

# C4-KNX-LC

Line Coupler, MDRC

User Guide



Control4®

This manual describes the function and configuration of the *Line Coupler, MDRC*.

Line Coupler, MDRC, SKU: C4-KNX-LC.

KNXPROD filename: LK/S 4.42, download: <https://ctrl4.co/knx-lc>

Subject to change.

*Exclusion of liability:*

Although the contents of this document have been checked to ensure that they are consistent with the hardware and software, deviations cannot be completely excluded. We therefore cannot accept liability. Any necessary corrections will be incorporated in new versions of the manual.

Please inform us of any suggested improvements.

# Control4® KNX

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# Control4® KNX General

## 1 General

The Control4® Line Coupler, MDRC (SKU: C4-KNX-LC. *KNXPROD File Name: LK/S 4.42*. Download: <https://ctrl4.co/knx-lc>; ETS v. 5.6.6 or greater). is a modular installation device with a module width of 2 space units. It is used as a line or area coupler or as a repeater. As a line coupler, the Line Coupler connects a line with a main line, as an area coupler it connects a main line with an area line. It provides electrical isolation in this way.

### 1.1 Using the product manual

This manual provides you with detailed technical information relating to the function, installation and programming of the Control4® KNX Line Coupler, MDRC (SKU: C4-KNX-LC. *KNXPROD File Name: LK/S 4.42*. Download: <https://ctrl4.co/knx-lc>. Use ETS version 5.6.6 or greater). The application of the Line Coupler is explained using examples.

The manual is divided into the following sections:

- Chapter 1 General
- Chapter 2 Device technology
- Chapter 3 Commissioning
- Chapter A Appendix

#### 1.1.1 ETS version




Use ETS version 5.6.6 or greater.

# Control4® KNX

## General

### 1.1.2 Notes

Notes and safety instructions are represented as follows in this manual:

<b>Note</b>
Tips for usage and operation
<b>Examples</b>
Application examples, installation examples, programming examples
<b>Important</b>
These safety instructions are used as soon as there is danger of a malfunction without risk of damage or injury.
<b>Caution</b>
These safety instructions are used as soon as there is danger of a malfunction without risk of damage or injury.
 <b>Danger</b>
These safety instructions are used if there is a danger for life and limb with inappropriate use.
  <b>Danger</b>
These safety instructions are used if there is a danger to life with inappropriate use.

## 1.2 Product and functional overview

The Line Coupler C4-KNX-LC (KNXPROD File Name: LK/S 4.42) can be used as a line/area coupler or as a repeater.

### 1.2.1 Line/area coupler

As a line/area coupler, the Line Coupler C4-KNX-LC (KNXPROD File Name: LK/S 4.42) connects the data flow of two lines but isolates them electrically.

The coupler can route physically addressed, group addressed as well as broadcast telegrams.

In order to route a physically addressed telegram, the Line Coupler compares the target address with its own physical address. The physical address of the Line Coupler determines the line affiliation. The telegrams are routed or not routed depending on the evaluation and parameterization. If the Line Coupler has not yet received its intended project-assigned physical address, this can cause device faults during commissioning.

The Line Coupler responds in accordance with its parameterization to telegrams with group addresses.

In order to reduce the telegram traffic, the Line Coupler only routes telegrams in normal operation (standard settings), whose group addresses have been entered in its filter table. However, it can be useful, particularly during commissioning and for diagnostic purposes, to set the option *route* for both parameters *Group telegrams main group 0...13* and *Group telegrams main group 14...31*, i.e. the filter table is switched off. If the system is fully in operation, both parameters should be reset again to the standard values. The Line Coupler is then subsequently reprogrammed with the application. Here the correct filter table will be transferred to the Line Coupler.

