DOCUMENTATION

LINE COUPLER / REPEATER

MEC*TP*

TECHNICAL AND APPLICATION DESCRIPTION

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0 VERSION HISTORY

| Version	Date	Comments
1.0	October 2012	First official issue.
1.1	8 February 2013	Additionally: MECtp description as Repeater.
1.2	21 February 2013	Additional information.
1.3	Mai 2013	Added note: telegram transmission, fallback time and physical address at delivery status.
1.4	April 2014	Chapter 5: new technical drawing
1.5	June 2014	Correction: Chap. 4 current consumption

1 CONTENTS

2 DESCRIPTION

Tapko MEC*tp* can be used as a **line/backbone coupler** or as a **line repeater**.

ML: Main line
SL: Sub line
BC: Backbone coupler
LC: Line coupler
R : Repeater
BD: Bus devices
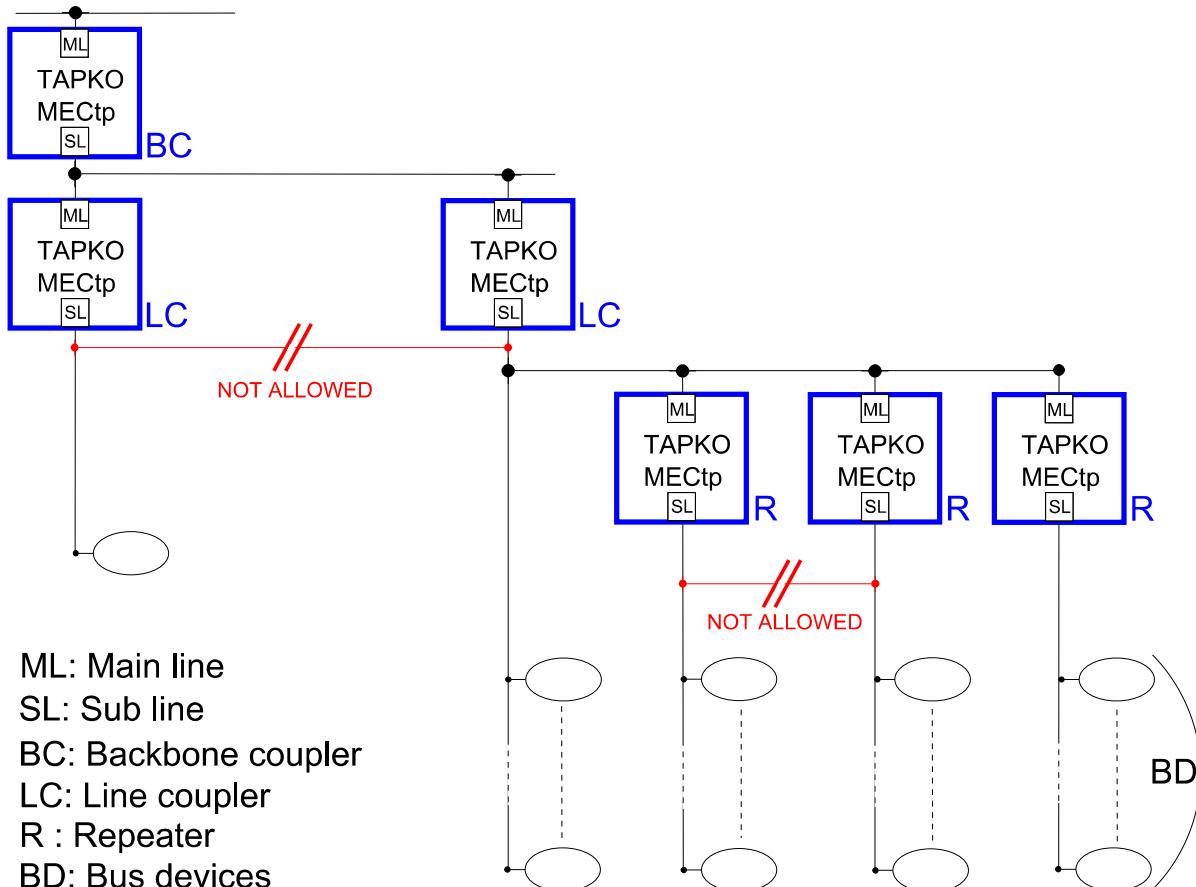
NOTE
Please note that commissioning straight <u>at delivery status</u> means:
- The line coupler does *block* all telegrams because the filter table is not defined,
- The fallback time after manual operation is 120 min and
- The physical address is 15.15.0.

