

KNX RF+ Line Coupler

RF-LK001.03

Further Documents:

Datasheet:

https://www.mdt.de/EN_Downloads_Datasheets.html

Assembly and Operation Instructions:

https://www.mdt.de/EN_Downloads_Instructions.html

Solution Proposals for MDT products:

<https://www.mdt.de/en/for-professionals/tips-tricks.html>

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2 Overview

2.1 Overview devices

This manual refers to the following devices (order number in bold).

- **RF-LK001.03** KNX RF+ Line Coupler, flush mounted

2.2 Functions

Line coupler

The device is used to connect devices on an RF radio line with devices on a TP (twisted pair) line. The bus load can be reduced via a filter table.

Segment coupler functionality (from ETS 6)

The new segment coupler function is a software extension of a line coupler that connects line segments independently of the media type. This means that a KNX RF line coupler can be integrated into a twisted pair line without having to create a separate structure.

Long Frame Support

The device supports “Long Frames” (longer telegrams). These contain more user data per telegram, which significantly reduces the programming time with the ETS.

2.3 Connection diagram

The following picture shows the exemplary connection diagram for a RF+ Line Coupler:

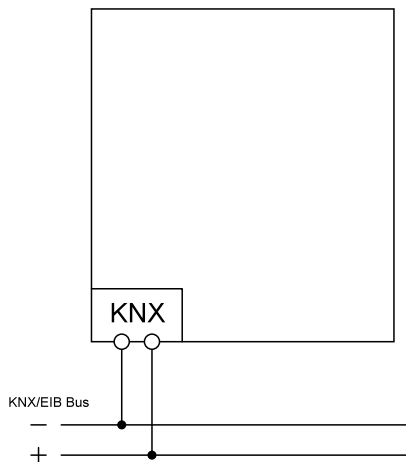


Figure 1: Exemplary connection diagram

2.4 Structure & Handling

The following pictures show the structure of the device:

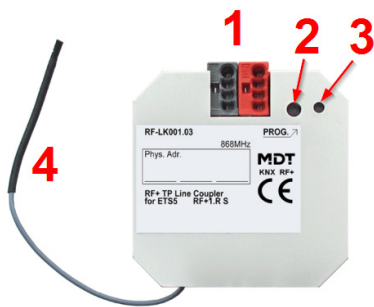


Figure 2: Structure & Handling

- 1 = Bus connecting terminal, Connection to main line (TP)
- 2 = Programming button
- 3 = Red programming LED
- 4 = Antenna, radio transmission to line (KNX RF)

2.5 Commissioning

1. Wire the device according to the connection diagram.
2. Connect interface to the bus, e.g. MDT USB Interface.
3. Switch on bus voltage.
4. Press the programming button on the device (red programming LED lights up continuously).
5. Set and programme the individual address in the ETS. (Programming LED turns off)
6. Configure and programme the settings in the application programme.

3 ETS Parameter

3.1 Main line (KNX TP)

The following table shows the available settings:

ETS Text	Dynamic range [Default value]	Comment
Telegram routing	<ul style="list-style-type: none"> ■ Groups: filter; Physical: block ■ Groups and Physical: filter ■ Groups: route; Physical: filter ■ Groups and Physical: route ■ individual setting 	<ul style="list-style-type: none"> ■ block: No telegram is forwarded. ■ filter: Only telegrams from the filter table are forwarded. ■ route: All telegrams are forwarded. ■ individual setting: The following parameters can be set individually.
Group telegrams: Main group 0...13	<ul style="list-style-type: none"> ■ route all (not recommended) ■ block ■ filter 	<ul style="list-style-type: none"> ■ All group telegrams (main group 0...13) are forwarded. ■ No group telegram (main group 0...13) is forwarded. ■ Only group telegrams (main group 0...13) from the filter table are forwarded.
Group telegrams: Main group 14...31	<ul style="list-style-type: none"> ■ route all (not recommended) ■ block ■ filter 	<ul style="list-style-type: none"> ■ All group telegrams (main group 14...31) are forwarded. ■ No group telegram (main group 14...31) is forwarded. ■ Only group telegrams (main group 14...31) from the filter table are forwarded.
Physical telegrams	<ul style="list-style-type: none"> ■ route all (not recommended) ■ block ■ filter 	<ul style="list-style-type: none"> ■ All physical telegrams are forwarded. ■ All physical telegrams are blocked. ■ Only physical telegrams corresponding to the filter table are forwarded.
Physical telegrams: Repetition for errors on the main line	<ul style="list-style-type: none"> ■ not active ■ up to 3 repetitions ■ only one repetition 	<p>In case of transmission errors (e.g. due to missing receiver) on the main line, physical telegrams are...</p> <ul style="list-style-type: none"> ■ not sent repeatedly. ■ sent up to three times repeatedly. ■ sent once repeatedly.

