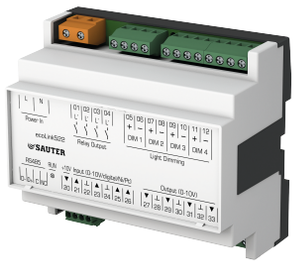
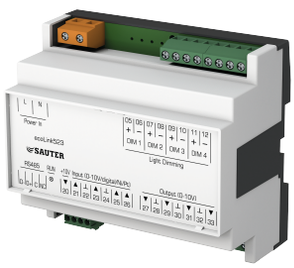
EY-EM 522, 523: Remote I/O module, ecoLink522, 523



EY-EM522F001



EY-EM523F001

Improving energy efficiency

Regulation, control, monitoring and optimisation of operational systems, e.g. room automation or HVAC engineering, in combination with an automation station

Features

- Part of the SAUTER EY-modulo 5 system family
- Remote I/O module for ecos500 and modu521
- Switching and dimming of up to 4 lamps
- Can be located up to 500 m from the automation station

Technical data

Power supply		
	Power supply	230 V~, ±10%, 50...60 Hz
	Current consumption	Max. 20 mA (typically 14 mA) Without load current of relays
	Power loss	Max. 2.5 W (typically 1.5 W)
Ambient conditions		
	Operating temperature	0...45 °C
	Storage and transport temperature	-25...70 °C
	Admissible ambient humidity	10...85% rh, no condensation
Inputs/Outputs		
Relay outputs	Type	0-I relay, NO contacts 230 V~ with voltage applied
	Load	230 V~/5 A resistive load Total max. 10 A
	Electrical life	> 3 × 10^5 cycles
DIM 10V outputs	Type	1...10 V passive output for electronic ballasts as per EN 60929 Electrically isolated
Analogue outputs	Type	0...10 V / 2 mA
Universal inputs	Analogue	0...10 V / 0...1 V
	Digital	O-I
	Resistance	100…2500 Ω
	Potentiometer	1...10 kΩ
	Ni1000/Pt1000	-20...100 °C
Interfaces and communication		
Connection to automation station	Control	From ecos500 or modu521
	Interface	RS485
	Protocol	SLC
	Cable length[1)]	Up to 500 m (depending on cable type)
Construction		
	Dimensions W x H x D	105 × 95 × 60 mm
	Weight	0.32 kg
Standards and directives		
	Type of protection[2)]	IP 00 (EN 60730)
	Protection class	II (EN 60730-1)
	Environment class	3K3 (IEC 60721)

1) *See the section "Engineering notes"*

2) *IP 20 with terminal cover (accessory 0900240020); IP 40 at front when mounted*

CE conformity according to	EMC directive 2004/108/EC[3)]	EN 61000-6-1, EN 61000-6-2 EN 61000-6-3, EN 61000-6-4
	Low-voltage directive 2006/95/EC	EN 60730-1

Overview of types

Type	Description
EY-EM522F001	Remote I/O module, 230 V~, 4 normally-open relay contacts, 4 DIM outputs
EY-EM523F001	Remote I/O module, 230 V~, 4 DIM outputs

Overview of I/O mix	EY-EM 522	EY-EM 523
Normally-open relay contacts (with voltage applied)	4	-
DIM-10V	4	4
Analogue outputs	4	4
Universal inputs	4	4

Accessories

Type	Description
0900240020	Terminal cover

Description of operation

The ecoLink family is comprised of a range of remote I/O modules for operating on room controllers of the ecos 5 system family. ecoLink modules can be used to expand the I/O mix of ecos 5 room controllers. Due to the positioning of the modules directly beside the actuators or sensors in the room and the digital RS485 connection to the ecos 5, the wiring can be reduced considerably.
The inputs/outputs (I/O) of the modules are controlled directly by the automation program of the ecos 5 room controller. No additional programming of the ecoLink modules is required.
The modules in the ecoLink522, 523 series are typically used to actuate dimmable lamps with occupancy detectors and light sensors, as well as valves and fans, with a linear control signal.

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

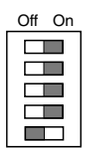
The ecoLink field modules can be assembled using a top-hat rail directly in the cabinet or at a suitable location in the system.

