

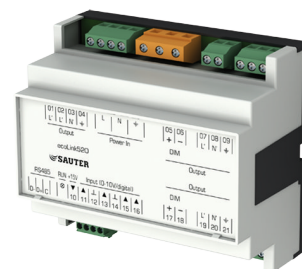
## EY-EM 520, 521, 526: Remote I/O module, ecoLink520, 521, 526

### How energy efficiency is improved

Optimum adjustment to applications by means of module technology. Less wiring needed

### Features

- Part of the SAUTER EY-modulo 5 system family
- Regulation, control, monitoring and optimisation of operational systems, e.g. room automation or HVAC engineering
- Remote I/O module for ecos500, 504, 505
- Communicative connection of actuators to automation stations
- Can be located up to 500 m from automation stations



EY-EM520F001

### Technical data

#### Power supply

Power supply	230 V~, ±10%, 50...60 Hz
Current consumption	≤ 35 mA (typically 20 mA) Without load current of relays
Dissipated power	≤ 8 W (typically approx. 4 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

Digital outputs	Type <sup>1)</sup>	O-I relay, normally-open contact or changeover contact
	Load <sup>2)</sup>	230 V~/1 A or 5 A (total max. 10 A)
	Switching frequency	> 3 × 10 <sup>5</sup> cycles
DIM-10V outputs	Type	1...10 V passive output for electronic ballasts electrically isolated as per EN 60929
Analogue/digital inputs	Type	0...10 V / O-I

#### Interfaces and communication

Activation	From ecos500, 504, 505
Interface	RS-485
Protocol	SLC
Cable	4-wire, twisted, shielded
Cable length <sup>3)</sup>	Up to 500 m with bus termination

#### Construction

Dimensions W x H x D	105 × 95 × 60 mm
Weight	0.32 kg

#### Standards and directives

Type of protection <sup>4)</sup>	IP00 (EN 60529)
Protection class	I (EN 60730-1) II (EN 60730-1) for EY-EM 526
Environment class	3K3 (IEC 60721)

<sup>1)</sup> See table "Overview of I/O mix"

<sup>2)</sup> See the section "Digital outputs (relays)"

<sup>3)</sup> See the section "Engineering notes"

<sup>4)</sup> IP20 with terminal cover (accessory 0900240020); IP40 at front when fitted



CE conformity according to	EMC Directive 2014/30/EU <sup>5)</sup>	EN 61000-6-1, EN 61000-6-2 EN 61000-6-3, EN 61000-6-4
	Low-Voltage Directive 2014/35/EU	EN 60730-1

### Overview of types

Type	Description
EY-EM520F001	Remote I/O module, 230 V~, 4 relays, normally-open contacts
EY-EM521F001	Remote I/O module, 230 V~, 2 relays, normally-open contacts
EY-EM526F001	Remote I/O module, 230 V~, 3 relays, changeover contacts

Overview of I/O mix	EY-EM 520	EY-EM 521	EY-EM 526
Normally-open relay contacts (with voltage applied)	4	2	0
Changeover relay contacts (potential-free)	0	0	3
DIM-10 V	2	2	2
0...10 V In, Digital In	4	4	4

### Accessories

Type	Description
0949360003	Plug-in connector for ecoLink RS-485, 10 pcs.
0900240020	Terminal cover

### Description of operation

The ecoLink family is comprised of a range of remote I/O modules for operating on automation stations (AS) of the modulo 5 system family. ecoLink modules can be used to expand the I/O mix of the inputs and outputs of automation stations. By placing the modules directly beside the actuators or sensors in the room and the digital RS-485 connection to the AS, the wiring needed can be reduced considerably.

The inputs/outputs (I/Os) of the modules are controlled directly by the automation program of the AS. No additional programming of the ecoLink modules is required.

The modules in the series ecoLink 520...526 are typically used to actuate dimmable lamps as well as sunshade equipment such as blinds.

