

EY6IO72: 4 × AO, 4 × DO(OC), 4 × UI (DI/CI/AI) I/O module, modu672-IO

Features

- Part of the SAUTER modulo 6 system family
- Plug-in element for extending the modu660-AS and modu680-AS automation stations and modu612-LC link coupler
- Activation with a standard signal (0(2)...10 V, 0(4)...20 mA) in operational systems, such as HVAC engineering
- Receiving digital inputs (alarm/status) and analogue inputs (Ni/Pt1000, U/I/R/Pot) in operational systems
- Four universal inputs, four analogue outputs and four digital outputs
- Power supply from automation station (modu6**-AS), link coupler (modu612-LC) or supply module (modu601-LC)
- Can be equipped with a local operating and indicating unit (modu600-LO)



EY6IO72F001

Technical data

Power supply		
	Power supply	From AS or LC via I/O bus
	Power consumption	
	Dissipated power	
Ambient conditions		
	Operating temperature	0...45 °C
	Storage and transport temperature	-25...70 °C
	Ambient humidity	10...90% rh, no condensation
Inputs/outputs		
Universal inputs (UI)	Number of inputs	4
	Analogue	0(2)...10 V, 0(4)...20 mA, R, Ni1000, Pt1000, Pot
	Digital ¹⁾	DI/CI (≤ 50 Hz)
Analogue outputs (AO)	Number of outputs	4
	Analogue	0(2)...10 V, 0(4)...20 mA
	Load	≤ 20 mA
	Load ≥ 5 Ω	Output 0...10 V / 2...10 V
	Load ≤ 400 Ω	Output 0...20 mA / 4...20 mA
Digital outputs (DO)	Load voltage	< 2 V (0(4)...20 mA)
	Number of outputs	4
	Type of outputs	Open collector, normally-open contacts (0-I), outputs switched with respect to ground (any arrangement)
	Power supply for DO	External, positive ≤ 28 V=
Interfaces and communication	Load	0...100 mA (max. 2 V voltage drop)
	Connection, LOI	4-pin
	Connection, I/O bus	7-pin, spring contact
	Connection terminals	4 × 8-pin spring-loaded plug-in connectors
	Earth connector	Spring contact against DIN rail
Construction		
	Fitting	On DIN rail 35 × 7.5/15 as per EN 60715
	Dimensions W x H x D	55.7 (3 HP) × 100 × 59 mm
	Weight	

¹⁾ 50 Hz only with PC module, otherwise 5 Hz



Standards and directives

	Type of protection	Connections and terminals:IP00 Front in DIN cut-out:IP30 As per 60730-1
	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, EN 50491-5-1, EN 50491-5-2, EN 50491-5-3

Overview of types

Type	Features
EY6IO72F001	4 × AO, 4 × DO(OC), 4 × UI (DI/CI/AI) I/O module (expected to be available in mid-2021)

Accessories

Type	Description
EY6LO00F001	Local operating and indicating unit for I/O modules

Manuals

Document number	Language	Title
D100397589	de	Systembeschreibung SAUTER modulo
D100408512	de	EY-modulo 6 – Best Practice I
D100402674	en	SAUTER modulo system description
D100410201	en	EY-modulo 6 – Best Practice I
D100402676	fr	Description du système SAUTER modulo
D100410203	fr	EY-modulo 6 – Meilleures pratiques I

Description of operation

The modu672-IO is an I/O module for extending the modu660-AS and modu680-AS automation stations and the modu612-LC link coupler.

The modu672-IO serves the following purposes in operational plants (e.g. in HVAC):

- Activation of actuators, such as relays or displays
- Activation via standard signal (0(2)...10 V, 0(4)...20 mA)
- Acquisition of digital status and alarm inputs
- Acquisition of digital counter pulses
- Receiving analogue inputs (Ni/Pt1000, U, I, R, Pot)

The module provides four universal inputs, four analogue outputs and four digital outputs.

All external power supplies must have safe, undamaged insulation.

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.

Improper use

The SAUTER modulo 6 system does not have functional safety and is not fail-safe. MTTF, MTBF and MTTR data is not available.

This product is not suitable:

- for safety functions
- in transportation means and storage facilities as per Directive 37/2005
- as a measuring device as per EU Measuring Instruments Directive 2014/32/EU
- for use outside and in rooms with the risk of condensation

Fitting notes



Note

Only qualified electricians are permitted to fit and connect the module.
Prevent access by laypersons.

The modu672-IO is a module that is connected frontally on the DIN rail. It is not necessary to slide it in from the side. The connection between the modules is made via spring contacts on the side. The modules must be pushed together on the DIN rail in such a way that the spring contacts ensure that the signal cable is connected to the I/O bus system.

The spring contacts of the last module on the right side must be covered by the bus cover provided with the automation station (AS).

All external power supplies must have safe, undamaged insulation.

Note



The ground terminal must not be earthed.

For examples and procedures for problem-free installation and wiring, see the manual "EY-modulo 6 – Best Practice I"

Assignment to the automation station (AS)

The type and position of the I/O module in the system are defined using CASE Suite. This information is stored permanently in the AS.

