# EY-LM 590: novaLink module, modu590

### How energy efficiency is improved

SAUTER EY-modulo 5 technology: modular, fast and universal

### Features

- Part of the SAUTER EY-modulo 5 system family
- Plug-in element for extending the modu524/525 automation station (AS)
- Suitable for connecting EY-FM 1** and EYY 1** remote units
- 24 V ~/= external power supply
- Up to eight field modules per novaLink module with DC power supply; six modules with AC power supply
- I/O bus and novaLink electrically isolated from each other
- Direct labelling on the front
- Can be equipped with a local operating and indicating unit

**EY-LM590F001**

## Technical data

| Power supply | | |
|---|---|---|
| | Power supply | 24 V=, ±10%<br>24 V~, +20%/−15%, 50…60 Hz |
| | Power consumption | Max. 20 W |
| | Dissipated power | Max. 1 W |
| | Current consumption | Max. 1.2 A |
| | Max. peak inrush current | Max. 20 A (2 ms) |

| Ambient conditions | | |
|---|---|---|
| | Operating temperature | 0...45 °C |
| | Storage and transport temperature | −25…70 °C |
| | Admissible ambient humidity | 10…85% rh, no condensation |

| Interfaces and communication | | |
|---|---|---|
| | Connection, LOI | 6-pin, integrated in electronics module |
| | Connection, I/O bus | 12-pin, integrated in base |
| | Connection terminals | 24 (0.5…2.5 mm$^2$) |

| Construction | | |
|---|---|---|
| | Fitting | On DIN rail |
| | Dimensions W x H x D | 42 × 170 × 115 mm |
| | Weight | 0.315 kg |

| Standards and directives | | |
|---|---|---|
| | Type of protection | IP30 (EN 60529) |
| | Protection class | III (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,<br>EN 61000-6-3, EN 61000-6-4 |

### Overview of types

| Type | Features |
|---|---|
| EY-LM590F001 | novaLink module, 8 novaLink channels, modu590 |

### Accessories

**Local operating and indicating units (LOI)**

| Type | Description |
|---|---|
| EY-LO630F001 | 16-LED indication, bi-colour |

**Field modules**

| Type | Description |
|---|---|
| EY-FM164F001 | moduLink164 digital output 4× 0-I (change-over relay) |
| EY-FM165F001 | moduLink165 digital output 2× 0-I-II (change-over relay) |

| Type | Description |
|------|-------------|
| EY-FM170F001 | moduLink170 analogue output 4× 0...10 V (2× 0...20 mA) |
| EY-FM174F001 | moduLink174 digital input 16× |

**Description of operation**

The modu590 novaLink module is used to extend the modu524 and modu525 automation stations. It receives digital inputs (alarm/status) and activates actuators such as relays and control units or displays of operational systems, e.g. in HVAC engineering. It enables EY-FM 1** moduLink or EYY 1** novaLink field modules to be connected to the EY-modulo 5. The modu590 module provides a total of eight channels for connecting field modules.

**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 modu590 novaLink module is comprised of two components. The baseplate in which the I/O bus system and the connection terminals are integrated and the hood with the actual novaLink electronics module.

**Fitting and connection**

Note
Only qualified electricians are permitted to fit and connect the module.
Prevent laypersons from accessing it.

The baseplate of the novaLink module is fitted in a cabinet using a DIN rail (EN 60715) and connected at the side directly to the I/O bus of the AS or the extension modules. This work may only be carried out when the system is disconnected from the electrical supply.
Do not connect any other users (loads) to the power supply.
Never ground the power supply to the secondary circuits (SELV).
The ground connected to the EY-LM590 ground terminal must be low noise. SAUTER recommends a short, direct, low-impedance connection to the DIN rail.
Removal/insertion of the electronics module from/to the baseplate is possible during operation of the AS. However, to ensure plant safety and to avoid any faults at inputs or outputs, the novaLink electronics module should only be removed or inserted while the base station is switched off. If the electronics module is connected when the base station is switched on, the inputs and outputs of the field modules may temporarily take on undefined statuses. Up to eight novaLink modules may be used per AS. Here the novaLink modules, like the I/O modules, must be connected behind the EY-CM *** communication modules. No particular sequence must be adhered to between normal I/O modules and the novaLink modules.
Connection condition for novaLink:
• Cable types: Cat 6 SFTP (Screened Foiled Twisted Pair), twisted in pairs and shielded in pairs (pair in metal foil).
• Each shielding foil is connected to the appropriate novaLink (ground) terminal "Link...-" and not grounded. Avoid spare wires in the novaLink cables. Select the correct number of wire pairs.
• Cable length: maximum 100 metres (5 nF / 7.5 Ω)
• One module per channel

**Labelling concept**

The novaLink module can be labelled with a paper insert in the front 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.

