



Linecoupler

KNX line coupler

ZSYLC

Application programme version: [1.0]

Manual edition: [1.0]_a

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1 INTRODUCTION

1.1 LINECOUPLER

Linecoupler constitutes the Zennio solution for the **interconnection** of KNX **twisted-pair** lines (TP-TP). The key features of **Linecoupler** are:

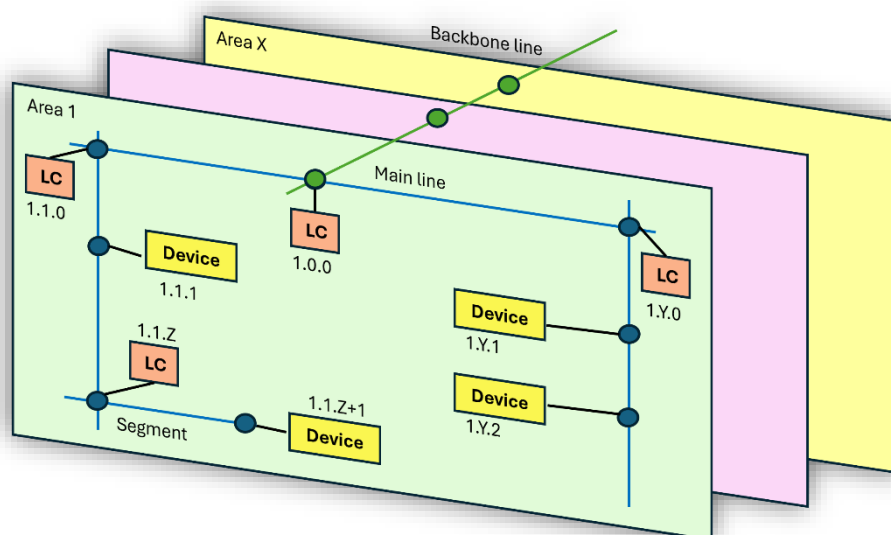


Figure 1. General.

- Ability to function as an **area coupler**.
- Ability to function as a **line coupler**.
- Ability to function as a **segment coupler**.
- Filtering of telegrams based on the selected parametersation options.
- Maximum APDU allowed by the KNX standard: **254 bytes**.
- **4 LED indicators**: one as a programming mode indicator, two to indicate the status of the lines and another to indicate the operating mode of the coupler.
- **Manual control** to allow routing by group address or by physical address.
- **KNX Security**. For detailed information about KNX security functionality and configuration, please refer to the specific user manual, "KNX Security Guide," available in the product section of the Zennio website (www.zennio.com).

- **Security Proxy** functionality allows secure multicast telegrams to be translated from one medium into plain-text telegrams sent to another. It also allows additional routing rules to be added for non-multicast telegrams based on the configured **P2P** or **broadcast mode**.

Notes:

- *The “Security Proxy” functionality is only available for ETS6. “KNX Security” must be enabled for it to work.*
- *For ETS5, the device will use a specific application programme. The differences in operation are set out in ANNEX I. ETS5.*

1.2 INITIALISATION AND VOLTAGE FAILURE

This device does not have specific settings to be applied during device startup. After a power failure, two cases must be distinguished:

- **Main line voltage failure:** If a voltage failure occurs on the main line, the device is no longer powered, interrupting any type of frame routing; furthermore, it will not be accessible for programming via ETS.
- **Secondary line voltage failure:** In this case, as with the main line, the device interrupts any type of frame routing; however, if the main circuit power supply is maintained, the device can be programmed from ETS.

1.3 LED INDICATORS

Linecoupler has 4 LED indicators on the top face that facilitate status monitoring and problem detection.

- **Programming LED:** a red LED that lights up if the device is in programming mode and flashes if it is in secure mode.
- **LED *Main* and *Sub*:** LEDs that indicate the status of the main (Main) and sub (Sub) lines:
 - **Off:** No power.
 - **Green (solid):** receives power.