If the configuration with CASE Suite does not match the physical arrangement of the module, this is indicated by the system LED of the module.

LED indicators

The following operating statuses of the I/O module are indicated by the front system LED:

Status ²⁾	Indicator	Description
Continuous green		Normal mode
Continuous orange		Startup mode
Flashing orange		Configuration error
Continuous red		Not configured
Flashing red		I/O bus communication error
Alternating Green → Red → Off (1 sec. each)		LED test
Off		No power supply

Universal inputs (UI)

Number of inputs	4	
Type of inputs (software coding)	Temperature, Ni1000 (DIN 43760)	
	Temperature, Pt1000 (EN 60751)	
	Resistance (R)	
	Voltage measurement (U)	
	Current measurement (I)	
	Potentiometer measurement (Pot)	
Protection against external voltage	Ni/Pt1000:	± 30 V= / 24 V~
	R:	± 30 V= / 24 V~
	U, 0(2)...10 V:	± 30 V= / 24 V~
	I, 0(4)...20 mA:	12 V / -0.3 V
	Pot:	12 V / -0.3 V
	DI:	± 30 V= / 24 V~

²⁾ LED flashing: 500 ms on, 500 ms off
LED flashing rapidly: 100 ms on, 100 ms off

Refresh rate	Ni/Pt1000:	1000 ms
	R:	1000 ms
	U, 0(2)...10 V:	100 ms
	I, 0(4)...20 mA:	100 ms
Resolution		12 bit oversampled
	Ni/Pt1000:	≤ 0.01 °K
	R:	< 0.1 Ω
	U, 0(2)...10 V:	1 mV
	I, 0(4)...20 mA:	< 0.005 mA
	Pot:	≤ 0.1%
Measuring ranges	Temperature, Ni1000:	-50...180 °C
	Temperature, Pt1000:	-50...180 °C
	Resistance (R):	200...2500 Ω
	Voltage (U):	0.15...11.5 V
	Current (I)	0.5...22 mA
	Potentiometer (Pot)	0...100%
	Reference (U _{ref}):	1.2 V
Digital input	Pulse counter	≤ 50 Hz
	Overview of pulse recording firmware module	Potential-free contacts with ground connection, opto-coupler, transistor (open collector) approx. I _{out} ≤ 1.5 mA
	BI	≤ 5 Hz
	PC	≤ 50 Hz

Temperature measurement (Ni/Pt)

The Ni/Pt1000 sensors are connected using two wires between one of the input terminals for universal inputs (channels u8...u11) and a ground terminal.

The inputs require no calibration and can be used directly. A line resistance of 2 Ω is pre-compensated as standard. With a cable cross-section of 1.5 mm², the maximum length of the connecting cable is therefore 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. 1.8 mA).

Voltage measurement (U)

The connection for voltage measurement is made between an input terminal (channels u8...u11) and the corresponding ground terminal.

The measuring ranges with or without offset 0(2)...10 V are selected using the CASE software. The internal resistance R_i of the input (load) is 9 MΩ.

Current measurement (I)

The connection for current measurement is made between an input terminal (channels u8...u11) and the corresponding ground terminal.

The measuring ranges with or without offset 0(4)...20 mA are selected using the CASE software. The 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 (channels u8...u11), 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 the measuring accuracy, ground connections should only be assigned to the same input type. For an optimum connection, it is recommended to connect one ground terminal of the I/O module directly (short) to the AS or to a corresponding cabinet terminal.

Digital inputs (DI with UI)

The automation station (AS) also records binary information with the universal inputs. The information (alarm and status) is connected between an input terminal (channels u8...u11) and the related ground terminal.

The module applies a voltage of > 9.5 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 1.5 mA.

Every input can be defined individually as an alarm, status or pulse counter by setting software parameters. The digital inputs can be displayed with the modu600-LO local operating and indicating unit.

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

Analogue outputs (AO)

Number of outputs		4
Type of outputs	Analogue:	0(2)...10 V= or 0(4)...20 mA ≥ 20 mA (source) per output Return cable connected to ground
Refresh rate		20 ms
Resolution	U, 0(2)...10 V:	2 mV
	I, 0(4)...20 mA:	20 µA

The output voltage is taken from between an output terminal (a0...a3) and a ground terminal.

The outputs are designed as push-pull outputs with active sink capability (> 1 V).

Every output can be subjected to a load of 2 mA.

A standard or default value can be defined in CASE Engine. This value applies if the module is supplied with power but the station is out of operation.

Switching between the current and voltage mode depends on the load connected:

- Load ≤ 400 Ω: the modu672-IO assumes that a current input is connected and issues a current signal.
- Load ≥ 5 kΩ: the modu672-IO assumes that a voltage input is connected and issues a voltage signal.

A load between 400 Ω and 5 kΩ is to be avoided, as under these conditions an undefined status exists. If there is another component in series with the load resistance (e.g. diode, Zener diode), this analogue output is unsuitable for this purpose. The output is explicitly unsuitable for sensors that take their energy supply from the current signal (0(4)...20 mA).

