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 the modu612-LC IP 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 or pulse counter) 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 modu6**-AS automation station, modu612-LC IP coupler or modu601-LC supply module
- Can be equipped locally with a modu600-LO operating and indicating unit

EY6IO72F001

Technical data

Power supply		
	Power supply	From AS or LC via I/O bus
	Power consumption	≤ 3 W
	Dissipated power[1]	≤ 3 W

Ambient conditions		
	Operating temperature	0…45 °C
	Storage and transport temperature	−20…70 °C
	Ambient humidity	10…90% rh, no condensation

Inputs/outputs		
Universal inputs (UI)	Number of inputs	4
	Analogue	U: 0(2)…10 V I: 0(4)…20 mA R: 200…2500 Ω Ni1000, Pt1000 Potentiometer
	Reference voltage	3 V (potentiometer)
	Digital[2]	DI/CI (≤ 50 Hz)
Analogue outputs (AO)	Number of outputs	4
	Analogue	U: 0(2)…10 V I: 0(4)…20 mA
	Voltage output (U)	Load > 5 kΩ
	Current output (I)	Load < 500 Ω
Digital outputs (DO)	Number of outputs	4
	Type of outputs	Open collector, NO contact (0-I), outputs switching to ground
	Power supply for DO	External, positive ≤ 28 VDC
	Workload	Typ. 100 mA, max. 250 mA Voltage drop ≤ 1.5 V

Interfaces, communication		
	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 metal DIN rail 35 × 7.5/15 as per EN 60715. DIN rail housing as per DIN 43880

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[1] *Measured value without accessories*

[2] *50 Hz only with PC module, otherwise 5 Hz*

	Dimensions W × H × D	56 (3 HP) × 100 × 59 mm
	Weight	137 g

Standards, directives

	Type of protection	Connections and terminals: IP00 Front in DIN cut-out:IP30 (EN 60730-1)
	Protection class	I (EN 60730-1)
	Software class[3]	A (EN 60730-1, Appendix H)
	Environment class	3K3 (IEC 60721)
CE/UKCA conformity[4]	EMC-D 2014/30/EU (CE)	EN 50491-5-1, EN 50491-5-2, EN 50491-5-3
	EMC-2016 (UKCA)	See EMC Directive
	RoHS-RL 2011/65/EU & 2015/863/EU (CE)	EN IEC 63000
	RoHS-2012 (UKCA)	EN IEC 63000

Overview of types

Type	Features
EY6IO72F001	4 × AO, 4 × DO(OC), 4 × UI (DI/CI/AI) I/O module

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 coupler.

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

• Activation of actuators, such as relays or displays. An external interlock may be required
• Activation via standard signal (0(2)…10 V, 0(4)…20 mA)
• Acquisition of digital status and alarm inputs
• Acquisition of digital counter pulses
• Acquisition of analogue inputs (Ni/Pt1000, U, I, R)
• Acquisition of a potentiometer in % against the reference signal (3 V)

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

All external power supplies must have safe, undamaged insulation.

Note

The modu672-IO can be used as a current and voltage source. The power consumption is thus greater when a load is connected than that of the other modulo 6 IO modules.

When calculating the use of modu601-LC power supply modules, each modu672-IO must be considered as a double load.

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.

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[3] *The product is not suitable for safety functions*

[4] *Explanation of abbreviations in the "Further information" section of the product data sheet and in the appendix to SAUTER's product catalogues*

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 transport equipment and storage facilities as per Regulation 37/2005
- As a measuring device as per EU Measuring Instruments Directive 2014/32/EU
- For use outdoors and in rooms with a risk of condensation

Engineering and fitting notes

Notice

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. The connection between the modules is made via spring contacts on the side.