Note
In the ecoLink modules, the ground terminals (⊥) are connected to the common connection (c) of the RS485 interface (the RS485 interface is not electrically isolated). In the EY-modulo 5 ecos, the ground terminals (⊥) are internally connected with the earth connector (PE).

The max. admissible bus length depends on the cable type used and the correct termination with terminating resistors. In general, a shielded cable with twisted wire pairs must be used. For Ethernet CAT-5 cables and J-Y(ST)Y cables, a bus length of up to 500 m is possible. The bus cabling must be a line topology. Star, tree or branch topologies are not recommended. On the ecos500 room automation station, there is a 3-core bus connection to the RS485 B interface. Observe the correct polarity.
The devices do not have internal terminating resistors. Therefore, a terminating resistor of 120 Ω must be connected at the start and end of the bus line, parallel to the D+/D- data lines.
Parallel laying of sensor lines and high-power current-carrying cables must be avoided. For the conduction of analogue signals, such as 0...10 V inputs/outputs and Ni/Pt1000 inputs, a separate grounding must be planned for every input and output from the ecoLink module to the relevant sensor or actuator. Shared ground wires lead to measurement errors that may particularly affect small measuring signals.

[3)] *EN 61000-6-2: In order to meet the European standard, the power cables for the inputs and outputs must not exceed 30 m in length*

Addressing/baud rate



Value	Off	On	
1		x	1
2		x	2
4		x	4
8		x	8
16	x		

Up to 16 modules can be connected to a bus line. These must be addressed uniquely. A DIL switch is planned for this. S1: 1...5 Valid address range: 1...16. Address 15 is set as an example in the image. The baud rate is fixed at 115 kBaud.

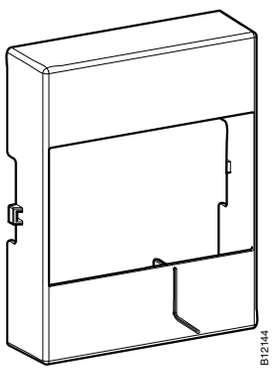
Fitting and power supply

ecoLink field modules are compact units suitable for wall mounting or for DIN 43880 installation on a 35 mm top-hat rail. The plant devices are connected using screw terminals. The following conditions must be observed:

- Connection may only be performed when the system is disconnected from the electrical supply.
- The unit must be protected against contact.
- The universal input (terminals 20...26), analogue output (terminals 27...33) and RS485 (D-, D+, C) connections are SELV electrical circuits. SELV electrical circuits must be laid separately from the mains supply circuits (low voltage) and the functional extra low voltage (FELV).
- The DIM connections (terminals 5...12) are control circuits designed for connection to electronic ballasts for lamps as per IEC 60929. DIM control circuits may be laid together with mains supply circuits; cables that are admissible for 230 V mains voltage must be used. The DIM electrical circuits are electrically isolated from all the SELV/PELV electrical circuits in the ecoLink device and must not be connected with SELV/PELV electrical circuits at any point.
- 0…10 V analogue outputs must not be misused as DIM outputs.
- The relay connections (terminals 1...4) are mains supply circuits that are connected internally with connection L (phase).

For terminals 01...33, the admissible conductor cross-section is min. 0.8 mm^2 (AWG 18), max. 2.5 mm^2 (AWG 13). The national standards and installation rules must be adhered to.
Communication wires must be laid professionally and must be separated from other power-carrying wires.
Special standards such as IEC/EN 61508, IEC/EN 61511, IEC/EN 61131-1 and -2 were not taken into account. Local requirements regarding installation, usage, access, access rights, accident prevention, safety, dismantling and disposal must be taken into account. Installation standards EN 50178, 50310, 50110, 50274, 61140 and similar must be observed.
For further information, see fitting instructions P10013055.

Terminal cover



Accessory 0900240020. When the cover is on, together with the ecoLink module, it ensures protection class IP 20. When mounted, the protection class on the front is IP 40. The customer must attach a cord grip for the connected lines.

Technical specification of the inputs and outputs

Universal inputs (UI)

Four universal inputs are available.
The functions for the inputs and the input ranges are parameterised via CASE Engine.