### 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.

### Engineering notes

The ecoLink field modules can be fitted using a DIN rail directly in the cabinet or at a suitable location in the system. The plant devices are connected using screw terminals. The work may only be carried out when the system is disconnected from the electrical supply.



#### Note

In the ecoLink modules, the ground terminals ( $\perp$ ) are connected to the common connection (c) of the RS-485 interface (the RS-485 interface is not electrically isolated). In the EY-modulo 5 ecos, the ground terminals ( $\perp$ ) 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 4-wire shielded cable with twisted wire pairs must be used. Observe the correct polarity of all signals. The wire shield of the entire bus line must be connected continuously, and connected to the protective earth as directly as possible (max. 8 cm) at one location, for optimum resistance to interference.

For Ethernet CAT-5 cables, as well as IYST-Y cables, a bus length of up to 500 m is possible. For RS-485 interfaces, the bus cabling must be in a line topology. Star, tree or branch topologies are not recommended. The devices do not have internal terminating resistors. Therefore, a terminating resistor of 120  $\Omega$  (0.25 W) 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, a separate grounding must be provided for every

<sup>5)</sup> 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

input from the ecoLink module to the relevant sensor. Shared ground wires lead to measurement errors that may particularly affect small measuring signals.

### Addressing/baud rate

Off	On	Value	Off	On	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	1		x	1
<input type="checkbox"/>	<input checked="" type="checkbox"/>	2		x	2
<input type="checkbox"/>	<input checked="" type="checkbox"/>	4		x	4
<input type="checkbox"/>	<input checked="" type="checkbox"/>	8		x	8
<input checked="" type="checkbox"/>	<input type="checkbox"/>	16	x		
<input checked="" type="checkbox"/>	<input type="checkbox"/>	32	x		
<input checked="" type="checkbox"/>	<input type="checkbox"/>	64	x		
<input checked="" type="checkbox"/>	<input type="checkbox"/>	128	x		

All ecoLink modules that are operated on a bus line must be uniquely addressed. An 8-position DIL switch is provided for this, with the settings coded in binary. The valid address range is 1-31 and can be restricted by the connected automation station. 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 DIN rail. The plant devices are connected using screw terminals. The following conditions must be observed:

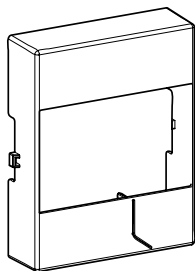
- Connection may only be performed when the system is disconnected from the electrical supply.
- The unit must be protected against contact.
- The ground terminals are connected internally to the earth connection (PELV electrical circuits).

Cross-section of the wires: min. 0.8 mm<sup>2</sup> (AWG 18), max. 2.5 mm<sup>2</sup> (AWG 13), taking standards and national installation regulations into account.

Communication wires must be laid professionally and must be kept at a distance from other live 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 also be observed.

For further information, see fitting instructions P100007334.

### 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.

### Technical specification of the inputs and outputs

#### Inputs

4 analogue inputs are available for active signals.

If the analogue inputs (0...10 V) are to be used as digital inputs, these are to be switched against the 15 V external terminal. With this circuitry, the inputs are defined as digital inputs via CASE Tool.

These 15 V are intended exclusively for the digital inputs.

Type of inputs:	Voltage measurement (U) Current measurement (I) (with ext. resistance) Digital input (DI)
Protection against external voltage: U/DI	±30 V/24 V~ (without destruction)
Resolution	10 bits

Scan rate	≤ 100 ms (analogue/digital values)
Update rate	≤ 300 ms (EY-modulo 5 ecos)
Measuring ranges:	
Voltage (U)	0 (2)...10 V
Current (I) (via ext. R)	0 (4)...20 mA
Digital input	Potential-free contacts, with 15 V connection. As a 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. The internal resistance  $R_i$  of the input (load) is 100 k $\Omega$ .