2.1 COUPLER

The basic functionality of MEC*tp* is coupling a KNX-TP-main line with a KNX-TP-sub line.
MEC*tp* provides galvanic isolation between the two connected lines.
Due to the flexibility of MEC*tp,* the coupler 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 MEC*tp* is filtering the traffic according the installation place in the hierarchy or according to the built in filter tables for group oriented communication.

The MEC*tp* 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 retransmissions on both lines.

2.2 REPEATER

The function of MEC*tp* as repeater has the target to link two lines for data transfer. MEC*tp* as repeater 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.

3 FUNCTION DESCRIPTION
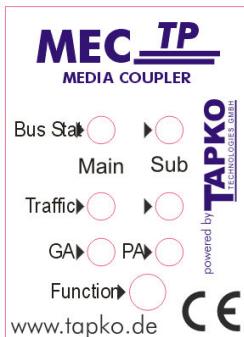
LEDs Bus Stat, Traffic and GA are green or red.
LED PA is green or yellow.

3.1 NORMAL MODE

LED Bus Stat Main green
Off: main line error
On: main line ok

LED Bus Stat Main red
On: manual overwrite active

LED Bus Stat Sub green
Off: sub line error or not connected
On: sub line ok

LED Traffic Main green
Blinking: bus traffic on main line
Off: no traffic on main line

LED Traffic Sub green
Blinking: bus traffic on sub line
Off: no traffic on sub line

LED Traffic Main red
Blinking: transmission error on main line

LED Traffic Sub red
Blinking: transmission error on sub line

LED Group Address
Routing of group telegrams
- Off: main and sub different
- Green: filter table active
- Green *and* red: route all
- Red: block

LED Physical Address
Routing of physical addressed telegrams
- Off: main and sub different
- Green: filter table active
- Green *and* yellow: route all
- Yellow: block

3.2 FUNCTION BUTTON

Long press (3 sec)
Switch to manual override.
Default function is set with main line and (sub) line parameter.
Manual override functionality is configured in "General parameters".

LED Bus Stat Main red
On: manual override active
Off: default configuration active

NOTE

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

Very long press (15s)
LEDs: **Bus Stat Main, Bus Stat Sub, Group Addr**, **Physical Addr** are on red
- release button and press again for some sec: resets all the parameter to factory default (incl. physical address).

3.3 ADDRESSING MODE

LED addressing mode
Off: normal operating mode
On: addressing mode
After receiving the physical address the line coupler automatically returns from addressing mode to the normal operating mode.

Button addressing mode
Button for switching between normal operating mode and addressing mode for assigning the physical address.

4 TECHNICAL DATA

⚠ Warning: may not be connected to 230V!

Marking/Design	MEC*tp*	
Supply	Bus main line	
Current consumption from Bus	approx. 30 mA	
Bus connector: main and sub line	KNX Wago bus connecting terminal (red/black) screw less for single-core cable Ø 0,6 to 0,8 mm	
Display elements	LED Bus Stat Main LED Traffic Main LED GA (Group Address) LED for programming mode	LED Bus Stat Sub LED Traffic Sub LED PA (Physical Address)
Control elements	Function button, Programming button	
Installation	on 35 mm DIN rail mount EN 60715 TH 35-75	
Type of protection	IP 20 according to EN 60529	
Degree of pollution	2 to IEC 60664-1	
Protection class	Class III to IEC 61140	
Overvoltage class	Class III to IEC 60664-1	
CE-indication	in accordance with EMC and low voltage guidelines Device complies with EN 60669-2-1 and EN 50491-5-3 / EN 61000-6-2	
Bus	Safety extra low voltage DC 21…30V SELV	
Certification	KNX	
Housing colour	Plastic PA66 housing grey	
Dimensions	DIN-rail mounted device H= 90mm, W= 36mm (2 SU), D= 70mm Mounting depth 64 mm	
Weight	66 g	
Climatic conditions	EN 50090-2-2	
Temperature range	Operation: 0°C… +45°C non-condensing Storage: -20°C… +60°C	
Relative humidity	5% to 93% non-condensing	

# 5 TECHNICAL DRAWING

> NOTE
> Please note that all dimensions are in mm. Device width is 2 SU.

