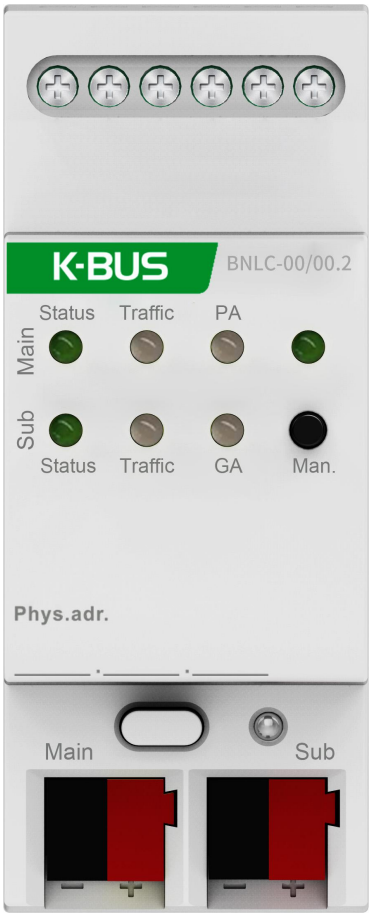
User Manual

K-BUS® Line Coupler_V1.1

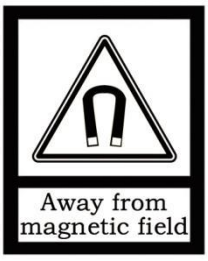
BNLC-00/00.2



KNX/EIB Home and Building Control System

Attentions

1. **Please keep devices away from strong magnetic field, high temperature, wet environment;**



2. **Do not fall the device to the ground or make them get hard impact;**

3. **Do not use wet cloth or volatile reagent to wipe the device;**

4. **Do not disassemble the devices.**

Contents

Chapter 1 Summary

The coupler can be used as line coupler, backbone coupler or repeater as well in existing KNX networks as in new KNX networks. It has a filter table with the help of which bus telegrams are either blocked off from one of the two lines or are passed on to another line thus reducing the bus load. The filter table is created by the ETS (KNX Tool Software) automatically on commissioning the system.

As there are no differences in hardware between the line coupler, the backbone coupler and the repeater they were given the same ordering number. After downloading the physical address, the functions of the coupler are configured automatically, as described in the following table:

Coupler function	Main line	Sub line
Backbone coupler	Backbone line	Main line 1-15
Line coupler	Main line 1-15	Sub line1-15
Repeater	Line 1-15	Segment 1-3

The power supply of the coupler electronics occurs via the connection to the main line.

Used as a line coupler, The basic functionality of the coupler is coupling a KNX-TP-main line with a KNX-TP-sub line. The coupler provides galvanic isolation between the two connected lines. Due to the flexibility of the coupler, it can be used as a line coupler to connect a line to a main line or as a backbone coupler to connect a main line to a backbone line. The main task of the coupler is filtering the traffic according the installation place in the hierarchy or according to the built in filter tables for group oriented communication. The the coupler provides outstanding features compared to other similar products, for example support for long messages (up to 250 byte length) and a configurable one button activation of special functions (e.g. transmit all group telegrams).These are helpful during installation, during run time and for trouble shooting. The high informative 6 duo LED display shows accurate the bus status on each line. This helps identifying common communication problems due to bus load or re-transmissions on both lines.

Used as a repeater, its function has the target to link two lines for data transfer. And it still provides galvanic isolation between the connected lines. Up to three line repeaters can be used

behind a line coupler. As a result, up to four lines can form a complete line. Each line must be supplied by a dedicated KNX power supply.

This manual provides the technical information about the coupler as well as assembly and programming in detail for users, and explains how to use the coupler by the application examples.

