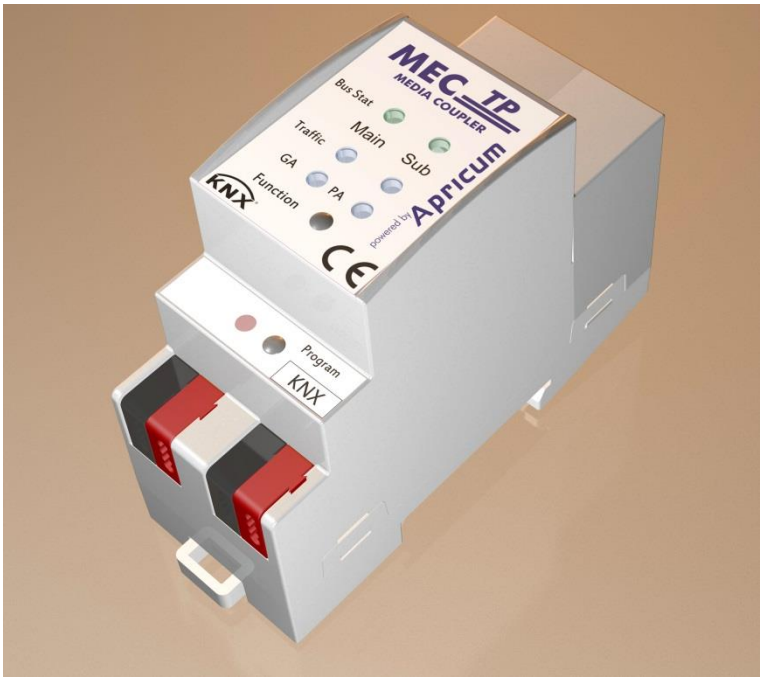
Apricum

DOCUMENTATION

MEC*tp*



TECHNICAL AND APPLICATION DESCRIPTION

Author: Peter Hauner

Last Modification: 2016-07-13

0 Version History

Version	Date	Comments
1.0	October 2012	First official issue
1.1	8 February 2013	Additional description: repeater
1.2	21 February 2013	Additional information
1.3	Mai 2013	Additional note: telegram transmission, fallback time, physical address at delivery status
1.4	April 2014	New technical drawing
1.5	June 2014	Correction: current consumption
1.6	January 2016	Additional information
1.7	July 2016	New documentation layout