Dimensions in mm
Tolerance: -0,5 mm/DIN 16742
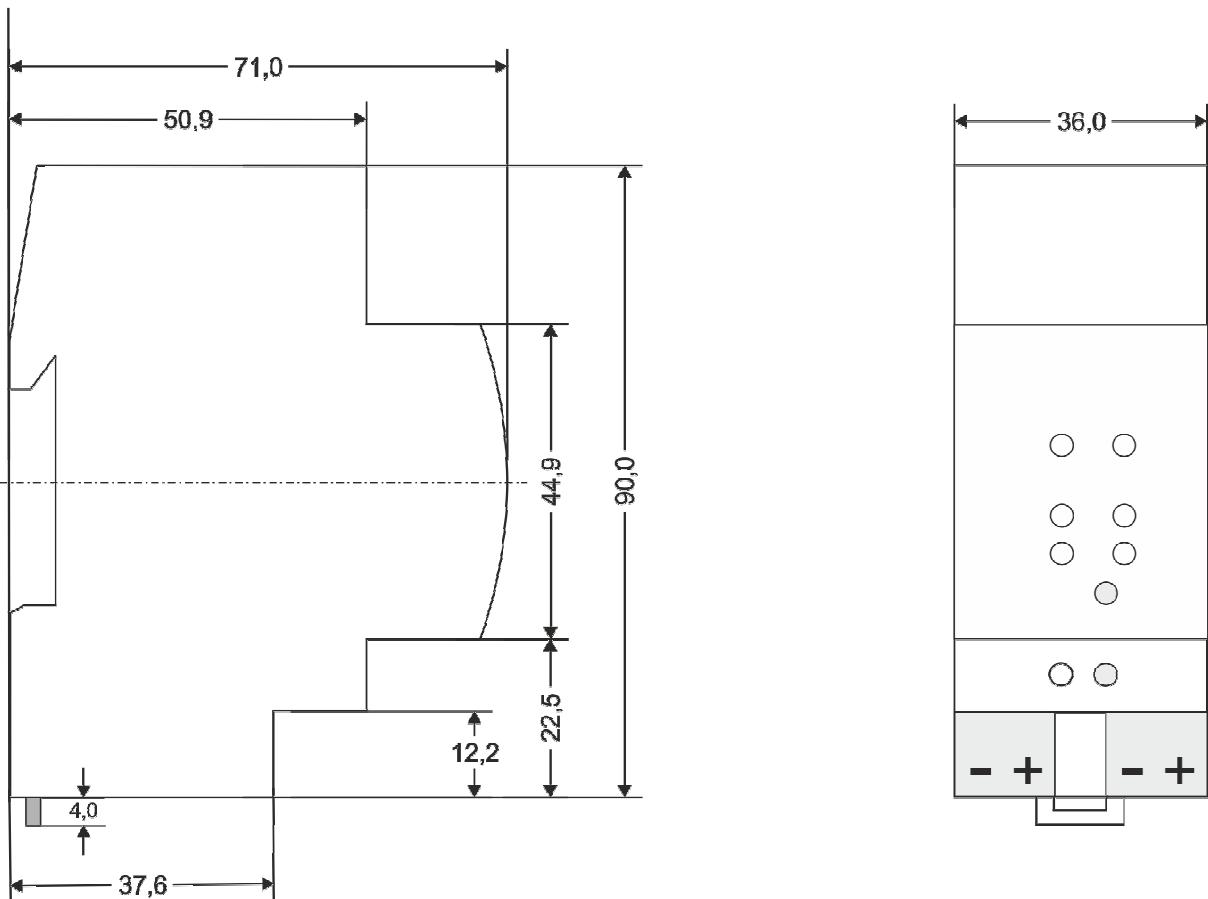
1 SU = 18mm