- **Green (flashing):** receives or sends telegrams.
- **Red (flashing):** A communication error has occurred in the sending of a KNX telegram.
- **LED Mode:** LED indicating the coupler's operating mode.
 - **Off:** functioning as a line or area coupler.
 - **Green (solid):** functioning as a segment coupler.
 - **Yellow (slow blinking, period 500ms):** "Pass GA" function activated.
 - **Yellow (fast flashing, period 250ms):** "Pass IA" function activated.
 - **Yellow (solid):** "Pass GA" and "Pass IA" functions activated.

Note: the yellow colour indicates that the "Pass GA" or "Pass IA" buttons have been pressed and their associated functionality has been activated: routing all frames (group and P2P, respectively). This does not reflect the configuration performed in ETS; that is, if the coupler is configured to route all telegrams, but no button is pressed, the LED will either light up green or remain off.

1.4 BUTTONS

Linecoupler has 3 buttons on the top face that facilitate control of the device.

- **Programming button:** a button that activates programming mode if the device is powered on and, if the device is started with the button pressed, causes it to enter secure mode.
- **"Pass IA" and "Pass GA" buttons:** Whenever manual control functionality is enabled, pressing these buttons will allow all frames to pass between the main and secondary lines. Activating the "Pass IA" button will allow all frames destined for a individual address to pass, while the "Pass GA" button will allow all frames destined for a group address to pass. Pressing the button again will deactivate this functionality, restoring the parameterised configuration.

Note: both buttons are independent, meaning both functions can be active at the same time.

2 CONFIGURATION

2.1 GENERAL

After importing the corresponding database into ETS and adding the device to the desired project topology, the configuration process begins by assigning a physical address **X.Y.Z**. Depending on the device's use, the configuration will be as follows:

- **Area coupler:** Must have physical address **X.0.0**.
- **Line coupler:** Must have physical address **X.Y.0**.
- **Segment coupler:** Must have physical address **X.Y.Z**.

ETS PARAMETERISATION

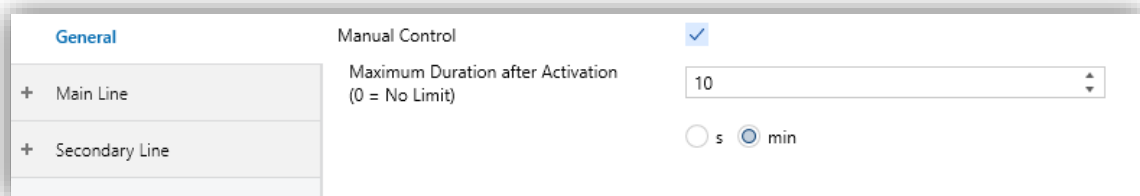


Figure 2. General parametrisation.

- **Manual control** [\[disabled / enabled\]](#)¹: Enables or disables manual control. When enabled, it allows to select the period during which this mode will remain active; it will be automatically disabled after this time has elapsed.
- **Maximum duration after activation** [\[0...3600\]\[s\]](#) [\[0...10...60\]\[min\]](#): Sets the maximum duration of manual control.

2.2 MAIN LINE / SECONDARY LINE

The line coupler allows the filtering of telegrams transmitted between its main line and secondary line to be configured.

- **Main line:** the line located at the higher level of the KNX topology, through which the coupler communicates with the rest of the installation.

¹ The default values for each parameter will be highlighted in blue in this document, as follows: [\[default / other options\]](#).

- **Secondary line:** the line located below the coupler, containing the devices directly connected to it.

*For example, a line coupler with the physical address **1.1.0** connects:*

- *Main line **1.0**, corresponding to the main line of area 1.*
- *Secondary line **1.1**, containing the devices with physical addresses **1.1.1, 1.1.2, ..., 1.1.255**.*

Telegrams transmitted between both lines can be forwarded, blocked or filtered according to the coupler configuration and the filter tables generated by ETS.