Type of inputs	Voltage (U) Current (I) Digital input (DI) Ni1000/Pt1000 Resistance (R) Potentiometer (Pot.)
Protection against external voltage:	±30 V/24 V~ (without destruction)
Input impedance (Ri)	≥ 80 kΩ
Resolution	10 bits
Scan rate	≤ 100 ms (analogue/digital values)
Update rate	≤ 300 ms (EY-modulo 5 ecos)
Voltage (U)	
Measuring range	0 (2)...10 V / 0 (0.2)…1 V
Resolution	≤ 0.1 V / ≤ 0.01 V
Accuracy	±0.2 V / ±0.02 V
Current (I)	
Measuring range	0 (4)...20 mA With external resistance and voltage input (U) Measuring range 0 (2)…10 V: 500 Ω Measuring range 0 (0.2)…1 V: 50 Ω
Ni1000	DIN43760
Pt1000	IEC751
Measuring range	-20…100 °C
Resolution	≤ 0.3 K
Accuracy	±1 K
Measuring current	≤ 1 mA
Resistance (R)	
Measuring range	100…2500 Ω
Resolution	≤ 5 Ω
Accuracy	±25 Ω
Measuring current	≤ 1 mA
Potentiometer	
Measuring range	0…100% (position)
Nominal resistance	1…10 kΩ
Resolution	≤ 1 % of measuring range
Accuracy	±2 % of measuring range
Output 10V (terminal 20), max. load	≤ 10 mA (i.e. ≥ 1 kΩ)
Digital input	
Potential-free contacts	Connected to ground I: < 1.5 kΩ 0: > 7 kΩ
Output current	≤ 1 mA
Voltage signal	I: 0...1.5 V 0: 3...11 V
Meter input	Max. 2 Hz (min. pulse duration 250 ms)

Voltage measurement (U)

The voltage to be measured is connected between an input terminal and a ground terminal. The signal must be potential-free. Two measuring ranges are available 0…10 V and 0…1 V.

Current measurement (I)

A current measurement 0(4)…20 mA is possible via external resistance. The current to be measured is connected parallel to the resistance at one of the input terminals and a ground terminal. The accuracy of the current measurement results from the accuracy of the voltage input and the tolerance of the resistance. It is preferable to use a 50 Ω resistance in order to keep the effect of self-heating on the accuracy to a minimum.
The current signal must be potential-free. A separate ground terminal must be used for the current measurement. Otherwise, zero-point shifts may lead to imprecise measurements in the case of other measuring signals.

Temperature measurement (Ni/Pt); resistance measurement (R)

The Ni/Pt1000 sensors and resistors are connected using two wires between one of the input terminals and a ground terminal. The inputs require no calibration and can be used immediately. Line resistance of 2 Ω is pre-compensated as standard. With the correct line resistance of 2 Ω (cable cross-section 1.5 mm^2), the power cable (wire) may be no more than 85 m long. Larger line resistances can be compensated by the parameterisation in CASE Engine. The measuring range for the resistance measurement is limited to 2500 Ω. If line break detection is desired, a threshold of, for example, 2400 Ω can be set in the ecos 5 automation program.

Potentiometer (Pot.)

This configuration is used to record the position of the potentiometer in the range 0…100%. The nominal resistance of the potentiometer is connected between output 10 V (terminal 20) and a ground terminal. The sliding contact of the potentiometer is connected to one of the input terminals. Terminal 20 is used exclusively to supply the potentiometers, as shown in the connection diagram. The output must not be connected to other devices. If multiple potentiometers are connected to terminal 20, the specified max. load must be adhered to.
The ratiometric measuring method compares the sliding contact voltage at the input with the voltage at the 10 V output and determines the position of the potentiometer in the range 0…100%. No calibration and no parameterisation of the nominal resistance are required. A line resistance of less than 10 Ω does not affect the measuring range (corresponds to approx. 400 m for a cable cross-section of 1.5 mm^2). A greater line resistance restricts the measuring range accordingly.

Digital inputs (DI)

The digital input function can be used with both potential-free contacts and voltage signals. Potential-free contacts and voltage signals are connected between an input terminal and a ground terminal. Digital inputs are generally used as alarm/status inputs. Therefore, an open contact corresponds to the state 0 - INACTIVE (bit=0). A closed contact corresponds to the state I - ACTIVE (bit=1). This assignment, defined as normal polarity, can be inverted using CASE Engine if required.

