/status), analogue inputs (Ni/Pt1000, U/I/R) and counter signal S0 in operational systems, e.g. in HVAC engineering.

### 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 modu533 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. The labelling is usually carried out using texts generated from CASE Suite, and the labels are printed on normal A4 paper using a commercial printer.

### 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	—————	Module in operation
	Pulsating green	o o o o o o	Module not assigned with the base station
	Rapid pulsating red	oooooooooooooooo	AS in configuration, update or download
	Flashing red	o o o o o o o	Module incorrectly assigned or internal error
	Alternating green – red – OFF	oo oo oo oo oo	Lamp test active (indicator type priority)
	No indicator		No power supply

### Universal inputs

The I/O module has a total of 8 universal inputs and 8 digital inputs. At the digital inputs, 4 inputs can also be used as an S0 interface.

Number of inputs	8
Type of inputs (software coding)	Ni1000 (DIN 43760) Pt1000 (IEC 751) Voltage measurement (U) Current measurement (I), channel u0, u1 only! Potentiometer input (Pot) Resistance (R) Digital input (DI)
<i>Protection against external voltage</i> Ni/Pt/U/R/Pot/DI I (channel u0, u1)	$\pm 30$ V/24 V~ (without destruction) +12 V/-0.3 V (without destruction)
Scan rate 100 ms Scan rate 500 ms Resolution	Channels u0, u5 Channels u1, u2, u3, u4, u6, u7 14 bit
<i>Measuring ranges</i> Voltage (U) Current (I) Potentiometer (Pot)	0 (2)...10 V, 0 (0.2)...1 V 0 (4)...20 mA 0...1 (100%) with 3-wire connection (1...10 k $\Omega$ )
Reference	$U_{ref}$ 1,23 V (terminal no. 9) > 1 k $\Omega$ , load max. 10 mA
Resistance (R)	200...2500 $\Omega$
<i>Temperature</i> 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	$\leq 3$ Hz

### Temperature measurement (Ni/Pt)

The Ni/Pt1000 sensors are connected using two wires between one of the input terminals and a ground terminal. The inputs require no calibration and can be used directly. Line resistance of 2  $\Omega$  is pre-compensated as standard. With the correct line resistance of 2  $\Omega$ , (cable cross-section 1.5 mm<sup>2</sup>), 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 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 $\Omega$ .

### Current measurement (I)

The current can be measured at two inputs. The current to be measured is connected on one of the input terminals for channel u0 and u1 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  $\Omega$ .

### Potentiometer measurement (Pot.)

The potentiometer is connected between a ground terminal and a  $U_{ref}$  (reference voltage) terminal. The slide contact is connected at an input terminal. This measurement is ratiometric. The voltage measured is proportionally related to the angle of rotation. To avoid overloading the reference output, the lowest potentiometer value should not drop below 1 k $\Omega$ . The reference output is not short circuit-proof. A value of 2.5 k $\Omega$  is recommended to guarantee a stable measurement.

### 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 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 modu630 local indicating unit (accessory) the digital inputs can be displayed.

### Digital inputs

Number of inputs	8 of which 4 are DI fixed
Type of inputs	Potential-free contacts with ground connection Opto-coupler Transistor (open collector)
Pulse counter	Up to 50 Hz (100 ms scan rate)
Protection against external voltage	$\pm 30$ 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 (d8...d11) 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 modu630 local indicating unit (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.

### “S zero” inputs

Number of inputs	4
Type of inputs	S0 current pulse
Standard	IEC 62053-31
(Software coding)	s12, s13, s14, s15

The S0 interface is used to record signals from energy counters.

The transmission is by means of current pulses (sink); the weighting is based on the counters connected.

The automation station applies a voltage of approximately 13 V to the terminals s12...s15.

A current flow of < 2 mA corresponds to a “LOW” value (= contact open), a current value > 1 mA is interpreted as a “HIGH” value (contact closed).

Pulse frequencies of up to 50 Hz can be recorded.

The S0 inputs can also be used as direct digital inputs.



Note

To maintain measuring accuracy, the connections to the ground should only be occupied with one input type at a time.