### Current measurement (I)

A current measurement 0(4)...20 mA is possible via external resistance (e.g. 500  $\Omega$ ). The current to be measured is connected parallel to the resistance at one of the input terminals and a ground terminal. 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.

### Digital inputs (DI)

The information (alarm/status) is connected between an input terminal and the 15 V external 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 15 V is applied at the input, giving a current of approximately ~0.3 mA. Every input can be defined individually as an alarm or a status by setting software parameters.

### Outputs

In the full version, 6 outputs are available: 4 relays, 2 analogue (DIM -10 V). The outputs are updated by the ecos system (EY-RC 500) every 200 ms.

### Digital outputs (relays)

#### EY-EM 520...521

The relay outputs are supplied via a common feed; this contains L, N and PE. Both N and PE are available again at the appropriate relay output. The relays with output terminals 7 and 19 are designed for the actuation of lamps. These relays have an increased start-up current compatibility. Peak inrush current at relay contact NO (work contact) 80 A for a maximum of 20 ms.

The relays with output terminals 1 and 2 are designed for the actuation of window blinds.

Number of outputs	Max. 4 (DO)
Type of outputs	Relays, normally-open contacts (0-I)
Load on outputs:	
Relays, terminals 7/19	230 V~, 5 A
Relays, terminals 1/2	230 V~, 1 A
Switching frequency	> 3 × 10 <sup>5</sup> cycles

#### EY-EM 526

The relays (change-over contacts) are designed for the actuation of lamps. The relays have an increased start-up current compatibility. Peak inrush current at relay contact NO (work contact) 80 A for a maximum of 20 ms.

Number of outputs	3 (DO)
Type of outputs	Relays, change-over contacts (0-I)
Load on outputs	230 V~, 5 A
Switching frequency	> 3 × 10 <sup>5</sup> cycles

Real feedback is only possible via digital inputs (BACnet COMMAND FAILURE)

### DIM 10V outputs

Number of outputs	2 (AO)
Type of outputs	DIM-10 V passive (opto-coupler)
Update time	200 ms

Settling time	1 s
Resolution	10 bits

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 approved 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. To connect multiple EBs to one DIM output, signal amplifiers from the EB manufacturer must be used.

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 from the EB manufacturer must be adhered to during installation.

### LED indicator

Status	Description
LED off	Device not in operation
Green light	Device in operation
Flashing green	Device is communicating with the AS but is not being addressed
Red light	Device is not functional (no program loaded)
Flashing red	Device is not communicating with the AS
Pulsating red	Internal device error
Orange light	Power-up phase, configuration

### Start-up behaviour/monitoring functions

The communication between the AS and the ecoLink modules is monitored. If the communication fails for more than the monitoring time of 10s, the affected ecoLink modules switch to the safety status. The data points in the AS are marked with the status "unreliable". 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 and Triacs 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 modules in question remain frozen at their last value while the safety status is in force.

If there are internal device faults, appropriate data points are mapped via the Reliability property.

The start-up behaviours (power-up) of the AS 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” runs out, 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 AS.

The operation behaviours differ as follows:

**a) AS in operation, ecoLink module power-up**

The ecoLink module maintains its outputs in a powerless state during power-up. If the AS detects an ecoLink power-up, communication with this module starts immediately. After the parameterised “power-up timer” has elapsed and communication with the AS is successful, the module switches to normal operation. If communication with the AS cannot be established within the monitoring time, the module switches to the safety state.

**b) AS and ecoLink module power-up**

Start-up proceeds in the same manner as the process described under a). Because the AS start-up takes longer than the monitoring period, the ecoLink modules will enter the safety state until the AS 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 an interruption in communications (see communication monitoring). If the AS 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.

When an ecos 5 is selected as the automation station, it can be set up for one, two or up to eight room segments (function segments). The types and addresses of the required ecoLink modules are then defined in the Definition module within CASE Engine. After this, all the inputs/outputs of the ecoLink modules can be used in CASE Engine and be mapped to BACnet data points.