1 Contents

2 **MEC*tp*** PRODUCT DESCRIPTION

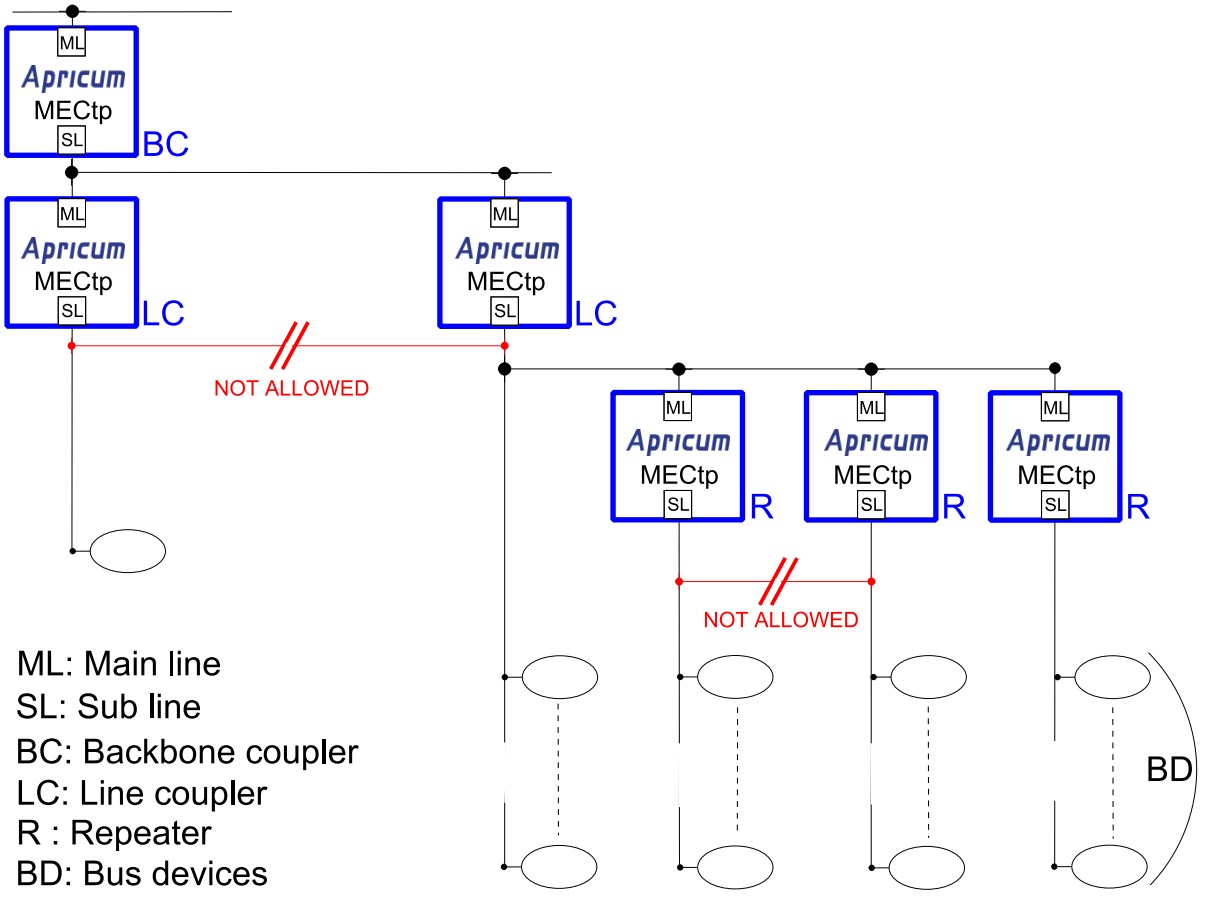
The **MEC*tp*** media coupling device can be used as a **line coupler,** as a **backbone coupler** or as a **line repeater**. The basic functionality of the **MEC*tp*** is coupling a KNX TP main line with a KNX TP sub line. Providing galvanic isolation between the two connected lines it enables a data connection between the upper line (main line or backbone) and the lower line.

Due to its flexibility the coupler can be used as a line coupler to connect a sub line to a main line or as a backbone coupler to connect a main line to a backbone line. The main task of the **MEC*tp*** is to filter the traffic according to the installation place in the hierarchy (individually addressed telegrams, in this document named Physical telegrams) or according to the built in filter tables for group oriented communication (Group telegrams).

Compared to other similar products the **MEC*tp*** provides outstanding features, for example its support of long messages (up to 240 byte APDU length) and a configurable one button activation of the "Manual Function" (transmit all telegrams, transmit Physical telegrams or transmit Group telegrams).This functionality is helpful during installation, during run time and for trouble shooting. To easily identify common communication problems due to bus load or retransmissions on both lines the high informative 6 duo LED display shows the bus status on each line accurately.

The **MEC*tp*** is also able to link two lines for data transfer. As a line repeater the **MEC*tp*** still provides galvanic isolation between the connected lines. Result is up to four lines can form a single sub line with up to three line repeaters used after the line coupler. Each sub line segment requires its own KNX power supply unit.