Analogue outputs (AO)

Number of outputs	4
Type of outputs	0(2)...10 V
Load	≤ 2 mA
Resolution	0.1 V
Accuracy	± 0.4 V
Update rate	≤ 200 ms (EY-modulo 5 ecos)
Settling time	1 s

The output voltage is taken from between the relevant output terminal and a ground terminal. Every output can be subjected to a load of 2 mA (the outputs do not have an active sink capability). The analogue output is short circuit-proof and grounded and is protected against external voltages. Permanent short-circuiting of multiple outputs leads to their thermal destruction.

Relay outputs

The relay outputs are supplied via a common feed (L). When the relays are used to switch lamps, window blinds or fans directly, neither the nominal load nor the specified start-up current of the relays may be exceeded. Some lamps and electronic ballasts of lamps have very large start-up currents, which are specified on the manufacturer’s data sheet. Inductive loads must be suppressed correctly.

Number of outputs	Max. 4
Type of outputs	0-I relay, normally-open contacts (NO)
Nominal load per contact	230 V~, 5 A resistive load 3A inductive load (cosφ > 0.4)
Start-up current	≤ 30 A for max. 20 ms
Total current for all contacts	≤ 10 A
Switching frequency	> 3 × 10^5 cycles for nominal load
Update rate	≤ 200 ms (EY-modulo 5 ecos)

DIM-10V outputs

Number of outputs	4
Type of outputs	1...10 V passive output for electronic ballasts with basic insulation
Sink capability	2 mA
Resolution	8 bits
Update rate	≤ 200 ms (EY-modulo 5 ecos)
Settling time	1 s

The outputs are sized with an 1…10 V interface for the control circuits of electronic ballasts (EB). The control output is provided by the EB (current source max. 0.6 mA as per EN 60929). The output is passive and only provides the interference-proof DC voltage signal of 1…10 V in combination with the current source of the EB. 1 V is the minimum brightness (EB control circuit short-circuited, i.e. 1 V or less), 10 V is the maximum brightness (control circuit open). Accordingly, no active voltage is supplied to the output terminals of the DIM output. The sink capability (external voltage distribution) is linear to the internal specification (0…100% corresponds to 0…10 V) for the released electronic ballasts (EB). Only one EB should be connected per DIM output. If multiple EBs are connected in parallel, they influence each other, so that, on the one hand, the signal range can be restricted and, on the other, there is non-linear behaviour. This can be compensated to an extent by linearising characteristics in CASE Engine.
EBs are dimmed using the control circuit via the DIM-10V outputs. A relay output must be used to switch the EB power line on/off. The DIM-10V output must be connected to the EB with the correct polarity (+/-).

Approved ballast devices

The following ballast devices have been checked:

Manufacturer	Type
OSRAM	Quicktronic intelligent: QT/-T/E 1×18-57 DIM
Philips	HF-R 1 26-42 PL-T/C EII
Vossloh Schwabe	ELXd 142-806

Safety instructions for EB devices

The control circuits of EBs only have basic insulation from mains supply circuits and therefore are not SELV current circuits (safety extra low voltage). For this reason, the DIM-10V outputs of the ecoLink module are potentially isolated (secure electrical isolation) via opto-couplers from all the SELV/PELV current circuits of the ecoLink module (universal inputs, analogue outputs, communication). DIM-10V outputs must not be connected with SELV/PELV current circuits.
Based on the insulation capability of the ecoLink module, all the connected ballasts must be connected to the same phase of the power supply.
The safety instructions of the EB manufacturer must be adhered to when installing it.

LED indicator

Status	Description
LED off	Device out of service
Green light	Device in operation
Flashing green	Device is communicating with the ecos500 but is not being addressed
Red light	Device is not ready for operation (no program loaded)
Flashing red	Device is not communicating with the ecos500
Pulsating red	Internal device error or short circuit of an output
Orange light	Power-up phase, configuration