The specification must be maintained across the entire measuring range. The load that applies to the output terminals, including the line resistance and parasitic resistances, is the deciding factor.

The outputs are protected against static discharges.

ATTENTION!



The analogue outputs (AO) are not protected against applied DC or AC voltage. However, there is protection against short circuits.

Digital outputs (DO)

Number of inputs/outputs	4
Type of inputs/outputs	Signal to ground/GND
Load on outputs	≤ 28 V= / 100 mA
Digital output	24 V= / 0...100 mA (sink)
Processing cycle time	60 ms
Length of connecting cable	≤ 30 m

Characteristics of the digital outputs

Targeted feedback signals can only be implemented via digital inputs.

The open collector outputs (OC) can be supplied with a maximum supply voltage of 28 V=. The signals are to ground/GND.

Plant devices are connected via pluggable spring-type terminals. This may only be carried out when the system is disconnected from the electrical supply.

**Note**

According to standard EN 61000-6-2, the connecting cables for the digital open collector outputs (DO-OC) may not be longer than 30 m.

In the event of a module defect, defined output states are guaranteed by an independent internal cut-off facility. This prevents flickering of the outputs.

The OC outputs assume the defined state "0" (off) in the following situations:

- if the power supply to the I/O module fails,
- if the power supply to the AS fails.

A standard or default value can be defined in CASE Engine. This value applies if the module is supplied with power but the station is out of operation.

**Note**

All OC outputs are equipped with protective circuitry. DO-OC is disabled in case of overload. After returning to normal load, the control command must be reset.

When connecting relays with integrated protection, e.g. with flyback diodes, the correct polarity must be observed.

Technical specification of the inputs and outputs

Universal input (UI)	Measuring range	Resolution	Accuracy
Ni/Pt1000	-50...+150 °C	< 0.01 K	± 1.5 K ± 0.25 K (at 15...30 °C)
R	200...2500 Ω	< 0.1 Ω	± 10 Ω
U, 0(2)...10 V	0/0.15...11.5 V	1 mV	± 0.01 V
I, 0(4)...20 mA	0/0.5...2 mA	< 0.005 mA	± 0.05 mA
Pot	100...10,000 Ω	≤ 0.1%	± 0.5%

Binary input	Switching threshold inactive "0"	Switching threshold active "1"	Switching hysteresis	Pulse counter
Universal input (UI)	4 V	1 V	0.4 V	≤ 50 Hz ³⁾

Analogue output (AO)	Range of adjustment	Resolution	Accuracy
U, 0(2)...10 V	0/0.01...10.5 V	2 mV	± 0.02 V
I, 0(4)...20 mA	0...22 mA	20 µA	1.5% of the measuring range, 0.33 mA

Binary output	Max. I _{out}	Voltage drop at max. I _{out}
Digital output (DO-OC)	100 mA	2 V

Channel and terminal assignment

Universal input (Ni/Pt1000, U, I, R, DI/CI)

Channel	Schematic	Terminals		
		Signal	Reference	GND
8	u8	17	19	18, 20
9	u9	21	23	22, 24
10	u10	25	27	26, 28
11	u11	29	31	30, 32

Analogue output (0(2)...10 V, 0(4)...20 mA)

Channel	Schematic	Terminals	
		Signal	GND
0	a0	2	1
1	a1	4	3
2	a2	6	5
3	a3	8	7

³⁾ 50 Hz only with PC module, otherwise 5 Hz

Digital output (DO/OC)

Channel	Schematic	Terminals	
		Signal	GND
4	od4	10	9
5	od5	12	11
6	od6	14	13
7	od7	16	15

Connection of the local operating and indicating unit (LOI)

The modu600-LO LOI can be added to the modu672-IO. The LOI enables the direct control of the positioning signals and the display of the input and output signals.

The unit can be installed and removed during operation (hot-pluggable) without affecting functions of the AS or I/O module.

For detailed information on the control function and display, see product data sheet 91.141 for the modu600-LO.

Note



The modu600-LO does not store any override values. When the unit is removed, all outputs are operated with the automatic values of the AS or the I/O module. When a unit is inserted, the signals remain unchanged.

LOIs allow limited operation of plant components without the intervention of the AS intended for the application. Outputs of the I/O modules in manual operation may change the value briefly when the user program is downloading. The LOI can be used to actuate the analogue outputs in the AS directly even without a user application (CASE Engine).

With the modu601-LC module for separate I/O module supply, the I/O modules can be supplied independently of the station, so that the signals can continue to be displayed and controlled in the event of the absence, failure or soft reboot of the station.

Note



The modu600-LO LOI is not suitable to be used as an emergency operating device as per Machine Directive 2006/42/EU. Standard EN ISO 13849-1 has not been considered. If applicable, a local emergency operating device must be installed on the plant side.

Access security

CAUTION!



Priority operating units can lose their priority function.

- ▶ Limit the access to the local operating level (incl. via apps) on site.
- ▶ Consider the access security during the planning and risk assessment of the plant.

Labelling concept

The LED display of the modu600-LO shows the individual channels as configured with CASE Suite.

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

Dimension drawing

All dimensions in millimetres.