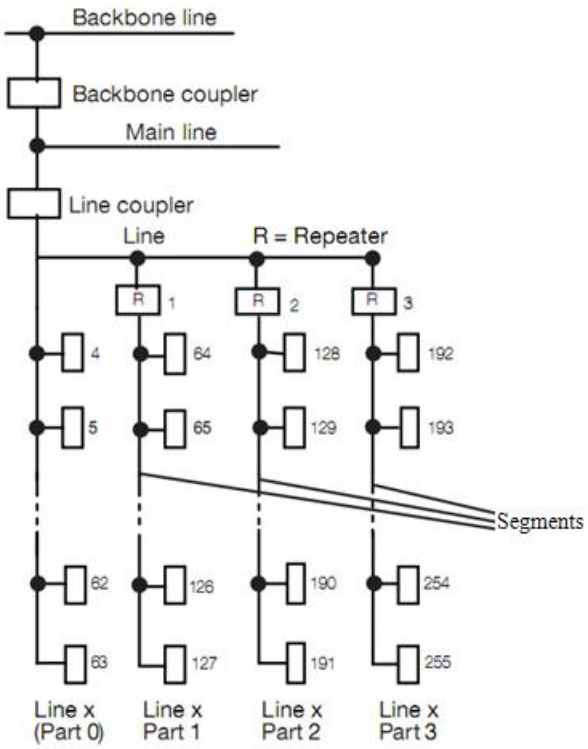


Fig.1 Connection of repeaters to a bus line

Application Programs ：

The coupler can be programmed with the ETS up from version ETS4. Used as a line/backbone coupler the application program “KNX Line Coupler” and used as a repeater the application program “KNX Line Repeater” has to be downloaded.

Please note that commissioning straight at delivery status means:

- The line coupler does block all telegrams because the filter table is not defined,

- The fallback time after manual operation is 120 min

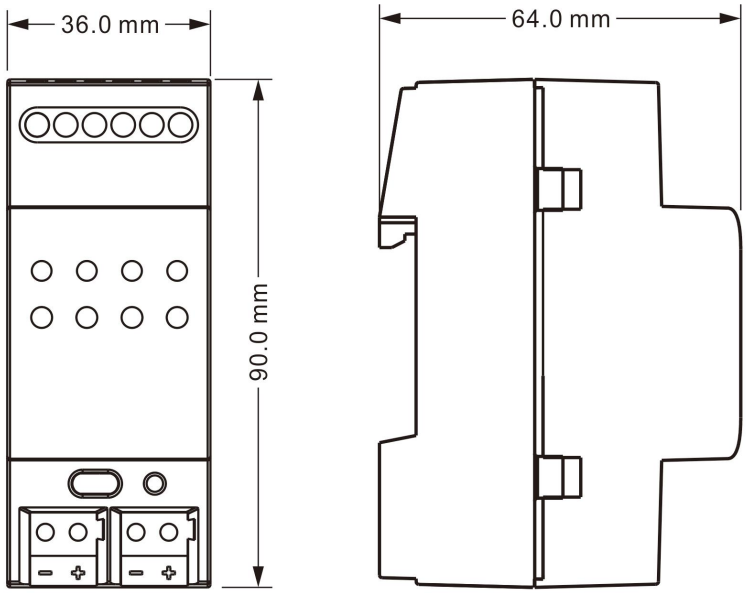
- The physical address is 15.15.0.

Chapter 2 Technical Data

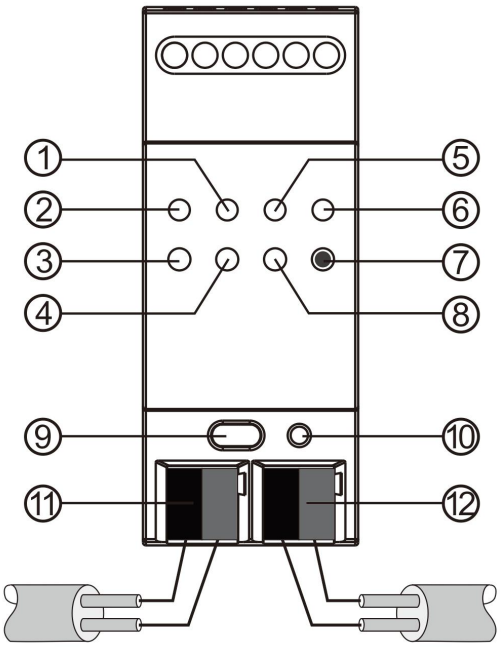
Power supply	Bus Main line	21-30V DC, used for power supply of the device
	Bus Sub line	21-30V DC
	Bus current	Main: <10mA/30V DC, Sub: <5mA/30V DC
	Bus consumption	Main: <300mW, Sub: <150mW
Connections	KNX Main/Sub line	Left bus connection terminal(Red/Black)
Operating and display	LED Bus State Main	Green on: Main line OK Off: main line error
	LED Bus State Sub	Green on: sub line ok Off: sub line error or not connected
	Traffic Main LED	Green: Bus traffic on sub line Red: flashing: Traffic error on main line
	Traffic Sub LED	Green: Bus traffic on sub line Red flashing: Traffic error on sub line
	GA LED(Routing group telegrams)	Green: Filter table active Red: Block; Green and Red: Route all Off: Main and sub different
	PA LED(Routing physical addressed telegrams)	Green: Filter table active Red: Block; Green and Red: Route all Off: Main and sub different
	Programming/Running LED	Red: For assignment of the physical address Green: flashing: The device running normally
	Programming button	For assignment of the physical address
	Function LED	Green: Enter manual override Off: Exit manual override
	Function button	Switch to manual override
Temperature	Operation	–5 °C ... + 45 °C
	Storage	–25 °C ... + 55 °C
	Transport	– 25 °C ... + 70 °C
Ambient	Humidity	<93%, expect dewing
Protection	IP 20	to EN 60529
Dimensions	36×90 ×64mm	
Weight	0.1KG	
Housing	Plastic housing, beige	
Design	Modular installation device, on 35mm mounting rail	