ETS Text	Dynamic range [Default value]	Comment
Group telegrams: Repetition for errors on the main line.	<ul style="list-style-type: none"> ■ not active ■ up to 3 repetitions ■ only one repetition 	In case of transmission errors (e.g. due to missing receiver) on the main line, group telegrams are... <ul style="list-style-type: none"> ■ not sent repeatedly. ■ sent up to three times repeatedly. ■ sent once repeatedly.
Confirm telegrams on main line	<ul style="list-style-type: none"> ■ if routed ■ always 	<ul style="list-style-type: none"> ■ Forwarded telegrams on RF line are confirmed by an “ACK” on the main line. ■ Each telegram on the main line is confirmed by an “ACK”.
Confirm own telegrams	<ul style="list-style-type: none"> ■ active ■ not active 	<ul style="list-style-type: none"> ■ Telegrams sent to the main line are confirmed by an additional “ACK”. ■ No confirmation by an “ACK”.

Table 1: Settings – Main line (KNX TP)

Note: The setting “**route all**” for group and physical telegrams is only intended for test purposes. The setting in normal operation is not recommended.

For more information on “Group telegrams” and “Physical telegrams”, see [4.2 Telegram routing](#)

3.2 Line (KNX RF)

The following table shows the available settings:

ETS Text	Dynamic range [Default value]	Comment
Programming via Line (KNX RF)	<ul style="list-style-type: none"> ■ allow ■ block 	Setting whether the programming of the device is also possible via the RF line.
Telegram routing	<ul style="list-style-type: none"> ■ Groups: filter; Physical: block ■ Groups and Physical: filter ■ Groups: route; Physical: filter ■ Groups and Physical: route ■ individual setting 	<ul style="list-style-type: none"> ■ block: No telegram is forwarded. ■ filter: Only telegrams from the filter table are forwarded. ■ route: All telegrams are forwarded. ■ individual setting: The following parameters can be set individually.
Group telegrams: Main group 0...13	<ul style="list-style-type: none"> ■ route all (not recommended) ■ block ■ filter 	<ul style="list-style-type: none"> ■ All group telegrams (main group 0...13) are forwarded. ■ No group telegram (main group 0...13) is forwarded. ■ Only group telegrams (main group 0...13) from the filter table are forwarded.
Group telegrams: Main group 14...31	<ul style="list-style-type: none"> ■ route all (not recommended) ■ block ■ filter 	<ul style="list-style-type: none"> ■ All group telegrams (main group 14...31) are forwarded. ■ No group telegram (main group 14...31) is forwarded. ■ Only group telegrams (main group 14...31) from the filter table are forwarded.
Physical telegrams	<ul style="list-style-type: none"> ■ route all (not recommended) ■ block ■ filter 	<ul style="list-style-type: none"> ■ All physical telegrams are forwarded. ■ All physical telegrams are blocked. ■ Only physical telegrams corresponding to the filter table are forwarded.

Table 2: Settings – Line (KNX RF)

Note: The setting “route all” for group and physical telegrams is only intended for test purposes. The setting in normal operation is not recommended.