3 KNX TOPOLOGY



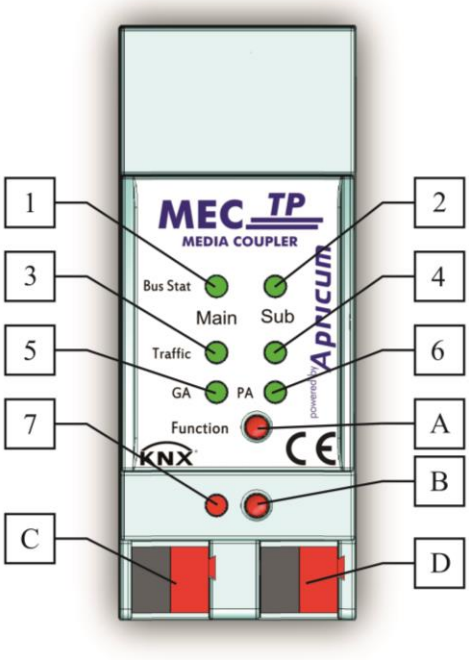
Picture 1: Topology

Please note:

Commissioning at delivery status means:

- ***All telegrams are blocked because the filter table is not defined***
- ***The fallback time after manual operation is 120 min***
- ***The physical address is 15.15.0***

4 DEVICE FRONTEND



Picture 2: Front view

1	**Bus state main line LED**
2	**Bus state sub line LED**
3	**Bus traffic main line LED**
4	**Bus traffic sub line LED**
5	**Group address filter table status LED**
6	**Physical address filtering status LED**
7	**Programming LED**
A	**Function button**
B	**Programming button**
C	**KNX connector main line**
D	**KNX connector sub line**

5 OPERATIONAL DESCRIPTION

According either to the factory default settings or to the latest parameter settings (downloaded from ETS, also other tools) being in "Normal Mode" the **MEC*tp*** operates as it is supposed to. The default configurations of the "Normal Mode" are set by the main line and the sub line parameters.

5.1 NORMAL MODE

	Green	Red
LED 1 Bus State Main	Off: main line error or not connected On: main line OK	On: manual overwrite active
LED 2 Bus State Sub	Off: sub line not connected On: sub line OK	N.A.
LED 3 Traffic Main	Blinking: bus traffic on main line (only valid telegrams) Off: no traffic on main line	Blinking: transmission error on main line
LED 4 Traffic Sub	Blinking: bus traffic on sub line (only valid telegrams) Off: no traffic on sub line	Blinking: transmission error on sub line
LED 5 Group Address	Routing of Group telegrams Off: main and sub different, On: filter table is active	Block
	On with mixed colour (green *and* red): route all	
LED 6 Physical Address	Routing of Physical telegrams Off: main and sub different, On: filter table active	**Yellow**: block
	On with mixed colour (green *and* yellow): route all	
LED 7 Programming	N.A.	On: device in "Program Mode" Blinking: LAN line error

5.2 PROGRAM MODE

With the Programming button the device can be switched between "Normal Mode" and "Program Mode". To download the physical address to the device this function is essential. After the download the **MEC*tp*** automatically returns to the "Normal Mode".

Programming LED (7):

Off: Normal Mode
On: Program Mode

5.3 Function Button

The function button is used for two purposes, either to switch to “Manual Function” or to do a factory reset. Being in “Normal Mode” it depends on the duration of time the button is being pressed.

5.3.1 Manual Function

- **Long press (≈ 3 sec) in “Normal Mode”**

  The device activates the “Manual Function” and the LEDs change their status. Pressing the button again for some seconds deactivates the “Manual Function”. After expiration of the Fallback time the device returns to “Normal Mode” automatically. To configure the “Manual Function” and set the Fallback time use the parameter tab “General”.

  Please note:

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

5.3.2 Factory Reset

- **Very long press (≈ 15 s) in “Normal Mode”**

  A factory reset is carried out by pressing the button for about 15 seconds (LEDs 1,2,5,6 light with mixed colour). After release, pressing it again for some seconds resets all the parameters to factory default (incl. physical address). Subsequently, the LEDs change their status.