### Disposal

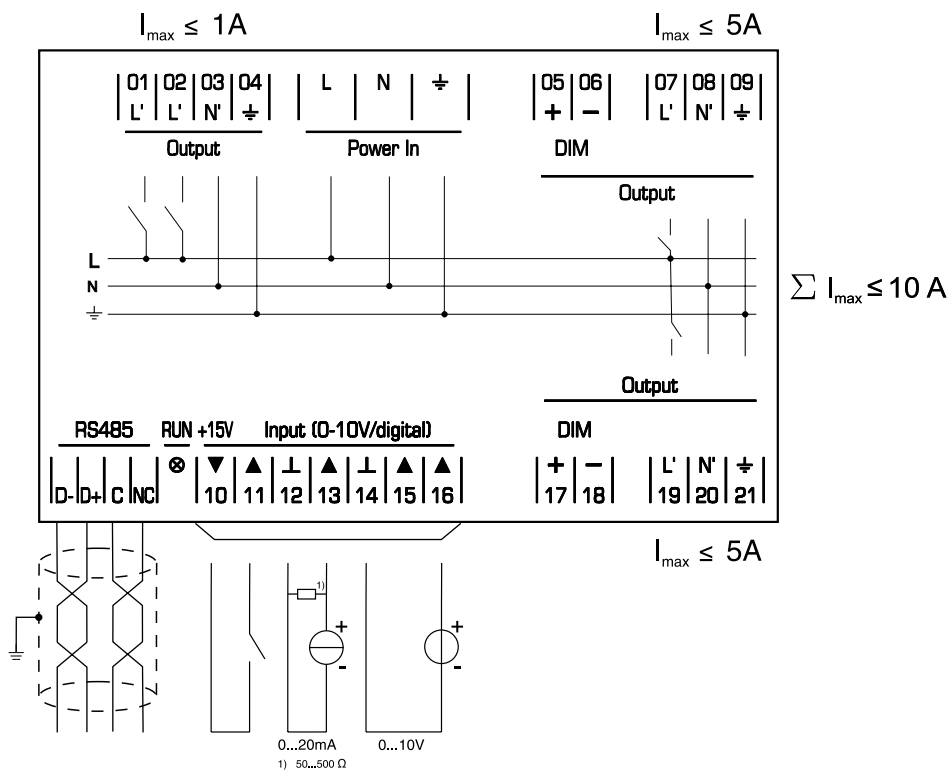
When disposing of the product, observe the currently applicable local laws.