Chapter 3 Dimension diagram and Connection diagram

3.1 Dimension diagram



3.2 Connection diagram



①Traffic Main LED	④Traffic Sub LED	⑦Function LED	⑫KNX Connection: Main line
②Bus Status Main LED	⑤GA LED	⑧PA LED	⑩Programming LED
③KNX Status Sub LED	⑥Function Status LED	⑨Programming Button	⑪KNX Connection: Sub line

Note:

The latest downloaded settings (parameters) and filter table are still available after switching back from “Manual operation” to “Normal operation”.

Chapter 4 Application Description Coupler

Application program	Max. number of communication objects	Max. number of group address	Max. number of associations
KNX Line Coupler/Repeater	**0**	**0**	**0**

4.1 Coupler

If the coupler receives telegrams (for example during commissioning) which use a physical address as destination address, it compares the physical addresses of the receiver with its own physical address and then decides whether it must route the telegrams or not.

The coupler reacts to telegrams with group addresses in accordance with its parameter settings. During normal operation (default setting), the coupler only routes those telegrams whose group addresses have been entered in its filter table.

If the coupler routes a telegram and does not receive an acknowledgement, or if a bus device finds a transmission error, the coupler repeats the telegram three times. With the parameters “Repetitions if errors...”, this behaviour can be set separately for both lines. These parameters should be left in the default setting.

4.2 Repeater

Line repeaters do not have any filter tables. This means that a telegram is sent to all lines irrespective of whether it is processed in the corresponding line. It is therefore not important whether the telegram has been triggered within the lines or whether it has been sent from the main line to the lines via the line coupler.

If an error occurs during the transmission of a telegram with the physical address of a receiver, the line repeater can repeat the telegram. This behavior can be set separately for both line segments with the parameters „ Physical: Repetition if errors on main line/on sub line“.

If the line repeater routes a group telegram and does not receive an acknowledgement, or if a bus device finds a transmission error, the line repeater repeats the telegram three times. With the parameters „Group: Repetition if errors on main line/on sub line“, this behaviour can be set separately for main line and sub line.

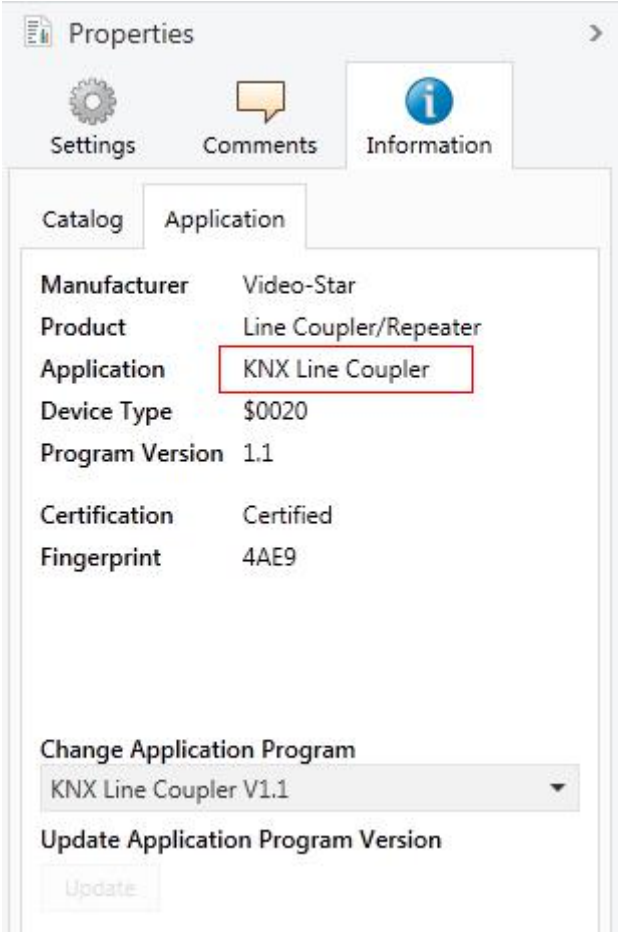
Chapter 5 Parameter setting description in the ETS

5.1 Coupler

5.1.1 Setting

If not already configured as “coupler”, the corresponding application program for “coupler” should be downloaded.