4 Settings in the ETS

4.1 Structure of a project

4.1.1 Topology with separate RF line

From ETS 5:

The project is set up identically to projects with twisted pair (abbreviated as “TP” in the following) line couplers, except that each connection from radio (abbreviated as “RF” in the following) to TP must be implemented via the RF-LK001.03 line coupler. A radio line is generated in the medium “RF”. Here, too, the RF line coupler has the address “x.0”.

The following picture shows the exemplary structure of a topology:

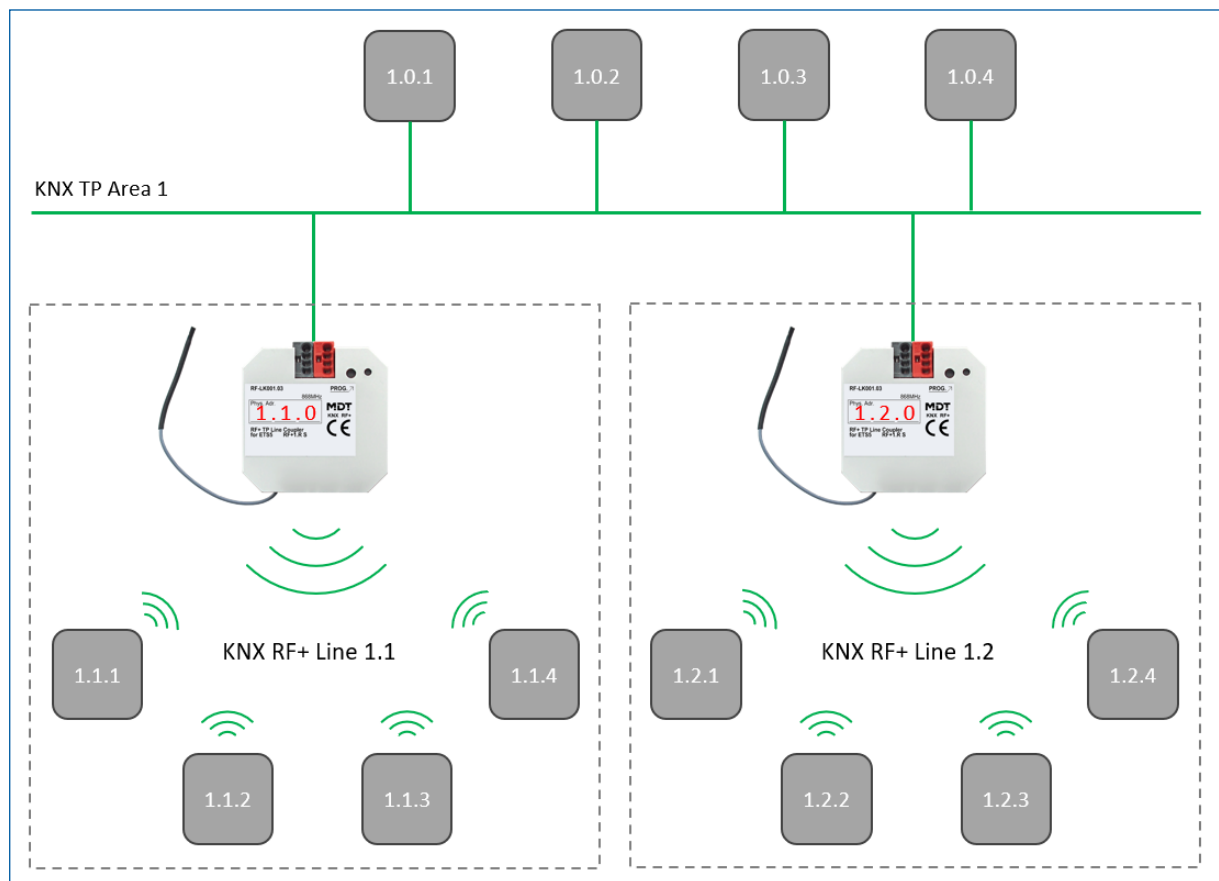


Figure 3: Example – Topology with RF Line

4.1.2 Topology with segment coupler

ETS 6:

With ETS 6 (from version 6.0.5), the RF line coupler can be used as a segment coupler. This is a software-side extension that connects line segments independently of the media type. This means that a KNX RF line coupler can be integrated into a TP line without having to create a separate structure for it.