2.2.1 RECEIVED TELEGRAMS

For telegrams received from the main line to the secondary line or vice versa, there are different configuration options for the different frame types.

There are three possible configurations for each control related to frame routing:

- **Block:** No frames are allowed to pass between the lines.
- **Route:** Allows all frames to pass between the lines.
- **Filter:** Allows or blocks the passage of telegrams based on compliance with the requirements set in the configuration.

ETS PARAMETERISATION

The screenshot shows a configuration window titled 'Routing' and 'Telegram Acknowledgement'. Under 'Routing', there are three rows for 'Physical Telegrams', 'Group Telegrams (X/Y/Z with X ≤ 13)', and 'Group Telegrams (X/Y/Z with X ≥ 14)', each with a 'Filter' dropdown menu. Below these is a 'Broadcast Telegrams' section with radio buttons for 'Block' and 'Route', where 'Route' is selected. Under 'Telegram Acknowledgement', there are two rows: 'Physical Telegrams' with radio buttons for 'If Routed or Addressed to Coupler' (selected) and 'Always', and 'Group Telegrams' with radio buttons for 'If Routed' (selected) and 'Always'.

Figure 3. Received telegram parametrisation.

Routing:

- **Physical Telegrams** [[Block](#) / [Route](#) / [Filter](#)]: These are telegrams associated with a physical address, such as those sent during device programming.
- **Group Telegrams (X/Y/Z with $X \leq 13$)** [[Block](#) / [Route](#) / [Filter](#)]
- **Group Telegrams (X/Y/Z with $X \geq 14$)** [[Block](#) / [Route](#) / [Filter](#)]
- **Broadcast Telegrams** [[Block](#) / [Filter](#)]

Telegram Acknowledgement:

- **Physical Telegrams** [[If routed or Addressed to Coupler](#) / [Always](#)]: sets the type of action that the device performs when receiving this type of telegram.
- **Group Telegrams** [[If Routed](#) / [Always](#)]: sets the type of action that the device performs when receiving this type of telegram.

Note: *this feature allows an ACK to be sent to the destination line immediately after the telegram itself is sent, so the telegram appears as confirmed (thus preventing repetitions in the case of faulty projects, etc.) even if no device has received it. In the event of a reception error on the destination line, the negative ACKs sent by the devices will overwrite this ACK, so having this parameter enabled will not cause any problems or data loss.*

2.2.2 SENT TELEGRAMS

Regarding the configuration of actions for telegrams sent from one line to the other, the menu is the same regardless of **Linecoupler** configuration.

It is possible to select which telegrams should be repeated if no ACK was received during transmission or if a NAK/BUSY response was received.

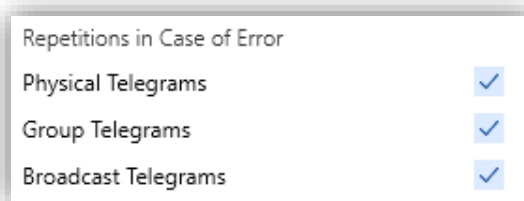
ETS PARAMETERISATION

Figure 4. Sent telegram parametrisation.

Repetitions in Case of Error:

- **Physical Telegrams** [*disabled* / [enabled](#)]: enables or disables physical telegram repetitions.
- **Group Telegrams** [*disabled* / [enabled](#)]: enables or disables group telegram repetitions.
- **Broadcast Telegrams** [*disabled* / [enabled](#)]: enables or disables broadcast telegram repetitions.

Note: *with repetitions enabled, the device may dynamically suppress repetitions to avoid overloading the bus.*

3 FILTER TABLE / SECURITY PROXY TABLE

The filter table is automatically created in ETS. The group addresses of the telegrams that must be routed by the coupler are included in this table. The contents of this table can be viewed in the preview. The security proxy tables are also displayed in this same preview.