6 APPLICATION DESCRIPTION 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.

7 ETS-PARAMETERS COUPLER

7.1 SETTINGS

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":
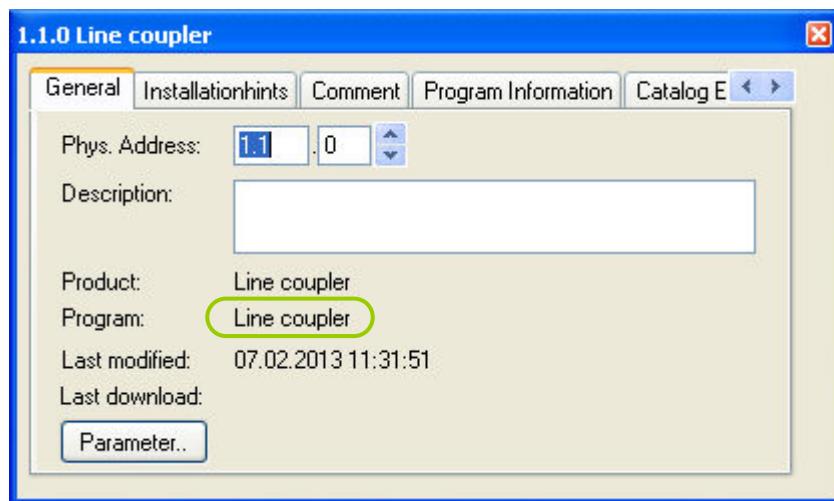
7.1.1 GENERAL
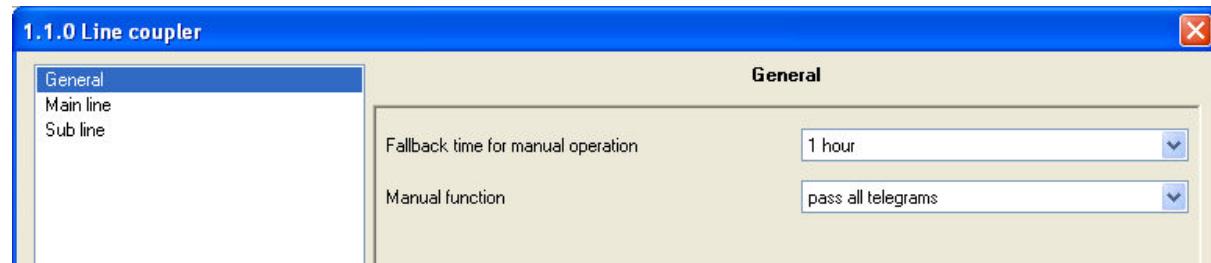
Picture 1: General

ETS-Text	Range **[Default value]**	Comment
Fallback time for manual operation	10 min, 1 hour, 4 hours, 8 hours **[1 hour]**	Time duration required to exit from "manual operation"
Manual function	Disabled Pass all telegrams Pass physical telegrams Pass group telegrams **[pass all telegrams]**	Telegram routing configuration for the manual function.

Table 1: Parameter General

NOTE
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.