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

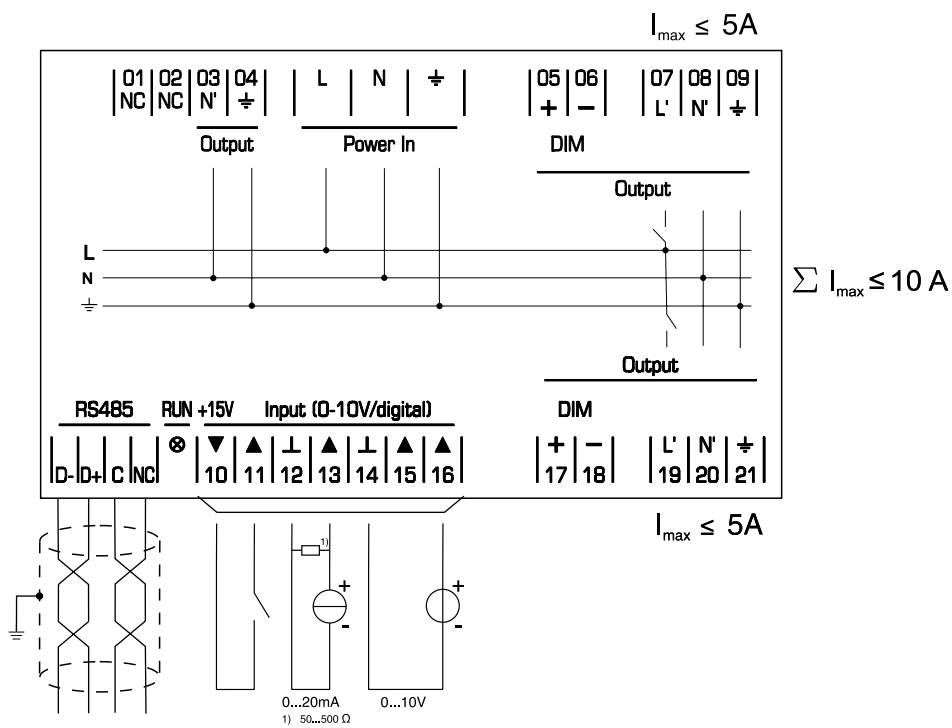
### Additional information

Fitting instructions	P10007334
Electrical safety 2006/95/EC	EN 60730-1
Declaration on materials and the environment	MD 92.845
Dimension drawing	M11463
<b>Connection diagram:</b>	
EY-EM520	A10656
EY-EM521	A10657
EY-EM526	A10658

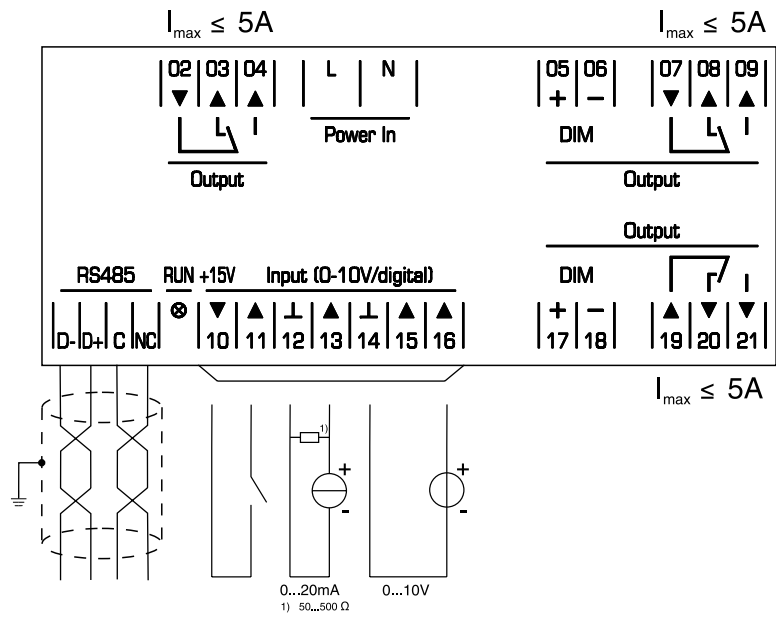
EY-EM 520 connection diagram



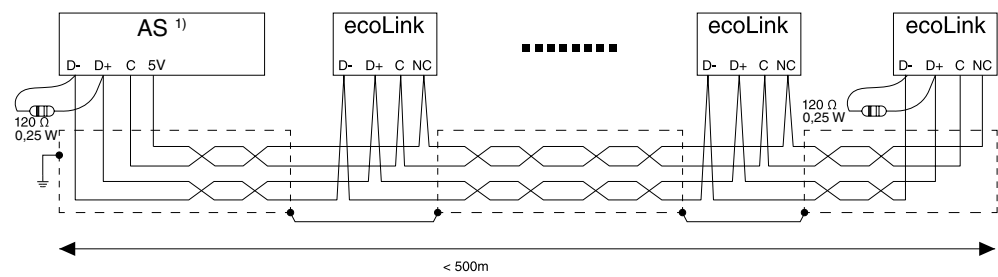
EY-EM 521 connection diagram



**EY-EM 526 connection diagram**



**RS-485 bus wiring, ecoLink modules only**



1) AS = automation station

**Dimension drawing**