The following picture shows the exemplary structure of a topology:

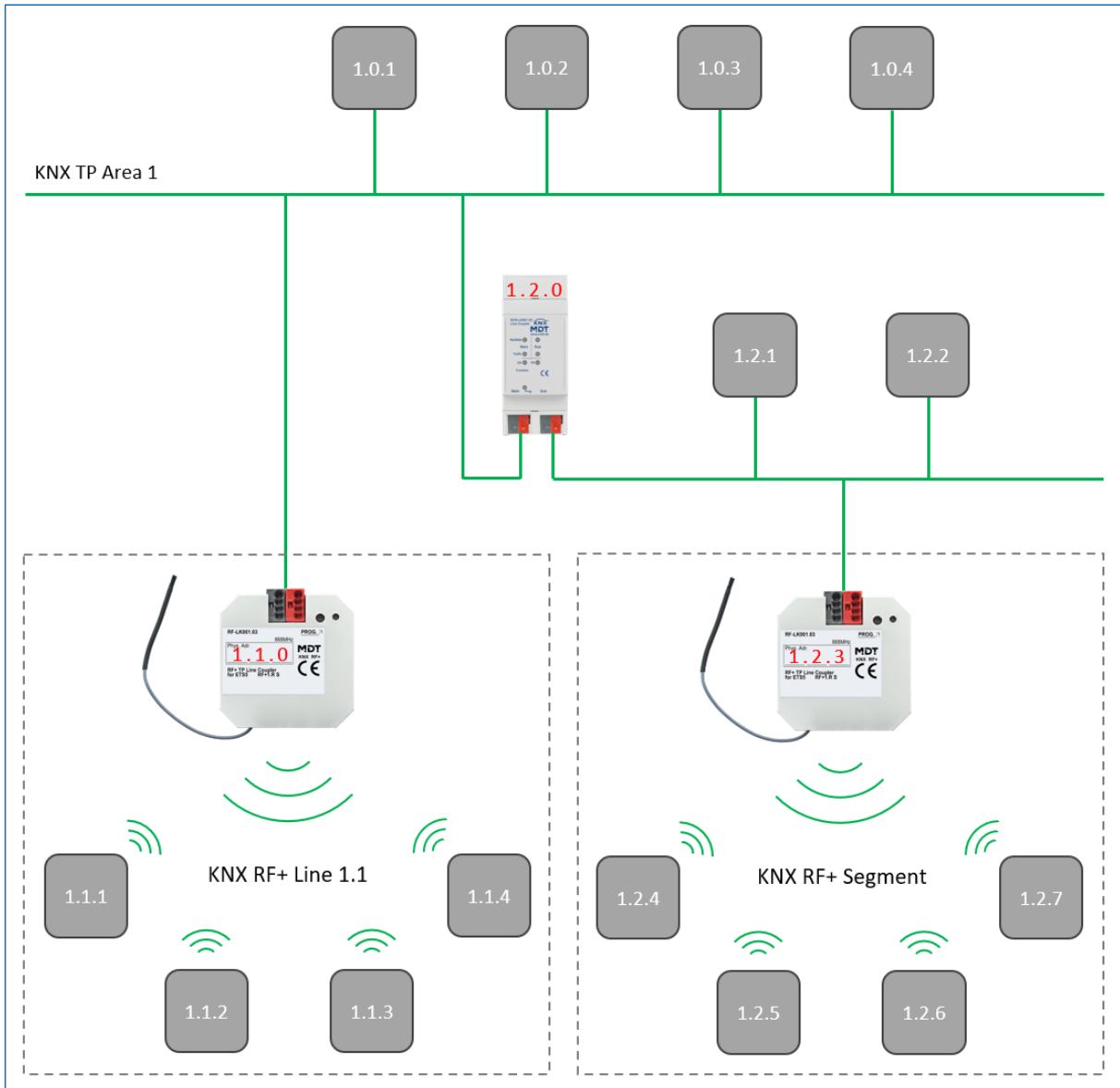


Figure 4: Example – Topology with segment coupler

Note:

- There may only ever be one segment coupler in an RF segment.
- In the ETS, it is not possible to create manual filter table entries for RF segments. This means that no additional group addresses can be added to the automatically created filter tables for subordinate segments.