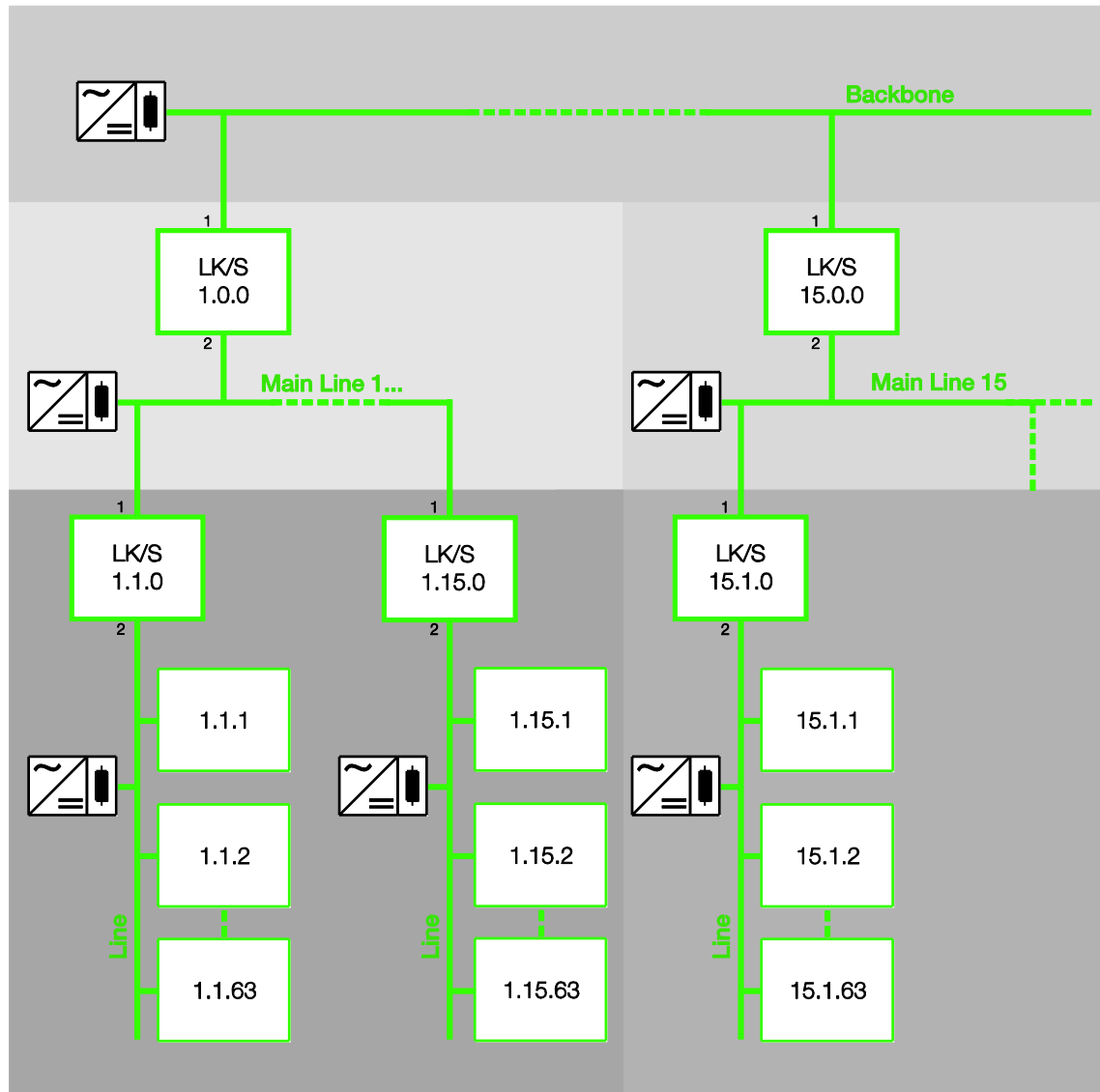
If the Line Coupler routes a telegram and does not receive an acknowledgement or there is a transmission error, the Line Coupler repeats the telegram up to three times. With the parameters *In case of errors repeat group telegrams*, the response for both lines is set separately. This parameter should be left as it is in the standard setting.

Normally the Line Coupler only acknowledges telegrams that it routes. The parameter *Telegram confirmation...* facilitates separate acknowledgement settings for both lines. This parameter should be left as it is in the standard setting.