7.1.2 MAIN LINE
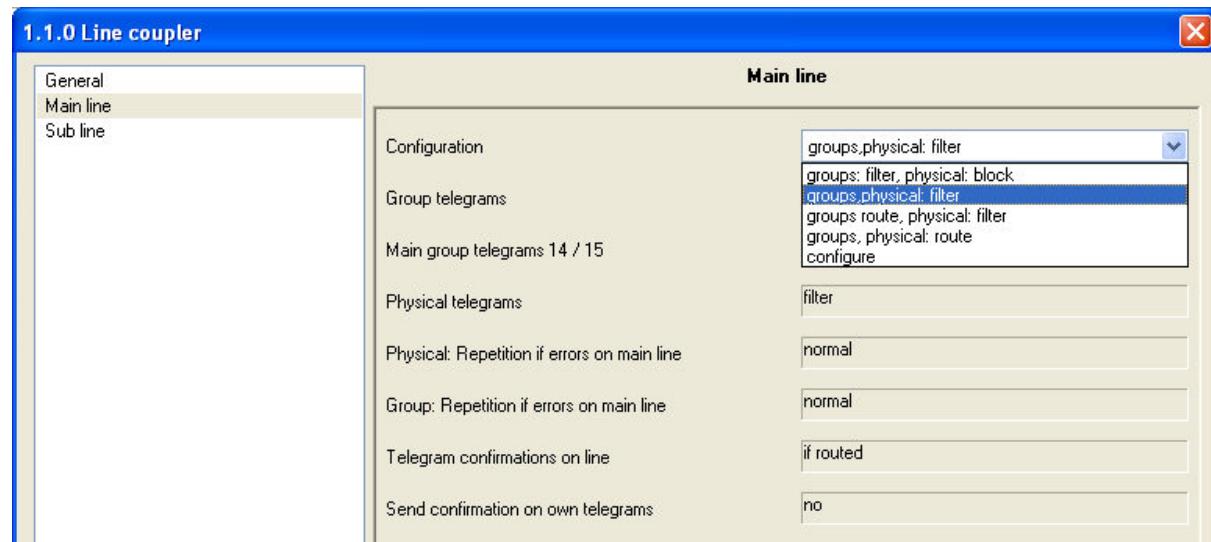
Picture 2: Main Line

ETS-Text	Range [Default value]	Comment
Configuration	groups: filter, physical: block groups, physical: filter groups: route, physical: filter groups, physical: route configure **[groups, physical: filter]**	- <u>Block</u>: no telegram is routed. - <u>Filter</u>: Only telegrams are routed which are entered in the filter table. - <u>Route</u>: the telegrams are routed. - <u>Configure</u>: the following parameters can be set individually. This parameter is to be set depending on the planed configuration.
Group telegrams	1. transmit all (for testing only) 2. block 3. filter **[filter]**	1. All group telegrams are transmitted. 2. No group telegram is transmitted. 3. Only group telegrams are routed which are entered in the filter table. The ETS 3/4 produces the filter table automatically.
Main group telegrams 14/15	1. transmit all 2. block **[transmit all]**	1. Group telegrams with the main group 14 or 15 (e.g. 14/1) are routed. 2. Group telegrams with the main group 14 or 15 (e.g. 14/1) are not routed.
Physical telegrams	1. transmit all (for testing only) 2. block 3. filter **[filter]**	1. All physical telegrams are transmitted. 2. No physical telegram is transmitted. 3. Only physical telegrams are routed based on physical address.
Physical: Repetition if errors on main line	1. no 2. normal 3. reduced **[normal]**	If a transmission error (e.g. due to missing receiver) is found when sending a physical telegram on the main line: 1. The physical telegram is not repeated. 2. The physical telegram is repeated up to 3 times. 3. The physical telegram will be repeated only one time.
Group: Repetition if errors on main line	1. no 2. normal 3. reduced **[normal]**	If a transmission error (e.g. due to missing receiver) is found when sending a group telegram on the main line: 1. The group telegram is not repeated. 2. The group telegram is repeated up to 3 times. 3. The group telegram will be repeated only one time.
Telegram confirmations on line	1. if routed 2. always **[if routed]**	1. Only telegrams which are to be routed are confirmed on the main line (ACK). 2. Each telegram on the main line is confirmed (ACK).
Send confirmation on own telegrams	1. yes 2. no **[no]**	1. Every telegram on the main line is confirmed with its own ACK (from the Line coupler). 2. No confirmation with own ACK → *See note below*

Table 2: Main Line

NOTE
If the parameter "*Send confirmation on own telegrams*" is set <u>yes</u>, the **line coupler** will send an ACK systematically when sending **any** own routed telegram.