Change can occur under “Change Application Program” and could be checked under “Properties”:



5.1.2 Parameter window “General”

Parameter window is shown as follow:

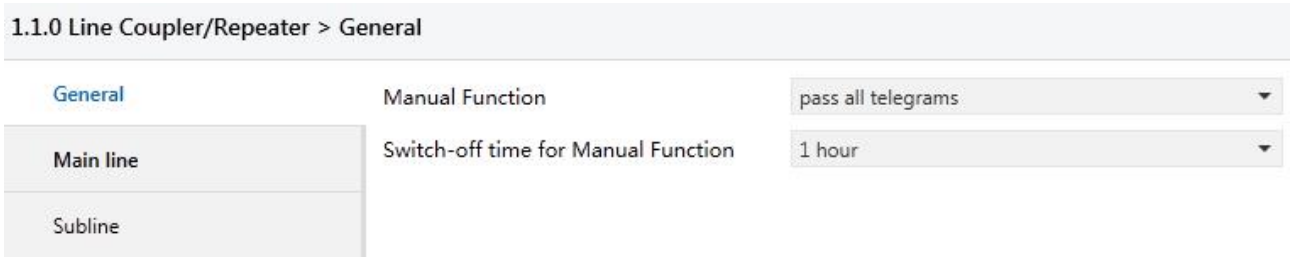


Fig.5.1 Parameter window “General

Parameter “Manual Function”

Telegram routing configuration for the manual function. Options:

Disabled

Pass all telegrams

Pass all Physical telegrams

Pass all Group telegrams

Parameter “Switch-off time for Manual Function”

Time duration required to exit from “manual operation”. Options:

10 min

1 hour

4 hours

8 hours

Please note that the parameter “transmit all” for Group or Physical telegrams is intended only for testing purposes and it should not be set for normal operation.

5.1.3 Parameter window “Main Line”

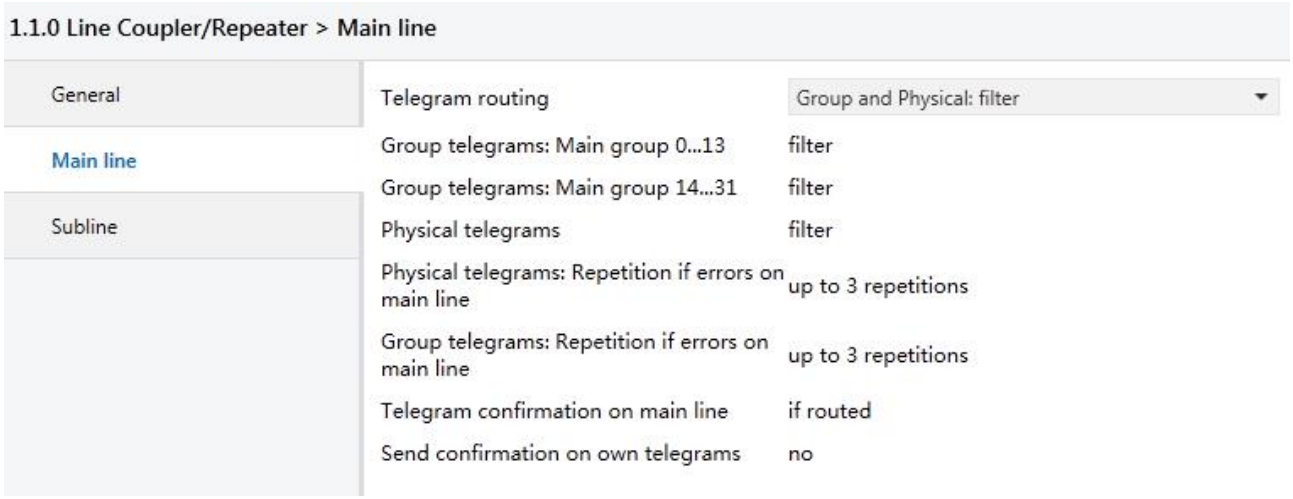


Fig.5.2 Parameter window “Main line”

Parameter “Telegram routing”

This parameter is to be set depending on the planed configuration. Options:

Group: filter, Physical: block

Group and Physical: filter

Group: route, Physical: filter

Group and Physical: route

Configure

Block: no telegram is routed.

Filter: only telegrams are routed which are entered in the filter table.

Route: the telegrams are routed.

Configure: the following parameters can be set individually.