**Assignment to the automation station (AS)**

The electronics of the novaLink module are encoded on the hardware side using pin inserts so that only the appropriate baseplate can be used. The AS detects whether a module baseplate is plugged into the I/O bus. Baseplate number and assignment of module types for the modules on the AS are defined with CASE Suite (from version 3.4 onwards). This information is permanently stored in the AS.

## Power supply of modu590

The modu590 novaLink module must be supplied via an external, separate, low-noise voltage source.
Connection conditions: 24 V=, ±10% or 24 V~, +20%/-15%, 50…60 Hz
The external power supply is required because the connected EY-FM 1** or EYY 1** field modules must be supplied by the modu590. The internal power supply of the AS is not capable of this.
By using the external power supply it is possible to ensure the autonomous operation of the field modules, even if the power supply of the automation station fails. Under these conditions, the outputs of the field modules can still be operated manually, but there is no longer any communication with the automation station.

Note

Please remember, that when 24 V AC is being used as the power supply, more heat is generated in the housing of the modu590 than when using 24 V DC. Therefore, when 24 V AC is being used, the number of field modules that can be used is reduced from eight to six field modules. Additionally, when 24 V AC is being used, compliance with the limit values of the EMC Directives is only ensured up to a maximum number of six field modules. Therefore, during the engineering it must be ensured that no more than six field modules are connected. This is not prevented by locking.

## Program download to the automation station

During a program download to the modu524/525 head station, the setpoints for the analogue and digital outputs are temporarily ignored and the outputs are on 0 for a few seconds. After the download, the program is restarted and the setpoints are met again.
If necessary, the outputs of the field modules can be set using the priority operation before the program download in order to avoid unintentional switching of the outputs.

## novaLink channel assignment

### I/O mix

In contrast to EY3600 and EY-modulo 2 automation stations, the novaLink channels of the modu590 can be used with different functions. However, they cannot be selected completely freely – various fixed I/O mixes have been defined instead. In most cases, this allows the available eight channels to be used to the full. The settings are defined via DIP switches (components S1, S2 and S3). The hood must be removed to set the DIP switches.
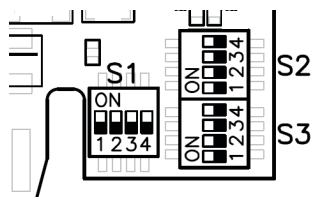


Section of PCB with DIP switches

For every I/O mix, the modu590 appears in CASE under a different identification. The different I/O mixes are defined via four DIP switches (for component S1, see the picture above). At present there are seven different I/O mixes, as described in the following table:

| Identification | Component S1 (ON=1, OFF=0) | | | | EY-FM 174 EYY 174 | EY-FM 164/165 EYY 164/165 | EY-FM 170 EYY 170 |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | (digital input) | (digital output) | (analogue output) |
| Not used | 0 | 0 | 0 | 0 | - | - | - |
| EY-LM591F001 | 1 | 0 | 0 | 0 | 8 (links 1-8) | - | - |
| EY-LM592F001 | 0 | 1 | 0 | 0 | - | 8 (links 1-8) | - |
| EY-LM593F001 | 1 | 1 | 0 | 0 | - | - | 8 (links 1-8) |
| EY-LM594F001 | 0 | 0 | 1 | 0 | 2 (links 1-2) | 4 (links 3-6) | 2 (links 7-8) |
| EY-LM595F001 | 1 | 0 | 1 | 0 | 3 (links 1-3) | 4 (links 4-7) | 1 (link 8) |
| EY-LM596F001 | 0 | 1 | 1 | 0 | 3 (links 1-3) | 3 (links 4-6) | 2 (links 7-8) |
| EY-LM597F001 | 1 | 1 | 1 | 0 | 3 (links 1-3) | 2 (links 4-5) | 3 (links 6-8) |

**Note**

When a 24 V AC supply is being used, two of the novaLink channels must remain free in each device. It does not matter which input or output type remains free. It must be ensured that no more than six channels are used.