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

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

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

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[5]	Indicator/display	Description
Continuous green	🟢	Normal mode
Continuous orange	🟠	Start-up 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

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[5] *LED flashing: 500 ms on, 500 ms off*

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)	
	Digital input (DI/CI)	
Protection against External voltage	± 28 VDC	
Measuring period	Ni/Pt1000	Approx. 1250 ms
	R	
	U, 0(2)…10 V	Approx. 200 ms
	I, 0(4)…20 mA	
Resolution		12 bit oversampled
	Ni/Pt1000	0.02 K
	R	0.1 Ω
	U, 0(2)…10 V	1 mV
	I, 0(4)…20 mA	0.02 mA
	Pot	0.1%
Measuring ranges At 25 °C.	Temperature, Ni1000 [*]	−50…185 °C
	Temperature, Pt1000 [*]	
	Resistance (R) [*]	200…2500 Ω R < 1600 Ω, $I_{measured}$ = 1.8 mA R > 1400 Ω, $I_{measured}$ = 1.0 mA
	Voltage (U)	0.01…10.5 V
	Current (I)	0.02…22 mA
	Potentiometer (pot)	0…100%
	Reference (U_{ref})	3.0 V ± 0.5%, max. 24 mA total at 125 Ω
Digital input	Pulse counter	≤ 50 Hz
	Overview of pulse recording firmware module	BI ≤ 5 Hz
		PC ≤ 50 Hz

[*] To avoid self-heating, the measuring signal is pulsed at approx. 20% duty cycle

Temperature measurement (Ni/Pt)

The Ni1000 sensors (DIN 43760, Ni1000TK5000) and Pt1000 sensors (EN 60751) are connected using two wires between one of the input terminals for universal inputs (channels u8 u11) and the corresponding 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. Other line resistances can be compensated by the software. The measurement current is pulsed so that the sensor is not heated up.

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 approx. 100 kΩ.

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 should be limited to 30 mA. The internal resistance R_i is 50 Ω ± 0.5%.

> **Note**
> If the power supply to the module fails, the current loop is interrupted during the current measurement and is no longer functional. Connected devices may also not be functional.

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 short-circuit-proof.

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 the corresponding ground terminal of the I/O module directly (short) to the automation station or to a corresponding cabinet terminal.

Digital inputs (DI/CI with UI)

The automation station 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 1.6 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)

	U	I
Function type	Voltage source	Current source
Outputs (4 pcs.)	0(2)...10 V	0(4)…20 mA
Resolution	2 mV	0.004 mA
Load	–	< 500 Ω
U_{max} (open)	–	< 16.8 V
Load	> 5 kΩ	–
I_{max} (at 5 kΩ)	2 mA	–
I_{max} short circuit	13 mA	–
Measuring period	20 ms	

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

The outputs (current or voltage) are designed as sources (not sinks) and are therefore active components.

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 or in start-up mode.

Digital outputs (DO)

Number of outputs	4
Type of outputs	Open collector, NO contact (0-I)
Load on outputs	≤ 28 VDC / typ. 100 mA, max. 250 mA
Processing cycle time	60 ms

Characteristics of the digital outputs

The open collector outputs (OC) can be supplied with a maximum supply voltage of 28 VDC. 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.

The OC outputs assume the defined default value in the following situations:
- If the power supply to the automation station fails, provided that the module with modu601-LC is still supplied
- If communication between the automation station and the module fails
- At start-up of the automation station

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 or in start-up mode.

Note

All OC outputs are equipped with a protective circuit. At I ≥ 265 mA, an OC output is switched off (overload protection). This condition is checked every 10 seconds.