Parameter “Group telegrams: Main group 0..13”

Options:

Transmit all (not recommended)

Block

Filter

Transmit all: Group telegrams (main group 0..13) are all routed.

Block: Group telegrams (main group 0..13) are all blocked.

Filter: Group telegrams (main group 0..13) are routed if entered in the filter table. The ETS produces the filter table automatically.

Parameter "Group telegram: Main group 14..31"

Options:

Transmit all (not recommended)

Block

Filter

Transmit all: Group telegrams (main group 14..31) are all routed.

Block: Group telegrams (main group 14..31) are all blocked.

Filter: Group telegrams (main group 14..31) are routed if entered in the filter table.

Parameter "Physical telegrams"

Options:

Transmit all (not recommended)

Block

Filter

Transmit all: Physical telegrams are all routed.

Block: Physical telegrams are all blocked.

Filter: Depending on the individual address physical telegrams are routed.

Parameter "Physical telegrams: Repetition if errors on main line"

Options:

No

Up to 3 repetitions

Only one repetitions

If a transmission error (e.g. due to missing receiver) is found when sending physical telegrams on the main line:

No: The physical telegrams are not repeated.

Up to 3 repetitions: The physical telegrams are repeated up to 3 times.

Only one repetitions: The physical telegrams are repeated only one time.

Parameter "Group telegrams: Repetition if errors on main line"

Options:

No

Up to 3 repetitions

Only one repetitions

If a transmission error (e.g. due to missing receiver) is found when sending group telegrams on the main line:

No: The group telegrams are not repeated.

Up to 3 repetitions: The group telegrams are repeated up to 3 times.

Only one repetitions: The group telegrams are repeated only one time.

Parameter "Telegram confirmations on main line"

Options:

If routed

Always

If routed: Only telegrams which are to be routed to the sub line are confirmed by an ACK on the main line .

Always: Each telegram on the main line is confirmed by an ACK.

Parameter "Send confirmation on own telegrams"

Options:

Yes

No

Yes: Every telegram on the main line is confirmed with its own ACK (from the Line coupler).

No: No confirmation with own ACK.

Note: If the parameter "Send confirmation on own telegrams" is set yes, the line coupler will send an ACK systematically when sending any own routed telegram.

5.1.4 Parameter window “Sub Line”

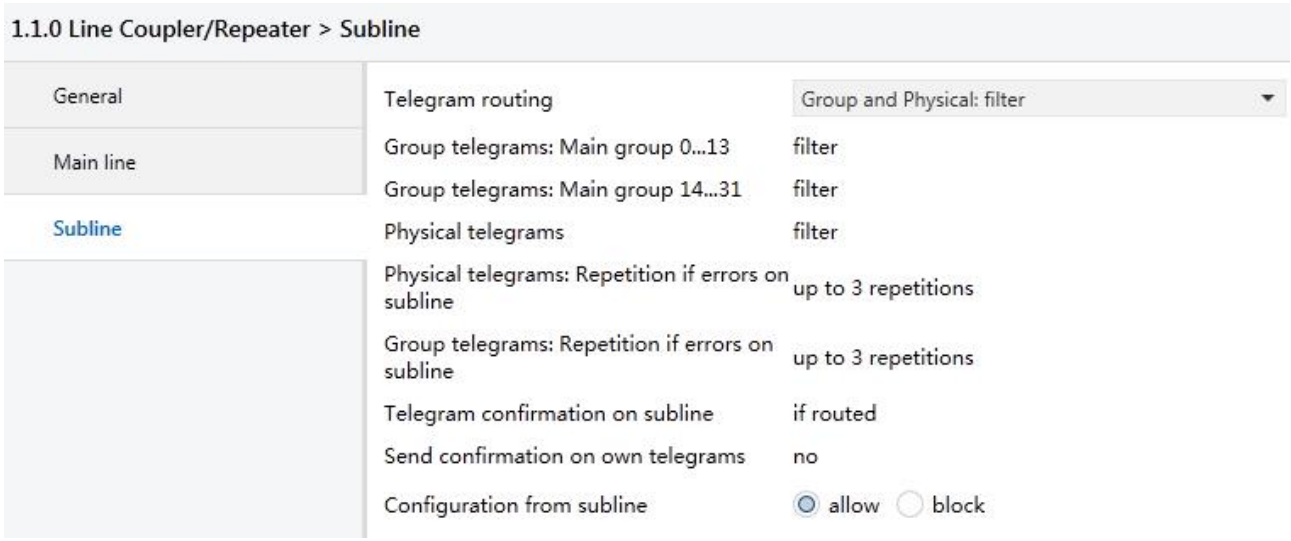


Fig.5.3 Parameter window “Sub line”

Parameter “Telegram routing”

This parameter is to be set depending on the planed configuration. Options:

Group: filter, Physical: block

Group and Physical: filter

Group: route, Physical: filter

Group and Physical: route

Configure

Block: no telegram is routed.