**Note**

Theoretically, if eight modu590s are used per AS, all of which have I/O mix EY-LM591F001, up to 64 field modules with digital inputs (EY-FM 174 or EYY 174) can be used per AS. This corresponds to 1024 digital inputs. However, the AS is limited to 512 BACnet objects. Therefore, such a configuration is not possible. Make sure that the I/O mixes are used meaningfully, with the maximum number of BACnet objects being considered.

The DIP switches for selecting the I/O mixes must be set when installing the module. When delivered ex works, the DIP switches are set to 0010. This corresponds to the frequently used configuration EY-LM594F001.

Additionally, eight further DIP switches are available (for components S2 and S3, see the picture above) one for each novaLink channel, to differentiate between EY-FM 164 (or EYY 164) and EY-FM 165 (or EYY 165) when operating with field modules with digital outputs.
The following assignment applies:

| Link channel | Component | Switch |
|---|---|---|
| Link 1 | S3 | 1 |
| Link 2 | S3 | 2 |
| Link 3 | S3 | 3 |
| Link 4 | S3 | 4 |
| Link 5 | S2 | 1 |
| Link 6 | S2 | 2 |
| Link 7 | S2 | 3 |
| Link 8 | S2 | 4 |

| DIP switch | Field module type |
|---|---|
| ON | EY-FM 165 or EYY 165 |
| OFF | EY-FM 164 or EYY 164<br>EY-FM 170 or EYY 170<br>EY-FM 174 or EYY 174 |

**Channel assignment**

The following tables describe the channel assignment for the individual I/O mixes:

| novaLink channel | Channel assignment on modu590 and input/output type | | | | | | |
|---|---|---|---|---|---|---|---|
| | EY-LM 591 | EY-LM 592 | EY-LM 593 | EY-LM 594 | EY-LM 595 | EY-LM 596 | EY-LM 597 |
| Link 1 | 0...15 DI | 0...3 DO | 0...3 AO | 0...15 DI | 0...15 DI | 0...15 DI | 0...15 DI |
| Link 2 | 16...31 DI | 4...7 DO | 4...7 AO | 16...31 DI | 16...31 DI | 16...31 DI | 16...31 DI |
| Link 3 | 32...47 DI | 8...11 DO | 8...11 AO | 32...35 DO | 32...47 DI | 32...47 DI | 32...47 DI |
| Link 4 | 48...63 DI | 12...15 DO | 12...15 AO | 36...39 DO | 48...51 DO | 48...51 DO | 48...51 DO |
| Link 5 | 64...79 DI | 16...19 AO | 16...19 AO | 40...43 DO | 52...55 DO | 52...55 DO | 52...55 DO |
| Link 6 | 80...95 DI | 20...23 DO | 20...23 AO | 44...47 DO | 56...59 DO | 56...59 DO | 56...59 AO |
| Link 7 | 96...111 DI | 24...27 DO | 24...27 AO | 48...51 AO | 60...63 DO | 60...63 AO | 60...63 AO |
| Link 8 | 112...127 DI | 28...31 DO | 28...31 AO | 52...55 AO | 64...67 AO | 64...67 AO | 64...67 AO |

💡 *DI = digital input, DO = digital output, AO = analogue output*

💡 *The assignment of the terminals on the modu590 can be found in the connection diagram. The assignment of the terminals on the field modules can be found in the technical data sheets for the relevant field modules.*

Comment: When used for multi-state objects with EY-FM/EYY 165, consecutive pairs of channels must be selected on the same field module in order to guarantee the correct switching sequence and function with the manual operation level.

## LED indicators

### System LED

The novaLink module is equipped with a system LED that indicates the operating statuses as follows:

| I/O bus LED | Status | Description |
|---|---|---|
| No designation | Continuous green light | Module in operation |
| | Flashing green or red | Module not ready for operation |
| | Alternating green and red – off | Lamp test active (indicator type priority) |
| | No indicator | No power supply |

### modu630 indicator unit

A modu630 indicator unit can be used to display the status of the 8 novaLink connections. Channels 1 to 8 are assigned to LEDs 1 to 8.

| LED indicators | Status | Description |
|---|---|---|
| No designation | Continuous green light | Field module connected, function OK |
| | Continuous red light | Error (e.g. short-circuited) |
| | Alternating green and red – off | Lamp test active (indicator type priority) |
| | No indicator | Field module not connected |

If an incorrect field module type is connected, this cannot be detected due to the novaLink telegram. The LED lights up green.