The preview can be accessed by right-clicking on **Linecoupler** in ETS and selecting "Filter Table Preview" from the drop-down menu.

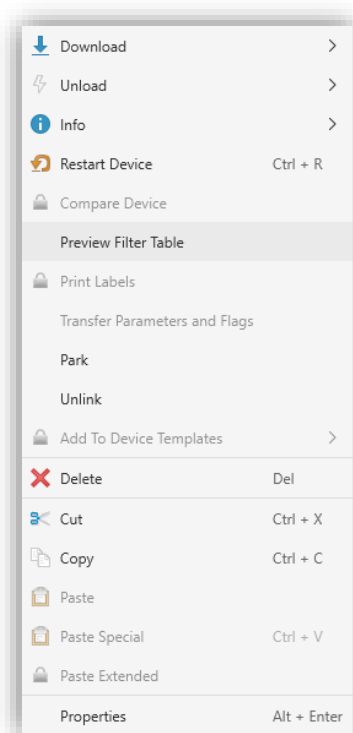


Figure 5. ETS Device menu.

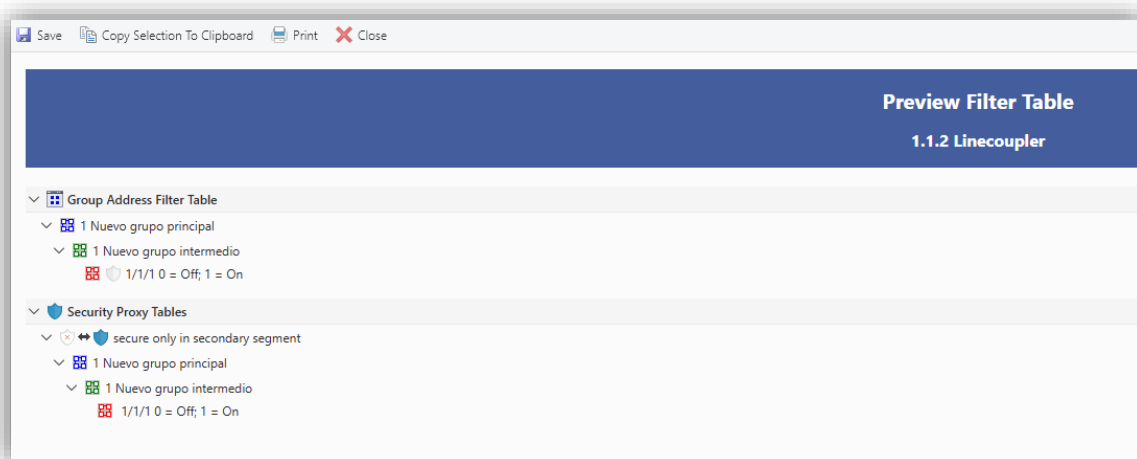


Figure 6. Filter table.

ANNEX I. ETS5

The operation in **ETS5** is identical to that of **ETS6**, with only a few differences. This is because **ETS5** does not offer **security proxy** or **segment coupler** functionality. These differences are detailed below.

- **Repeater:** This functionality is only available in **ETS5**. It allows routing or blocking based on the configuration, without filtering options. A parameter in the **ETS5** application programme allows either area/line coupler or repeater configuration options to be selected.

ETS PARAMETRISATION

Figure 7. General parametrization (ETS5).

- **Operation Mode** [[Area / Line Coupler](#) / [Repeater](#)]: allows the parameters to be displayed on the remaining pages according to the selected operating mode.

Note: *the remaining parameters are identical to those detailed in section 2.1.*

If the “Repeater” parameter has been selected in ETS5, the configuration will be the same as shown in section 2.2, with the following characteristics:

Received Telegrams:

- **Routing:** The “Filter” option is removed, allowing only **routing** or **blocking** to be selected.
- **Telegram Acknowledgement:** The option is locked to “Always”.

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