# Control4® KNX General

## Topology

As a line coupler, the Line Coupler C4-KNX-LC (KNXPROD File Name: LK/S 4.42) connects a line with a main line. As an area coupler, the Line Coupler connects a main line with an area line. Each line requires its own power supply.



Backbone = Area line with up to 15 area couplers, physical address x.0.0

Main Line = Main line with up to 15 line couplers, physical address x.y.0

Line = Line with up to 64 devices including the line coupler. Up to 256 devices are possible when up to three line repeaters are used.

The function of the device is assigned by the assignment of the physical address.

### Note

If a second output of the Power Supply SV/S is used for connection, a DV/S choke must be connected.  
For further information refer to the Power supply product manual



# Control4® KNX

## General

### 1.2.2

#### Repeater

As a repeater, the Line Coupler C4-KNX-LC (KNXPROD File Name: LK/S 4.42) connects the data flow of two line segments but isolates them electrically.

Behind a line coupler (in one line), up to three repeaters can be connected in parallel in a line. This is how up to four line segments form an entire line. A line can thus be expanded from 64 possible devices (1 line) up to 256 devices (4 line segments). Every line segment must be provided with power by its own KNX power supply.

The repeaters do not have filter tables. For this reason, a telegram is sent in all line segments independently of whether or not it is processed in the respective line segment. Whether this telegram is initiated within the line or whether it has been sent from the main line via the repeater is also irrelevant.

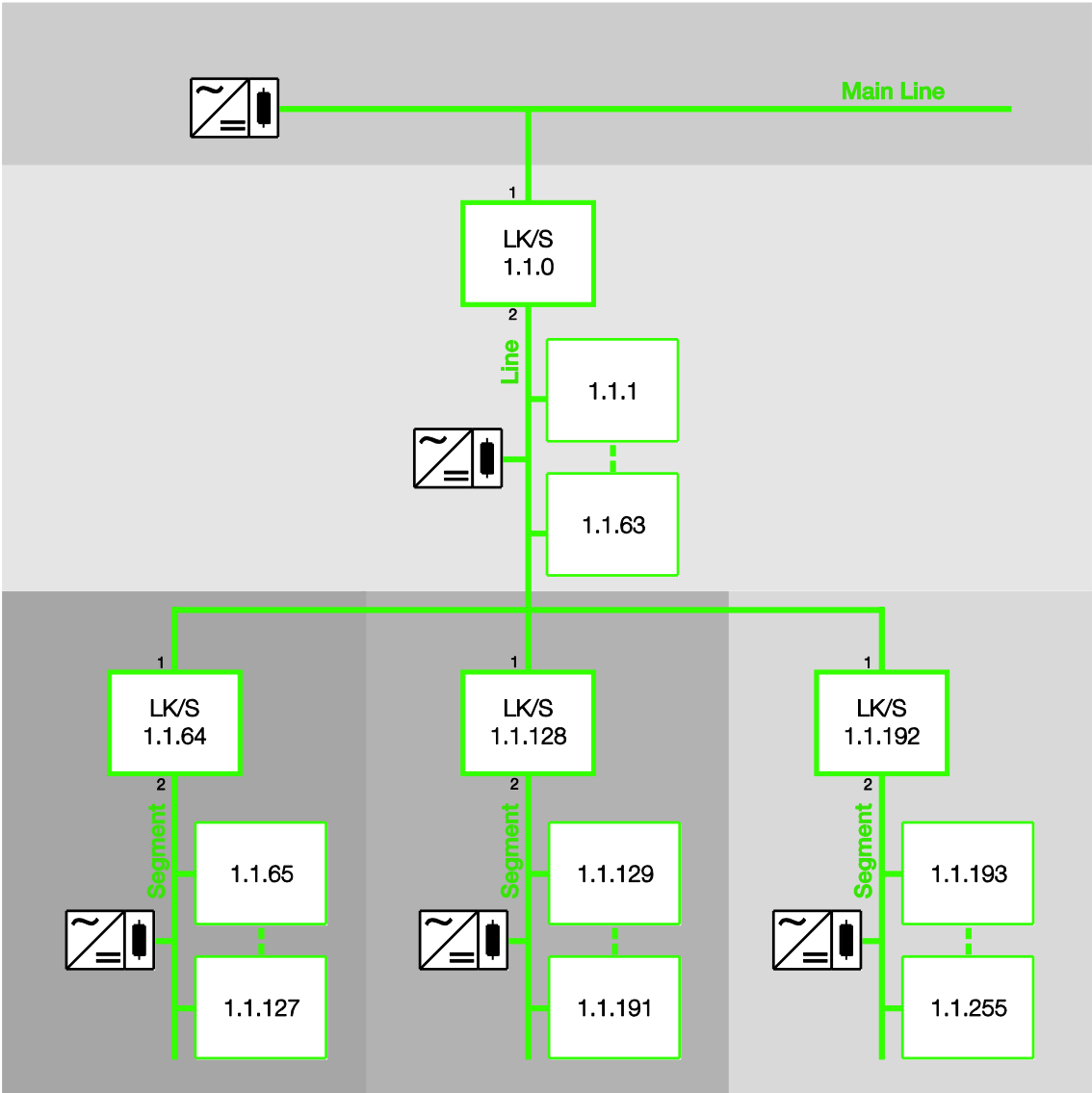
If there is a transmission error of a physically addressed telegram, this telegram is not repeated.