The modu630 indicator unit is not supplied with the novaLink module (see accessories).

## BACnet Reliability property and status flags

A BACnet object in the modu590 displays the status if an error occurs: Error on the I/O bus, internal error in the modu590, communication error between modu590 and a field module. Under these conditions, the Reliability property becomes "unplugged" (proprietary property, value 1000), and the status flags "In Alarm" and "Fault" are set.

## Digital outputs on EY-FM/EYY 164/165

The polarity of the digital outputs can be inverted via the BACnet object (polarity = reverse). This inverts the polarity of the value in automatic mode. However, the set polarity does not have any effect on the manual control directly on the field module.

Note that this behaviour is in contrast to the behaviour of the manual operation level with EY-LO 625 and EY-LO 650. There the manual operation level has direct access to the BACnet objects and can take the polarity into account. With the moduLink field modules, the manual operation level is organised by the field module itself, independently of the BACnet objects. For reasons of compatibility with existing installations, this behaviour is not adjusted.

## Analogue outputs on EY-FM/EYY 170

For the EY-FM/EYY 170 field modules with analogue outputs, note that, at a setpoint of 10 V, the outputs have an actual output value of approx. 10.1 to 10.2 V. This deviation is deliberate to make sure that, at a setpoint of 10 V, the maximum value is definitely achieved. This ensures, for example, that a valve actuator really opens completely. The deviation is linear across the entire measuring range. The longer the novaLink connection between modu590 and the field module, the higher this value can become. With the maximum cable length of 100 m, the value can be up to 10.4 V. If this value is too high, it can be adjusted in the CASE Engine module via the relevant parameters.

## Digital inputs on EY-FM/EYY 174

With cable lengths from 30 m upwards, in rare cases incorrect measurements of the digital inputs can occur with EY-FM/EYY 174. Under these conditions, a 2.2 kΩ resistor can be fitted on the field module between the terminals of the novaLink connection (LINK n+ and LINK n-).

## Monitoring function for EY-FM 164/165/170

To monitor the operability of the EY-FM 164, EY-FM 165 and EY-FM 170 field modules, these field modules have an additional output (monitor). During correct operation, a current of approx. 10 μA is output. With automation stations of the EY3600 and EY-modulo 2 series, it was possible to connect and evaluate this monitor output directly at an analogue input. With a modu524/525 or the corresponding I/O modules, this is not possible right away because the input resistance of the analogue inputs is too high (approx. 9 MΩ). If the monitor output of the field modules is to be used with a

modu524/525 or I/O modules, a voltage must be measured across an external resistor. For this a 56 kΩ resistor can be used parallel to a 0-10 V input. Thus the example applications for modu225, that are specified in the product data sheets of the field modules, can be used.

### Maintenance

The novaLink module is maintenance-free. Repairs should be carried out by SAUTER. Modules may only be replaced by a qualified electrician.

### 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
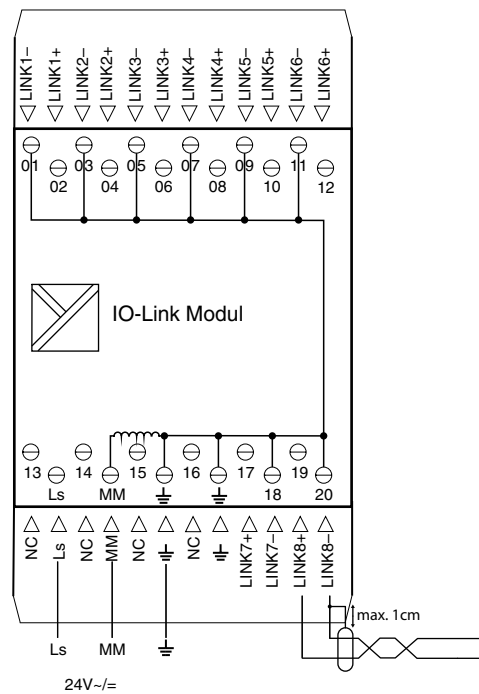


Note

Comply with the connection conditions – see sections "Fitting and connecting" and "Power supply for modu590".

### Dimension drawing