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[6]
Ni1000	−50…+185 °C	0.02 K	± 1.7 K ± 1.0 K (measured value: 15...30 °C)
Pt1000			± 2.9 K ± 1.6 K (measured value: 15...30 °C)
R	200…2500 Ω	0.1 Ω	± 5 Ω
U	0.1…10.5 V	1 mV	± 0.03 V
I	0.05…22 mA	0.02 mA	± 0.08 mA
Pot	500…10 000 Ω	0.1%	± 0.5%

Binary input

	Guaranteed switching threshold		Switching hysteresis	Pulse counter
	Inactive "0"	Active "1"		
Universal input (UI)	4 V	1 V	0.4 V	≤ 50 Hz[7]

Analogue output (AO)

	Range of adjustment	Resolution	Accuracy
U	0/0.01…10.5 V	2 mV	± 0.02 V
I	0…22 mA	4 µA	±0.5% of measuring range

Binary output

	I_{typ} (I_{max})	Voltage drop at I_{max}
Digital output (DO-OC)	100 mA (250 mA)	< 1.5 V

Channel and terminal assignment

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

Duct	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

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[6] *At an I/O module temperature of 25 °C*

[7] *50 Hz only with PC module, otherwise 5 Hz*

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

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

Digital output (DO/OC)

Duct	Schematic	Terminals	
		Signal	GND
4	o4	10	9
5	o5	12	11
6	o6	14	13
7	o7	16	15

Connection of the local operating and indicating unit (LOI)

The I/O module can be supplemented by the LOI modu600-LO. The LOI enables direct control of the positioning signals and display of the input and output signals.

The unit can be installed and removed during operation (hot-pluggable) without affecting functions of the automation station 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 a unit is removed and inserted, the signals remain unchanged.
Override values are deleted during a firmware update.

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

As required by EN ISO 16484, the modu600-LO offers independent local priority operation on the IO modules when the automation station is switched off or has failed. This requires 24 VDC from the module for separate IO module supply, the modu601-LC.

Modules supplied via a modu612-LC can also benefit from local priority operation with the modu600-LO if the automation station fails.

Note

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

Access security

NOTICE!

Priority operating units can lose their priority function.
►Limit access to the local operating level (including via apps) on site.
►Take access security into account 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.

Additional information

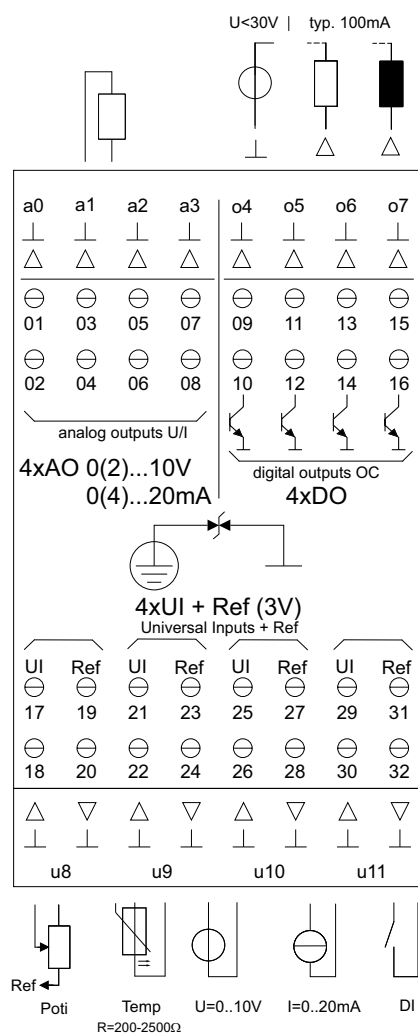|	
Fitting instructions	P100017303
Declaration on materials and the environment	MD 91.136

Abbreviations used

CE	Manufacturer's Declaration of Conformity for the European Union (EU)
UKCA	Manufacturer's Declaration of Conformity for the United Kingdom of Great Britain and Northern Ireland (UK)
EMC-D	Electromagnetic Compatibility Directive 2014/30/EU
EMC-2016	Electromagnetic Compatibility Regulations 2016 (UK)
RoHS-D	RoHS Directives 2011/65/EU and 2015/863/EU
RoHS-2012	Restriction of Hazardous Substances (RoHS) Regulations 2012 (UK)

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 mm.

72,3*

59

52,5

*) Depth when installing
modu600-LO

107

100

50

50

56