If the repeater routes a telegram and does not receive an acknowledgement or there is a transmission error, the repeater repeats the telegram up to three times. With the parameters *In case of errors repeat group telegrams*, the response for both line segments is set separately.

# Control4® KNX General

## Topology

Up to three repeaters are connected in parallel in a line. Each line segment requires its own power supply.



Main Line = Main line with up to 15 line couplers

Line = Line with up to three repeaters

Line Segment = Line segment, per segment up to 64 devices are possible (in total up to 256 devices are possible) including the repeater.

Note
The topology is not defined with the repeater. Under the coupler 1.1.0, the addresses 1.1.0 to 1.1.255 can be assigned as required to the segments.

# Control4® KNX Device technology





## 2 Device technology



The Control4® KNX Line Coupler C4-KNX-LC (KNXPROD File Name: LK/S 4.42) is a modular installation device with a module width of 2 space units. It is used as a line or area coupler or as a repeater. As a line coupler, the Line Coupler connects a line with a main line, as an area coupler it connects a main line with an area line. It provides electrical isolation in this way.

If required, the Line Coupler filters telegrams and only routes the telegrams intended for other lines. It is possible to route or block all telegrams for diagnostic purposes.

### 2.1 Technical data

<b>Supply</b>	Rated voltage	21...31 V DC, via the bus
	Power consumption	Maximum 0.25 W
	Current consumption	Maximum 12 mA
<b>Connections</b>	KNX, subline (2 = Line)	Via left bus connection terminal
	KNX, subline (1 = Main line)	Via right bus connection terminal
<b>Operating and display elements</b>	Button/LED  (red)	For assignment of the physical address
	LED  <b>ON</b> (green)	For indicating operation
	LED  <b>Main Line</b> (yellow)	For indicating telegram traffic on the main line
	LED  <b>Line</b> (yellow)	For indicating telegram traffic on the sub line
<b>Enclosure</b>	IP 20	To EN 60 529
<b>Safety class</b>	III, in the installed state	To EN 61 140
<b>Insulation category</b>	Overvoltage category	III to EN 60 664-1
	Pollution degree	II to EN 60 664-1
<b>KNX safety extra low voltage</b>	SELV 31 V DC	
<b>EMC requirements</b>	Compliant to EN 61000-6-2, EN 61000-6-3 and EN 50090-2-2	

# Control4® KNX

## Device technology

<b>Temperature range</b>	Operation	-5 °C...+45 °C
	Storage	-25 °C...+55 °C
	Transport	-25 °C...+70 °C
<b>Ambient conditions</b>	Maximum air humidity	To EN 50 491 95 %, no condensation allowed
<b>Design</b>	Modular installation device (MDRC)	Modular installation device, Pro <i>M</i>
	Dimensions	90 x 36 x 64.5 mm (H x W x D)
	Mounting width	2 modules at 18 mm
	Mounting depth	64.5 mm
<b>Installation</b>	On 35 mm mounting rail	To EN 60 715
<b>Mounting position</b>	As required	
<b>Weight without packaging</b>	0.075 kg	
<b>Housing/colour</b>	Plastic housing, grey	
<b>Approval</b>	EN 60 669-1, EN 50 428	
<b>KNX certification</b>	EN 50 090-2-2, EN 50 491	
<b>CE mark</b>	In accordance with the EMC guideline and low voltage guideline, RoHS	