Start-up behaviour/monitoring functions

The communication between the ecos500 and the ecoLink modules is monitored. If the communication fails for longer than the 10s monitoring time, the affected ecoLink modules switch to the safety state. The data points in the ecos500 are marked with the “unreliable” state. All outputs of the affected ecoLink modules are switched to the defined value for the safety state (“relinquish default”). 0-I transitions (i.e. not actuated - actuated) of relays are delayed by 1s. This applies both when reaching and when leaving the safety state. This can prevent damage due to immediate switchovers of actuators

such as window blinds. The inputs of the affected modules remain frozen on their last value while the safety state is in force.
Additionally, if there are internal device errors, appropriate data points are mapped via the Reliability property.
The start-up behaviours (power-up) of the ecos500 and ecoLink are different. The “power-up timer” parameter in the ecoLink (default value = 1 s) defines the waiting time of the ecoLink until the communication monitoring starts. This parameter can be set individually for each ecoLink module (value range 1...254 s). Settings are made using the SAUTER CASE Suite software. Until the “power-up timer” has elapsed, the outputs will be maintained in the same manner as when the device is without power.
The “power-up timer” parameter can be used to define a start-up sequence for the ecoLink modules or to synchronise the start-up behaviour with the ecos500.
A distinction is made between the following operation behaviours:
a) ecos500 in operation, ecoLink module power-up
The ecoLink module maintains its outputs in a powerless state during power-up. If the ecos500 detects an ecoLink power-up, communication with this module starts immediately. After the parameterised “power-up timer” has elapsed and communication with the ecos500 is successful, the module switches to normal operation. If communication with the ecos500 cannot be established within the monitoring time, the module switches to the safety state.
b) ecos500 and ecoLink module power-up
Start-up proceeds in the same manner as the process described under a). Because ecos500 start-up takes longer than the monitoring period, the ecoLink modules will enter the safety state until the ecos500 has started completely, after which they switch to the normal mode. If this is not desired, the power-up timer parameter can be set to a value > 120s.
c) ecoLink in operation, ecos500 power-down
A power-down of the ecos500 has the same effect as a communication interruption (see communication monitoring). If the ecos500 is then powered up, communication with the ecoLink modules is automatically established. The modules leave the safety state as previously described.

Integration of ecoLink modules via CASE Suite

The ecoLink modules are engineered using CASE Suite. Depending on whether the ecos500 is designed for one, two or four function segments, the device addresses 1...16, 1...8 or 1...4 are displayed in a table. In the case of two or four segments, the device addresses are mirrored. An ecoLink module can then be assigned to each of these addresses. Data points are then defined and assigned to the relevant modules with their channel connections. This allows the inputs and outputs to be mapped directly to BACnet data points.

Additional information

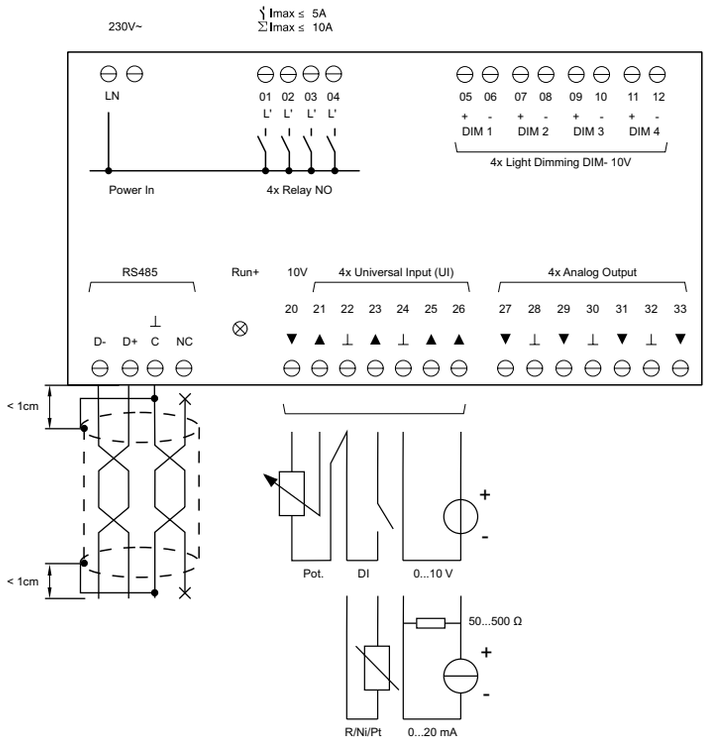
Fitting instructions	P100013055
Declaration on materials and the environment	MD 94.077