7.1.3 SUB LINE
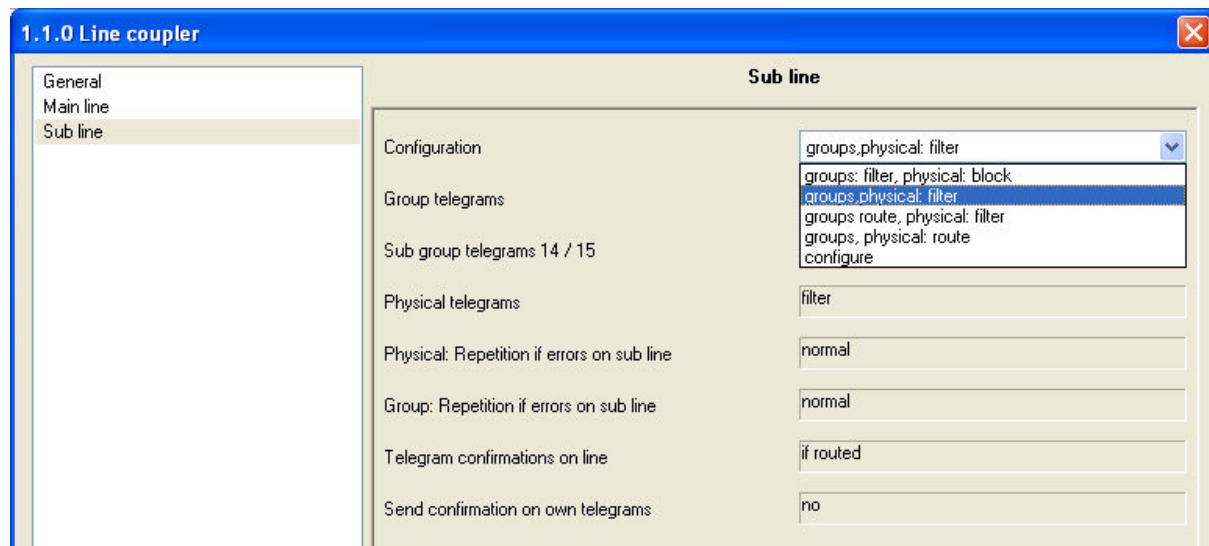
Picture 3: Sub line

ETS-Text	Range [Default value]	Comment
Configuration	groups: filter, physical: block groups, physical: filter groups: route, physical: filter groups, physical: route configure **[groups, physical: filter]**	- <u>Block</u>: no telegram is routed. - <u>Filter</u>: Only telegrams are routed which are entered in the filter table. - <u>Route</u>: the telegrams are routed. - <u>Configure</u>: the following parameters can be set individually. This parameter is to be set depending on the planed configuration.
Group telegrams	1. transmit all (for testing only) 2. block 3. filter **[filter]**	1. All group telegrams are transmitted. 2. No group telegram is transmitted. 3. Only group telegrams are routed which are entered in the filter table. The ETS 3/4 produces the filter table automatically.
Sub group telegrams 14/15	1. transmit all 2. block **[transmit all]**	1. Group telegrams with the sub group 14 or 15 (e.g. 14/1) are routed. 2. Group telegrams with the sub group 14 or 15 (e.g. 14/1) are not routed.
Physical telegrams	1. transmit all (for testing only) 2. block 3. filter **[filter]**	1. All physical telegrams are transmitted. 2. No physical telegram is transmitted. 3. Only physical telegrams are routed based on physical address.
Physical: Repetition if errors on sub line	1. no 2. normal 3. reduced **[normal]**	If a transmission error (e.g. due to missing receiver) is found when sending a physical telegram on the sub line: 1. The physical telegram is not repeated. 2. The physical telegram is repeated up to 3 times. 3. The physical telegram will be repeated only one time.

Group: Repetition if errors on sub line	1. no 2. normal 3. reduced **[normal]**	If a transmission error (e.g. due to missing receiver) is found when sending a group telegram on the sub line: 1. The group telegram is not repeated. 2. The group telegram is repeated up to 3 times. 3. The group telegram will be repeated only one time.
Telegram confirmations on line	1. if routed 2. always **[if routed]**	1. Only telegrams which are to be routed are confirmed on the sub line (ACK). 2. Each telegram on the sub line is confirmed (ACK).
Send confirmation on own telegrams	1. yes 2. no **[no]**	1. Every telegram on the sub line is confirmed with its own ACK (from the Line coupler). 2. No confirmation with own ACK

Table 3: Sub Line

8 APPLICATION DESCRIPTION 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 behaviour 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.