# Control4® KNX

## Device technology

Device type	Application program	Maximum number of communication objects	Maximum number of group addresses	Maximum number of associations
<b>C4-KNX-LC</b>	Couple Repeat/...*	0	0	0
(KNXPROD File Name: LK/S 4.42)	Couple/...*	0	0	0
	Repeat/...*	0	0	0

Download:  
<https://ctrl4.co/knx-lc>

\* ... = current version number of the application program.

### Note

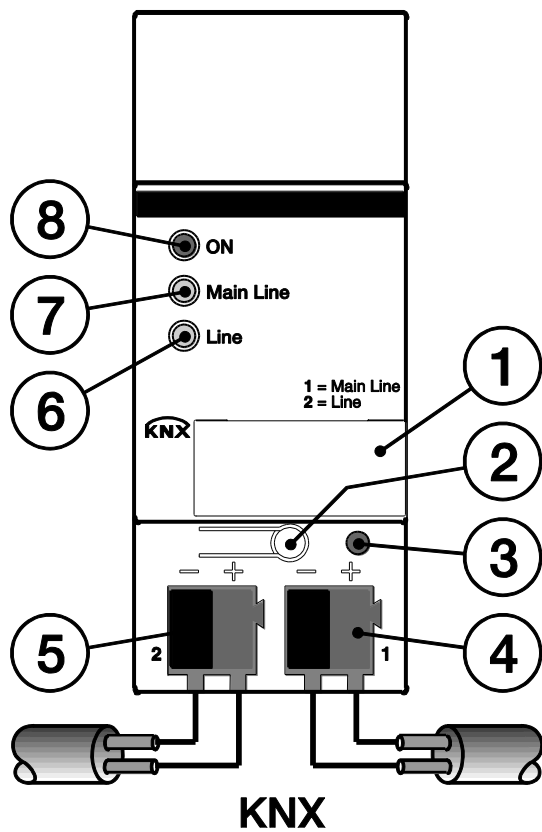
The ETS and the current version of the device application program are required for programming.  
**Use ETS version 5.6.6 or greater.**

The current application program is available for download at <https://ctrl4.co/knx-lc>.  
 After import in the ETS, it is available in the ETS under *Control4/System devices/Couplers*.

The device does not support the locking function of a KNX device in the ETS. If you inhibit access to all devices of the project with a *BCU code*, it has no effect on this device. Data can still be read and programmed.

# Control4® KNX Device technology

## 2.2 Circuit diagram



2CDC 072 003 F0012

### Line Coupler

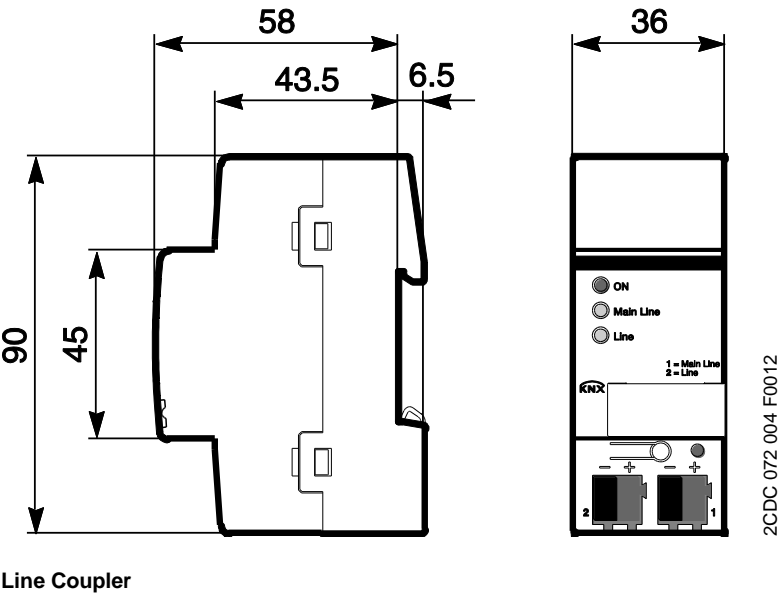
- 1 Label carrier
- 2 Button *Programming*
- 3 LED *Programming* (red)
- 4 Bus connection terminal Control4® KNX of the primary/main line
- 5 Bus connection terminal Control4® KNX of the secondary line
- 6 LED **Line** (yellow)
- 7 LED **Main Line** (yellow)
- 8 LED **ON** (green)