4.2 Telegram routing

A distinction is made between two types of telegrams:

- Telegrams with physical address
- Telegrams with group addresses

Addressing with individual addresses is used for programming, for example, while addressing with group addresses is used for “normal” bus communication.

The behaviour of the line coupler with **physical addresses** is relatively simple. If the destination address is in the line of the line coupler, the telegram is forwarded, otherwise it is not.

The behaviour of telegrams with **group addresses** is defined by the use of filter tables. The filter tables specify which group addresses are transmitted from TP to RF and vice versa by the line coupler.

The line coupler listens to all group telegrams on both the TP and RF sides and compares the target address of the telegram with the group addresses in the filter table. If the target address is in the filter table, the telegram is converted to the other medium. If the destination address is not in the filter table, the line coupler does not forward the telegram.

4.3 Filter table

The filter table is created automatically by the ETS. However, there are exceptions where it may be useful to add group addresses manually to the filter table.

Each group address that contains communication objects of TP devices and devices that belong to the RF line of the line coupler are automatically added to the filter table by the ETS. This means that all group addresses required for proper communication are already present in the filter table. However, as mentioned at the beginning of this chapter, it can sometimes be useful to add group addresses to the filter table manually, e.g. if a visualisation is to display the behaviour of certain group addresses or if group addresses are to be made visible for diagnosis in the group/bus monitor.

To add the group address manually, the group address is selected in the ETS and the item “Pass through line coupler” is set from “No” to “Yes”:

When manually adding group addresses to the filter table, however, please note that the group addresses can now pass through all line couplers and this increases the bus load on all lines. Therefore, only group addresses that are really needed should be added to the filter table.

4.4 Preview filter table

To do this, right-click on the respective line coupler. In the context menu that opens, the entry “Preview Filter Table” can now be selected. The filter table shows all group addresses that are transferred from the RF line to the TP line – and vice versa.

4.5 Procedure for commissioning

After all devices have been inserted according to the corresponding topology, the devices can be configured according to the user’s own requirements.

The correct procedure is particularly important during commissioning, as this is the only way to ensure data exchange between wired transmission and radio transmission:

- **Programming the line coupler**
By programming the line coupler, the current settings are loaded into the line coupler. Furthermore, the current filter table is loaded into the line coupler.
- **Programming the other RF devices**
When programming the KNX RF devices, the parameter settings are loaded into the device. This process is analogous to all TP devices. Furthermore, the programming process of the RF devices writes the domain address into the device. This address is unique for each RF line and ensures that all RF devices of a line can communicate with each other, but that the line cannot be influenced by any device outside the line.

Important: Whenever the project is changed, the line coupler must first be reprogrammed (application programme). Then all devices affected by the change must be reprogrammed.

If changes are made to the topology of the project, the line coupler must be reprogrammed first and then all devices affected by the change in topology.

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6 Appendix

6.1 Statutory requirements

The devices described above must not be used in conjunction with devices which directly or indirectly serve human, health, or life-safety purposes. Furthermore, the devices described must not be used if their use may cause danger to people, animals, or property.

Do not leave the packaging material carelessly lying around. Plastic foils/ bags etc. can become a dangerous toy for children.

6.2 Disposal

Do not dispose of the old devices in the household waste. The device contains electrical components that must be disposed of as electronic waste. The housing is made of recyclable plastic.

6.3 Assembly



Danger to life from electric current!

The device may only be installed and connected by qualified electricians. Observe the country-specific regulations and the applicable KNX guidelines

The units are approved for operation in the EU and bear the CE mark.

Use in the USA and Canada is not permitted!

6.4 History

V1.0 First Version of Technical Manual

DB V2.0 08/2023