9 ETS-PARAMETERS REPEATER

9.1 SETTINGS

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":
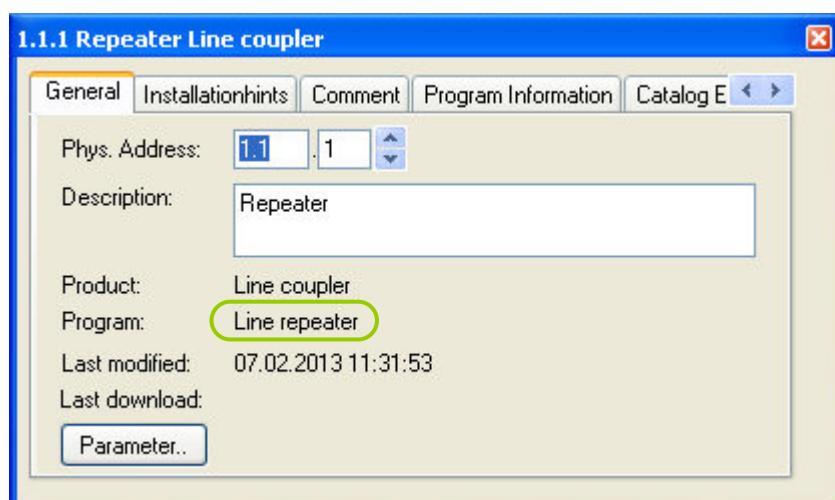
9.1.1 GENERAL
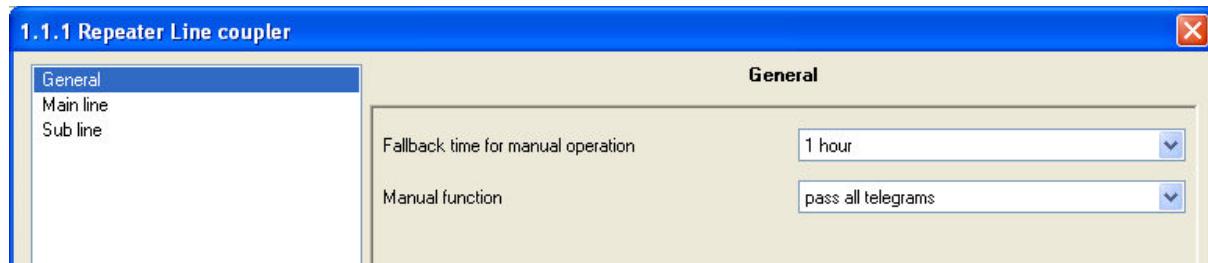
Picture 4: General

ETS-Text	Range [Default value]	Comment
Fallback time for manual operation	10 min, 1 hour, 4 hours, 8 hours [1 hour]	Time duration required to exit from "manual operation"
Manual function	Disabled Pass all telegrams Pass physical telegrams Pass group telegrams [pass all telegrams]	Telegram routing configuration for the manual function.

Table 4: Parameter General

9.1.2 MAIN LINE
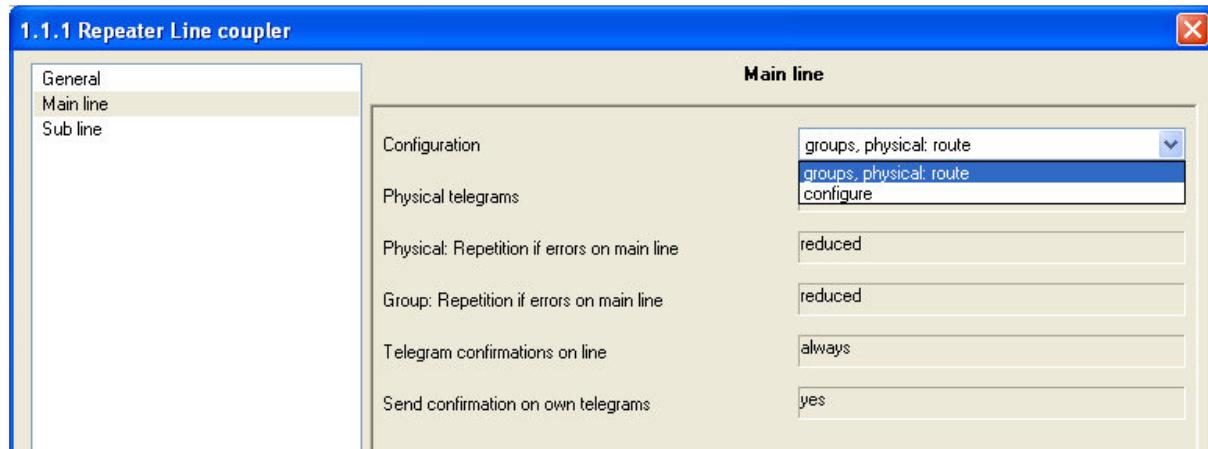
Picture 5: Main Line

ETS-Text	Range [Default value]	Comment
Configuration	groups, physical: route configure [groups, physical: route]	- Route: the telegrams are routed. - Configure: the following parameters can be set individually. This parameter is to be set depending on the planed configuration.
Physical telegrams	1. transmit all 2. block [transmit all]	1. All physical telegrams are transmitted. 2. No physical telegram is transmitted.