#### Note

The main and secondary lines must each be supplied with power from separate power sources (electrically isolated).

# Control4® KNX Device technology

## 2.3 Dimension drawing



# Control4® KNX

## Device technology

### 2.4 Assembly and installation

The Control4® KNX Line Coupler, MDRC C4-KNX-LC (*KNXPROD File Name: LK/S 4.42*, download: <https://ctrl4.co/knx-lc>) is a modular installation device for quick installation in the distribution board on 35 mm mounting rails to EN 60 715.

The Line Coupler mounting position can be selected as required.

The connection to the bus is established using the supplied bus connection terminals.

Accessibility to the Line Coupler for the purpose of operation, testing, visual inspection, maintenance and repair must be provided compliant to VDE 0100-520.

#### **Commissioning requirements**

In order to commission the Line Coupler, a PC with ETS 5.6.6 (or greater) and a KNX interface, e.g. USB or IP, are required. The Line Coupler is ready for operation, after bus voltage is connected to the main line.

For programming the Line Coupler, it is necessary to at least connect the primary line. If the secondary subline is also connected, the Line Coupler can also be programmed from the secondary subline.

The installation and commissioning may only be carried out by electrical specialists. The appropriate norms, guidelines, regulations and specifications for your country should be observed when planning and setting up electrical installations and security systems for intrusion and fire detection.

Protect the device from damp, dirt and damage during transport, storage and operation.

Only operate the device within the specified technical data limits!




The device should only be operated in an enclosed housing (distribution board)!

#### **Supplied state**

The Line Coupler is supplied with the physical address 15.15.0.

#### **Assignment of the physical address**

The assignment and programming of the physical address is carried out in the ETS.

Button  on the Line Coupler is pressed to assign the physical address. The red LED  lights up. It switches off, as soon as the ETS has assigned the physical address or button  has been pressed again. The selection of the physical address is dependent on the required device function (coupler or repeater).

For further information see: [Product and functional overview](#), page 5.

#### **Cleaning**

If devices become dirty, they can be cleaned using a dry cloth or a cloth dampened with a soapy solution. Corrosive agents or solutions should never be used.

#### **Maintenance**

The Line Coupler is maintenance-free. No repairs should be carried out by unauthorised personnel if damage occurs, e.g. during transport and/or storage.






# Control4® KNX Device technology

## 2.4.1

### Display elements

Indicator LEDs are located on the front of the Line Coupler.

The response of the display elements is described in the following table:

LED	KNX operation
 <b>ON</b>	<i>OFF</i> : The Line Coupler is not operational. No power supply is applied or it has malfunctioned. <i>ON</i> : The Line Coupler is operational and is supplied by the main line. The power supply is applied.
 <b>Main Line</b>	<i>OFF</i> : No main line connected or voltage failure on the main line. <i>ON</i> : The main line is connected. <i>Flashes</i> : Telegram traffic on the main line.
 <b>Line</b>	<i>OFF</i> : No line connected or voltage failure on the line. <i>ON</i> : A line is connected. <i>Flashes</i> : Telegram traffic on the line.



# Control4® KNX Commissioning

## 3 Commissioning

The parameterization of the Line Coupler is undertaken using application program *Couple Repeat* and the Engineering Tool Software ETS. (Use ETS 5.6.6 or greater).