Filter: only telegrams are routed which are entered in the filter table.

Route: the telegrams are routed.

Configure: the following parameters can be set individually.

Parameter “Group telegrams: Main group 0..13”

Options:

Transmit all (not recommended)

Block

Filter

Transmit all: Group telegrams (main group 0..13) are all routed.

Block: Group telegrams (main group 0..13) are all blocked.

Filter: Group telegrams (main group 0..13) are routed if entered in the filter table. The ETS produces the filter table automatically.

Parameter "Group telegram: Main group 14..31"

Options:

Transmit all (not recommended)

Block

Filter

Transmit all: Group telegrams (main group 14..31) are all routed.

Block: Group telegrams (main group 14..31) are all blocked.

Filter: Group telegrams (main group 14..31) are routed if entered in the filter table.

Parameter "Physical telegrams"

Options:

Transmit all (not recommended)

Block

Filter

Transmit all: Physical telegrams are all routed.

Block: Physical telegrams are all blocked.

Filter: Depending on the individual address physical telegrams are routed.

Parameter "Physical telegrams: Repetition if errors on sub line"

Options:

No

Up to 3 repetitions

Only one repetitions

If a transmission error (e.g. due to missing receiver) is found when sending physical telegrams on the sub line:

No: The physical telegrams are not repeated.

Up to 3 repetitions: The physical telegrams are repeated up to 3 times.

Only one repetitions: The physical telegrams are repeated only one time..

Parameter "Group telegrams: Repetition if errors on sub line"

Options:

No

Up to 3 repetitions

Only one repetitions

If a transmission error (e.g. due to missing receiver) is found when sending group telegrams on the sub line:

No: The group telegrams are not repeated.

Up to 3 repetitions: The group telegrams are repeated up to 3 times.

Only one repetitions: The group telegrams are repeated only one time.

Parameter "Telegram confirmations on sub line"

Options:

If routed

Always

If routed: Only telegrams which are to be routed to the main line are confirmed by an ACK on the sub line .

Always: Each telegram on the sub line is confirmed by an ACK.

Parameter "Send confirmation on own telegrams"

Options:

Yes

No

Yes: Every telegram on the sub line is confirmed with its own ACK (from the Line coupler).

No: No confirmation with own ACK.

Parameter "Confirmation from sub line"

Options:

Allow

Block

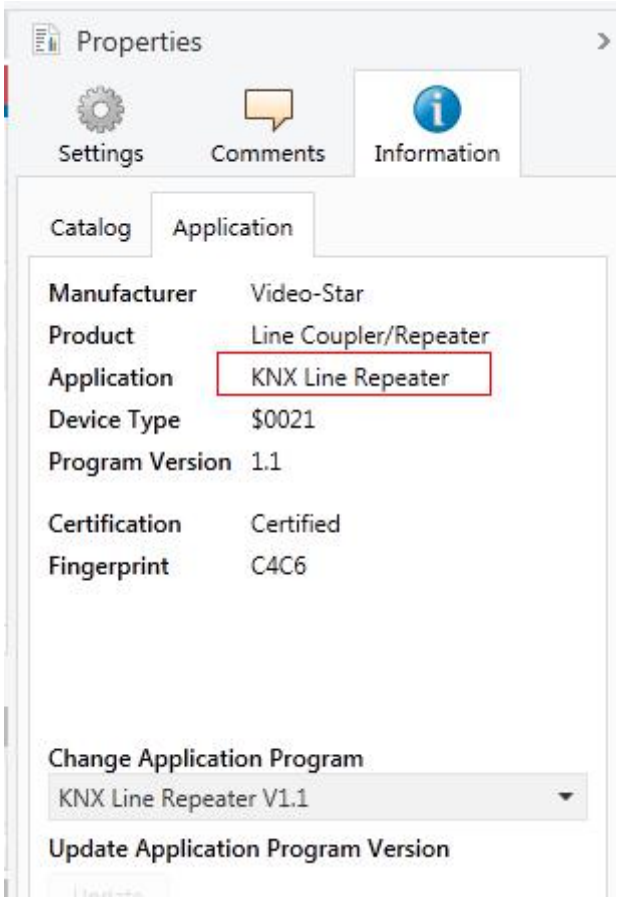
If blocked an ETS download to the line coupler can occur only via main line.