Physical: Repetition if errors on main line	1. no 2. normal 3. reduced **[reduced]**	If a transmission error (e.g. due to missing receiver) is found when sending a physical telegram on the main line: 1. The physical telegram is not repeated. 2. The physical telegram is repeated up to 3 times. 3. The physical telegram will be repeated only one time.
Group: Repetition if errors on main line	1. no 2. normal 3. reduced **[reduced]**	If a transmission error (e.g. due to missing receiver) is found when sending a group telegram on the main line: 1. The group telegram is not repeated. 2. The group telegram is repeated up to 3 times. 3. The group telegram will be repeated only one time.
Telegram confirmations on line	1. if routed 2. always **[always]**	1. Only telegrams which are to be routed are confirmed on the main line (ACK). 2. Each telegram on the main line is confirmed (ACK).
Send confirmation on own telegrams	1. yes 2. no **[yes]**	1. Every telegram on the main line is confirmed with its own ACK (from the Line coupler). 2. No confirmation with own ACK → *See note below*

Table 5: Main Line

NOTE

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.

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9.1.3 SUB LINE
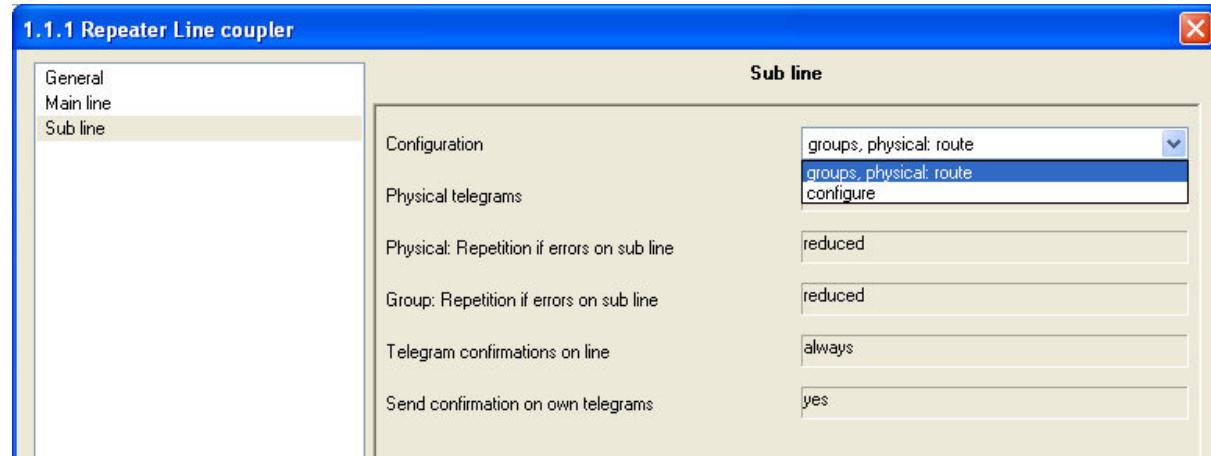
Picture 6: Sub line

ETS-Text	Range [Default value]	Comment
Configuration	groups, physical: route configure [groups, physical: route]	- <u>Route</u>: the telegrams are routed. - <u>Configure</u>: the following parameters can be set individually. This parameter is to be set depending on the planed configuration.
Physical telegrams	1. transmit all 2. block [transmit all]	1. All physical telegrams are transmitted. 2. No physical telegram is transmitted.
Physical: Repetition if errors on sub line	1. no 2. normal 3. reduced [reduced]	If a transmission error (e.g. due to missing receiver) is found when sending a physical telegram on the sub line: 1. The physical telegram is not repeated. 2. The physical telegram is repeated up to 3 times. 3. The physical telegram will be repeated only one time.
Group: Repetition if errors on sub line	1. no 2. normal 3. reduced [reduced]	If a transmission error (e.g. due to missing receiver) is found when sending a group telegram on the sub line: 1. The group telegram is not repeated. 2. The group telegram is repeated up to 3 times. 3. The group telegram will be repeated only one time.
Telegram confirmations on line	1. if routed 2. always [always]	1. Only telegrams which are to be routed are confirmed on the sub line (ACK). 2. Each telegram on the sub line is confirmed (ACK).
Send confirmation on own telegrams	1. yes 2. no [yes]	1. Every telegram on the sub line is confirmed with its own ACK (from the Line coupler). 2. No confirmation with own ACK

Table 6: Sub Line