The current application program is available for download at <https://ctrl4.co/knx-lc>.  
After import in the ETS, it is available in the ETS under *Control4/System devices/Couplers*.

For parameterization purposes, a PC or Laptop with ETS and a connection to the KNX, e.g. via RS232, USB or IP interface, is required.

### 3.1 Overview

The following table provides an overview of the functions possible with the Line Coupler (C4-KNX-LC) in ETS 5.6.6. The current application program is available for download at <https://ctrl4.co/knx-lc>.

**Use ETS 5.6.6 or greater.**

After import in the ETS, it is available in the ETS under *Control4/System devices/Couplers*.

<b>Line/Area Coupler properties</b>	<b>ETS 5.6.6</b>
Function <i>Line/Area Coupler</i>	■
Filter group telegrams main group 0...13	■
Filter group telegrams main group 14...31	■
Block physically addressed telegrams	■
Block broadcast telegrams	■
In case of errors repeat telegrams	■
Telegram confirmation	■

■ = property applies

<b>Repeater properties</b>	<b>ETS 5.6.6</b>
Function <i>Repeater</i>	■
In case of errors repeat telegrams	■

■ = property applies

# Control4® KNX Commissioning

## 3.2 Parameters

The parameterization of the Line Coupler is implemented using the Engineering Tool Software ETS 5.6.6 or greater.

The current application program is available for download at <https://ctrl4.co/knx-lc>.

After import in the ETS, it is available in the ETS under *Control4/System devices/Couplers*.

The following chapter describes the parameters of the Line Coupler using the parameter windows. The parameter windows feature a dynamic structure, so that further parameters may be enabled depending on the parameterization and the function.

The default values of the parameters are underlined,

e.g.:

Options:     yes  
              no

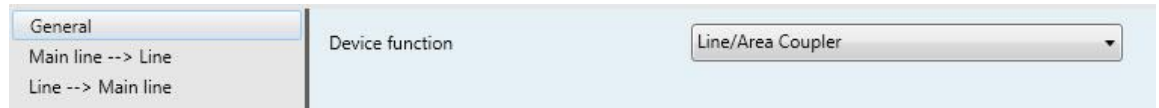
### 3.2.1 Application for ETS 5.6.6 (or greater)

The application *Couple Repeat* with extended functional range is only available for the Line Coupler (C4-KNX-LC) and ETS 5.6.6 or higher.

# Control4® KNX Commissioning

## 3.2.1.1 Parameter window *General*

The device functions are defined in this parameter window.



### **Device function**

Options:      Line/Area Coupler  
                Repeater

- *Line/Area Coupler*: The data flow between two lines is connected. Both lines are electrically isolated from one another. The Parameter window [Main line --> Line](#), page 20, and Parameter window [Line --> Main line](#), page 23, appear.
- *Repeater*: The data flow between two line segments is connected. Both lines are electrically isolated from one another. Parameter window [Settings](#), page 24, is enabled.

# Control4® KNX Commissioning

## 3.2.1.2 Device function - *Line/Area Coupler*

### 3.2.1.2.1 Parameter window *Main line --> Line*

This parameter window is visible if in Parameter window [General](#), page 19, the device function *Line/Area Coupler* has been selected.

In this parameter window, the settings for the connection from the primary/main line to the line are

Parameter	Value
Group telegrams main group 0...13	filter
Group telegrams main group 14...31	filter
Physically addressed telegrams	filter
Broadcast telegrams	route
In case of errors repeat telegrams	yes
Telegram confirmation	only if routed
If free group address structure is used: <-- Note	
Main group 0...13 => 1...28,671	
Main group 14...31 => 28,672...65,535	

undertaken.

#### **Group telegrams main group 0...13**

#### **Group telegrams main group 14...31**

Option: filter  
route  
block

- *filter*: Only group telegrams entered into the filter table are routed. The ETS automatically creates the filter table.
- *route*: All group telegrams are routed.
- *Block*: All group telegrams are blocked.

#### **Physically addressed telegrams**

Option: filter  
block

- *filter*: Physically addressed telegrams (programming telegrams) are routed according to the topology.
- *block*: Physically addressed telegrams are blocked.