### 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	$\pm 0.5\%$	0.5%
U (0/0.2...1 V)	0.02...1.1 V	< 0.1 mV	$\pm 0.5\%$	0.5%
U (0/2...10 V)	0.15...10.2 V	< 1 mV	$\pm 0.5\%$	0.5%
I (0/4...20 mA)	0.02...22 mA	< 0.02 mA	$\pm 1\%$	2%
R	200...2500 $\Omega$	< 0.1 $\Omega$	$\pm 0.5\%$	1%
Pot ( $\geq 1$ k $\Omega$ )	0...100%	< 0.5%	$\pm 1\%$	1%
<b>Digital input</b>				
<b>Binary input (0-1)</b>				
Switching threshold inactive	< 1.5 V			
Switching hysteresis	> 0.4 V			
Pulse counter	$\leq 50$ Hz			
<b>S0 input</b>				
Current pulses (sink)				
Switching threshold active	> 10 mA			
Switching threshold inactive	< 2 mA			
Power supply	Internal, 13 V			
Pulse counter	$\leq 50$ Hz			

## Channel and terminal assignment

Description modu533	Channel	Schematic	Terminals	
			Signal	GND
<b>Universal input</b> (Ni/Pt1000/U/I/R/Pot) Power signal to channels 0, 1 only, or to terminals 1, 2 Reference voltage 1.23 V	0	u0	1	
	1	u1	2	3
	2	u2	4	5
	3	u3	6	7
	4	u4	8	
		Ref	9	
	5	u5	10	
<b>Digital input</b> (Pulse counter CI)	6	u6	11	
	7	u7	12	
	8	d8	13	
	9	d9	14	
	10	d10	15	16
<b>S0 input</b>	11	d11	17	18
	12	s12	19	20
<b>S0 input</b>	13	s13	21	22
<b>S0 input</b>	14	s14	23	
<b>S0 input</b>	15	s15	24	

### Connection of local operating unit

The I/O module can be complemented with a modu630 local indicating unit (accessory) to allow direct display of the digital inputs or violations of limit values of analogue inputs. The unit can be installed and removed during operation (hot-pluggable) without affecting functions of the automation station 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 product data sheet PDS 92.081.

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.

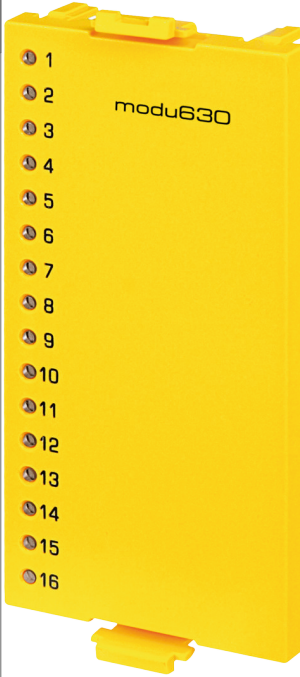
### Disposal

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

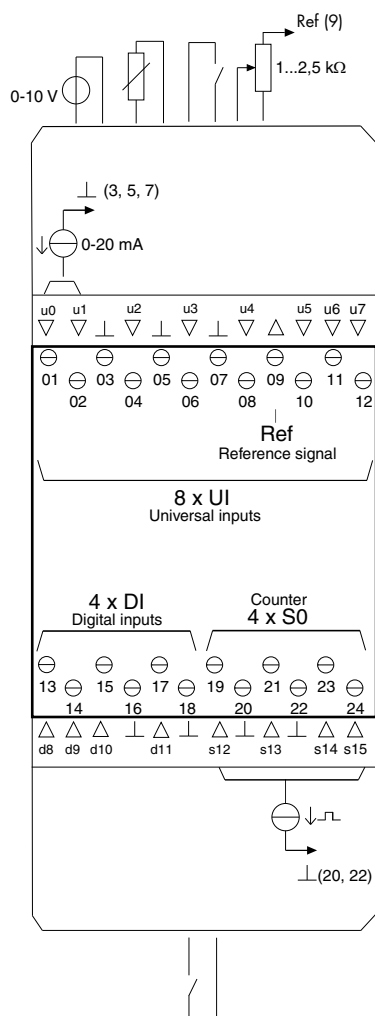
More information on materials can be found in the Declaration on materials and the environment for this product.

Accessories

<b>EY-LO630F001</b>	Single unit used for indication of the data points of the modu533 I/O module or modu525 AS	
	<b>16 LEDs</b>	LED indication, bi-colour, green/red (freely configurable for alarm/status)



Connection diagram



## Dimension drawing