Disposal

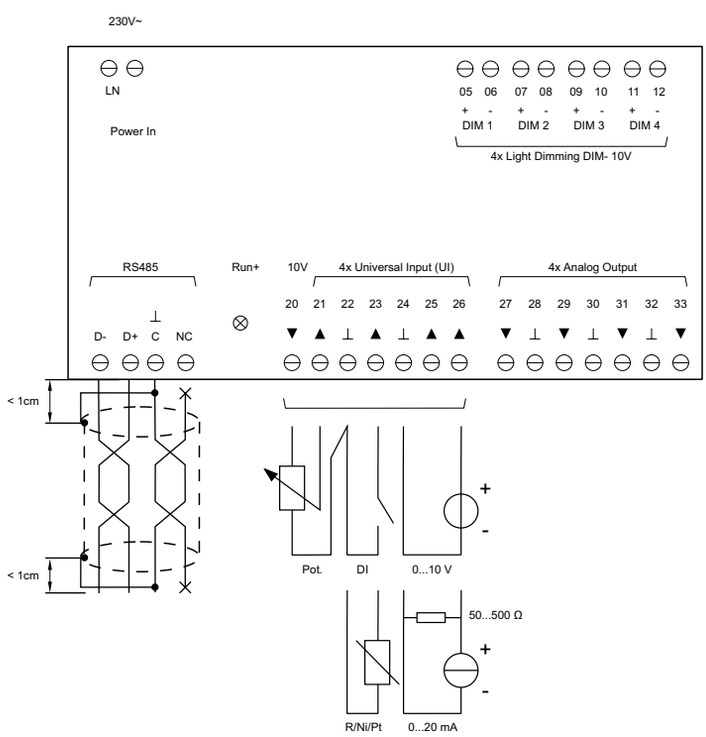
When disposing of the product, observe the currently applicable local laws.
More information on materials can be found in the Declaration on materials and the environment for this product.

Connection diagram

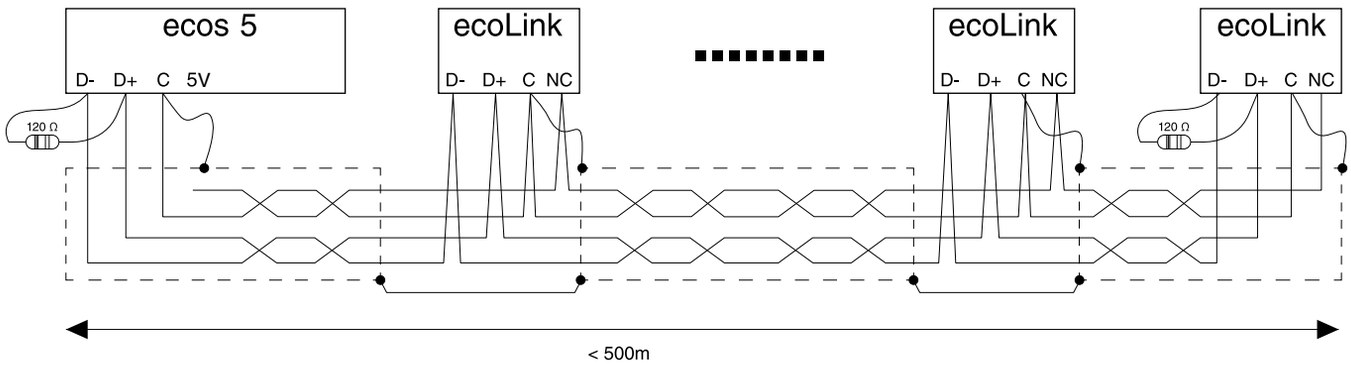
EY-EM 522



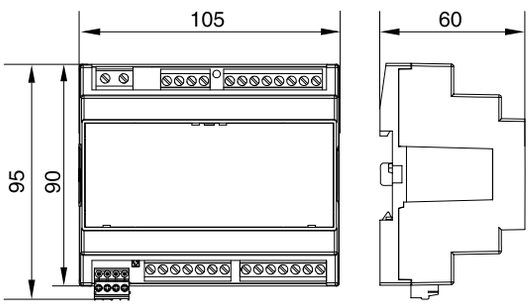
EY-EM 523



RS845 bus wiring



Dimension drawing



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