5.2 Repeater

5.2.1 Setting

If not already configured as “repeater”, the corresponding application program for “repeater” should be downloaded.

Change can occur under “Change Application Program” and could be checked under “Properties”:



5.2.2 Parameter window “General”

Parameter window is shown as follow:

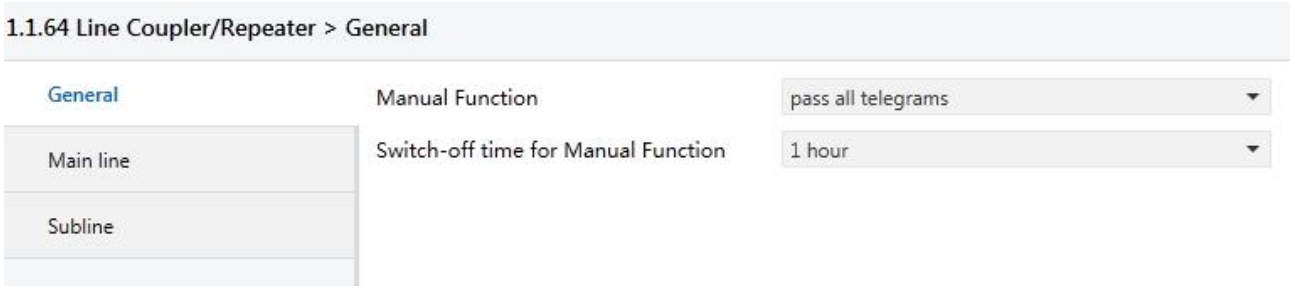


Fig.5.4 Parameter window “General”

Parameter “Manual function”

Telegram routing configuration for the manual function. Options:

Disabled

Pass all telegrams

Pass all Physical telegrams

Pass all Group telegrams

Parameter “Switch-off time for Manual function”

Time duration required to exit from “manual operation”. Options:

10 min

1 hour

4 hours

8 hours

Please note that the parameter “transmit all” for Group or Physical telegrams is intended only for testing purposes and it should not be set for normal operation.

5.2.3 Parameter window “Main Line”

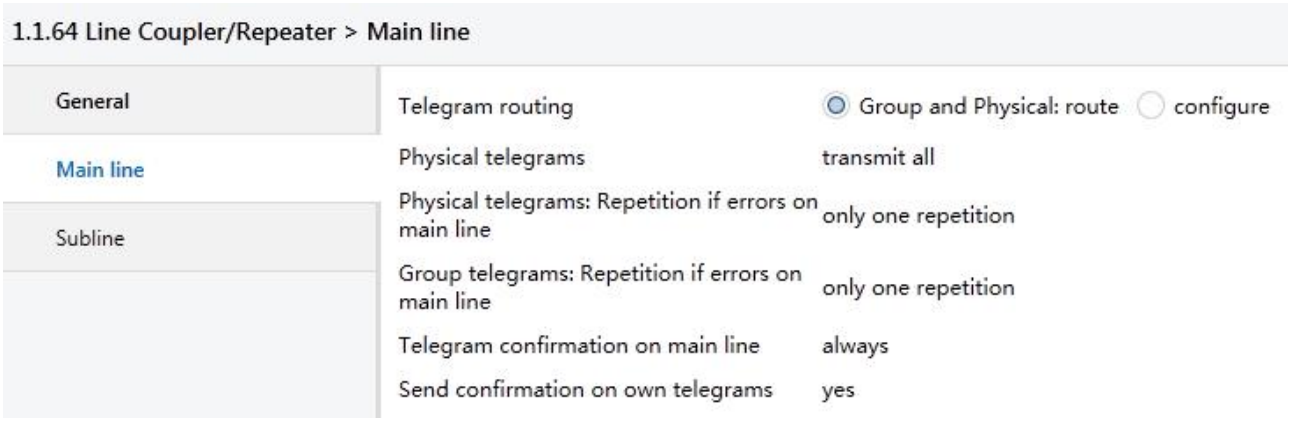


Fig.5.5 Parameter window “Main line”

Parameter “Telegram routing”

This parameter is to be set depending on the planed configuration. Options:

Groups and Physical: route

Configure

Route: the telegrams are routed.

Configure: the following parameters can be set individually.

Parameter “Physical telegrams”

Options:

Transmit all

Block

Transmit all: Physical telegrams are all routed.

Block: Physical telegrams are all blocked.

Parameter “Physical telegrams: Repetition if errors on main line”

Options:

No

Up to 3 repetitions

Only one repetitions

If a transmission error (e.g. due to missing receiver) is found when sending physical telegrams on the main line:

No: The physical telegrams are not repeated.