# Control4® KNX Commissioning

## Broadcast telegrams

Options:     route  
              block

Broadcast telegrams are used, for example, by the ETS to identify KNX devices in programming mode.

- *route*: Broadcast telegrams are routed.
- *Block*: Broadcast telegrams are blocked.

## In case of errors repeat telegrams

Options:     yes  
              no  
              user-defined

- *yes*: If an error is detected when a telegram is transmitted, the telegram is repeated up to three times.
- *no*: The telegram is not repeated.
- *user-defined*: The response can be set individually for different types of telegram.

## Repeat group addressed telegrams

Options:     yes  
              no

- *yes*: If an error is detected when a group addressed telegram is transmitted, the telegram is repeated up to three times.
- *no*: The telegram is not repeated.

## Repeat physically addressed telegrams

Options:     yes  
              no

- *yes*: If an error is detected when a physically addressed telegram is transmitted, the telegram is repeated up to three times.
- *no*: The telegram is not repeated.

## Repeat broadcast telegrams

Options:     yes  
              no

- *yes*: If an error is detected when a broadcast telegram is transmitted, the telegram is repeated up to three times.
- *no*: The telegram is not repeated.

# Control4® KNX Commissioning

## Telegram confirmation

Options:      only if routed  
             always

- *only if routed*: Telegrams that are routed are acknowledged.
- *always*: Every telegram is acknowledged.

**The following applies with a group address view:**

**Main groups 0...13 => 1...28,671**

**Main groups 14...31 => 28,672...65,535**

<---NOTE

In ETS 5.6.6 it is possible to not just assign two or three-stage group addresses, it is possible to freely assign them. If the free group address view is selected, main group 0...13 corresponds to subgroup range 1...28,671 and main group 14...31 with subgroup range 28,672...65,535. Relevant details can be read with the assistance of the Help in the ETS.



# Control4® KNX Commissioning

## 3.2.1.2.2 Parameter window *Line --> Main line*

This parameter window is visible if in Parameter window [General](#), page 19, the device function *Line/Area Coupler* has been selected.

In this parameter window, the telegram functions for the connection from a secondary line to the primary/main line are defined.

The parameter setting of the connections *Line --> Main line* and *Main line --> Line* do not differentiate from one another. The descriptions of the parameter setting options are described in Parameter window [Main line --> Line](#), page 20.

# Control4® KNX Commissioning

## 3.2.1.3 Device function *Repeater*

General	Settings
In case of errors repeat group addressed telegrams on main line <span>yes</span>	
In case of errors repeat group addressed telegrams on line <span>yes</span>	

### 3.2.1.3.1 Parameter window *Settings*

This parameter window is visible if in Parameter window [General](#), page 19, the device function *Repeater* has been selected.

#### **In case of errors repeat group addressed telegrams on main line**

Options: yes  
no

- **yes:** If an error is detected when a group addressed telegram is transmitted on the main line, the telegram is repeated up to three times.
- **no:** The telegram is not repeated.

#### **In case of errors repeat group addressed telegrams on line**

Options: yes  
no

- **yes:** If an error is detected when a group addressed telegram is transmitted on a line, the telegram is repeated up to three times.
- **no:** The telegram is not repeated.

# Control4® KNX Appendix

## A Appendix

### A.1 Scope of delivery

The Control4® KNX Line Coupler, MDRC C4-KNX-LC (*KNXPROD File Name: LK/S 4.42*, download: <https://ctrl4.co/knx-lc>) is supplied together with the following components.

Please check the items received using the following list.

- 1 x Line Coupler, MDRC (C4-KNX-LC)
- 1 x installation and operating instructions
- 2 x bus connection terminal (red/black)

# Control4® KNX

## Appendix

### A.2 Ordering information

Device type	Product name	Weight 1 pc. [kg]	Pack unit [pc.]
<b>C4-KNX-LC</b>  (KNXPROD File Name: LK/S 4.42)  Download: <a href="https://ctrl4.co/knx-lc">https://ctrl4.co/knx-lc</a>	Line Coupler, MDRC	0.075	1

# Control4® KNX Appendix

## Notes



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