Up to 3 repetitions: The physical telegrams are repeated up to 3 times.

Only one repetitions: The physical telegrams are repeated only one time.

Parameter "Group telegrams: Repetition if errors on main line"

Options:

No

Up to 3 repetitions

Only one repetitions

If a transmission error (e.g. due to missing receiver) is found when sending group telegrams on the main line:

No: The group telegrams are not repeated.

Up to 3 repetitions: The group telegrams are repeated up to 3 times.

Only one repetitions: The group telegrams are repeated only one time.

Parameter "Telegram confirmations on main line"

Options:

If routed

Always

If routed: Only telegrams which are to be routed to the sub line are confirmed by an ACK on the main line .

Always: Each telegram on the main line is confirmed by an ACK.

Parameter "Send confirmation on own telegrams"

Options:

Yes

No

Yes: Every telegram on the main line is confirmed with its own ACK.

No: No ACK confirmation.

Notes:

If the parameter "Send confirmation on own telegrams" is set yes, the repeater will send an ACK systematically when sending any own routed telegram.

Since the repeater has no filter table, it makes sense to send an ACK with every routed telegram.

5.2.4 Parameter window “Sub Line”

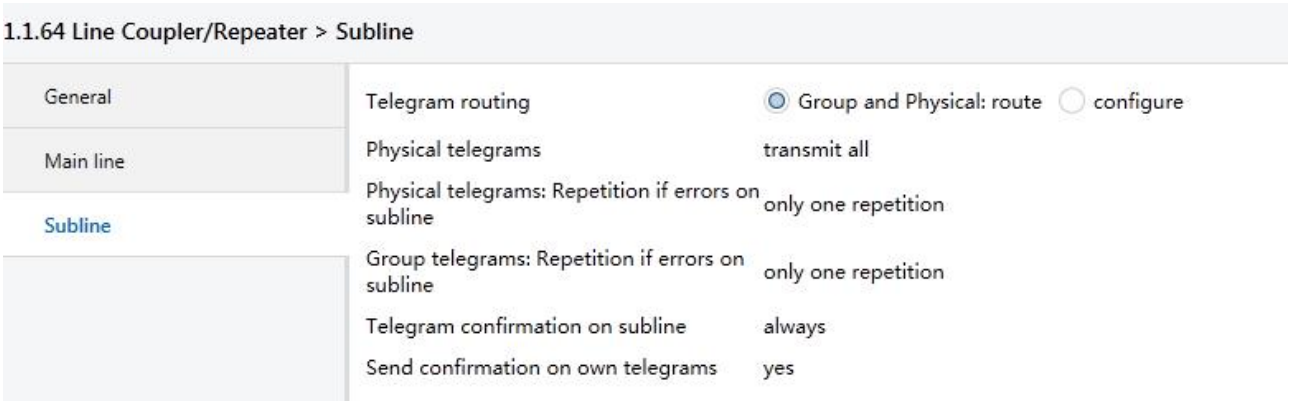


Fig.5.6 Parameter window “Sub line”

Parameter “Telegram routing”

This parameter is to be set depending on the planed configuration. Options:

Groups and Physical: route

Configure

Route: the telegrams are routed.

configure: the following parameters can be set individually.

Parameter “Physical telegrams”

Options:

Transmit all

Block

Transmit all: Physical telegrams are all routed.

Block: Physical telegrams are all blocked.

Parameter “Physical telegrams: Repetition if errors on sub line”

Options:

No

Up to 3 repetitions

Only one repetitions

If a transmission error (e.g. due to missing receiver) is found when sending physical telegrams on the sub line:

No: The physical telegrams are not repeated.

Up to 3 repetitions: The physical telegrams are repeated up to 3 times.

Only one repetitions: The physical telegrams are repeated only one time.

Parameter "Group telegrams: Repetition if errors on sub line"

Options:

No

Up to 3 repetitions

Only one repetitions

If a transmission error (e.g. due to missing receiver) is found when sending group telegrams on the sub line:

No: The group telegrams are not repeated.

Up to 3 repetitions: The group telegrams are repeated up to 3 times.

Only one repetitions: The group telegrams are repeated only one time.

Parameter "Telegram confirmations on sub line"

Options:

If routed

Always

If routed: Only telegrams which are to be routed to the main line are confirmed by an ACK on the sub line .

Always: Each telegram on the sub line is confirmed by an ACK.

Parameter "Send confirmation on own telegrams"

Options:

Yes

No

Yes: Every telegram on the sub line is confirmed with its own ACK .

No: No ACK confirmation .