6 Application Description Line Coupler

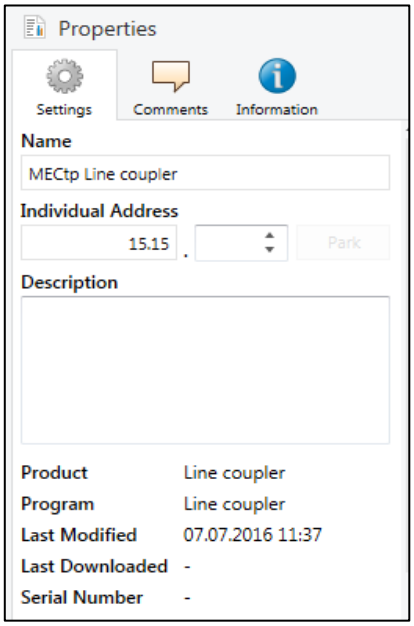
With the coupler receiving physically addressed telegrams (Physical telegrams), for example during commissioning, it compares the physical address of the receiver with its own physical address to decide whether to route the telegrams or not. On receiving telegrams with group addresses (Group telegrams) the coupler proceeds in accordance with its parameter settings. At default setting the coupler only routes those telegrams whose group addresses have been entered in its filter table.
In case of not receiving an acknowledgement after routing a telegram, due to a bus transmission error for example, the coupler repeats the telegram up to three times (depending on the corresponding parameter that is set by ETS). With the parameters „Repetitions if errors ...“ this function can be adjusted separately for both connected lines. The default settings of these parameters should be retained.

7 ETS-Parameters Line Coupler

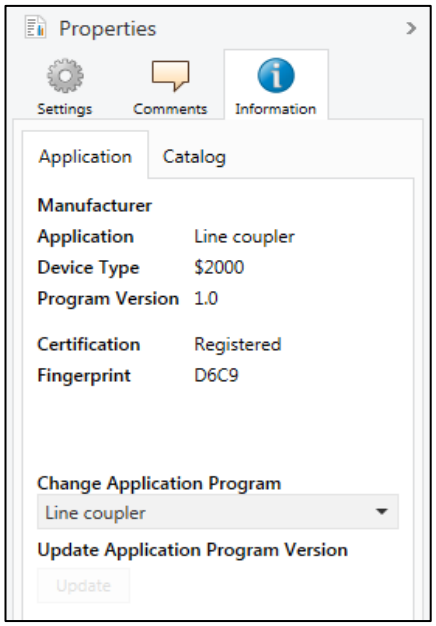
All screenshots in this document describing ETS parameters represent the **MEC*tp*** ´s database entry in the ETS5.

7.1 Settings

In the properties window the basic settings of the **MEC*tp*** can be adjusted and checked. Under the Settings tab the device name and the physical address (individual address) can be changed/downloaded to the device.



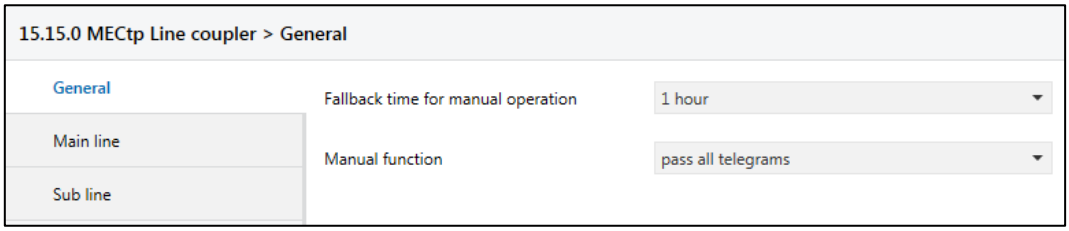
Picture 3a: Properties/Settings



Picture 3b: Properties/Information

When not already configured as “Line coupler”, the application program for “Line coupler” has to be downloaded to the device. Under the Information tab this configuration can be changed by the menu “Change Application Program”. After changing the configuration the filter table entries can be added manually. Also updating the application program can be done here.

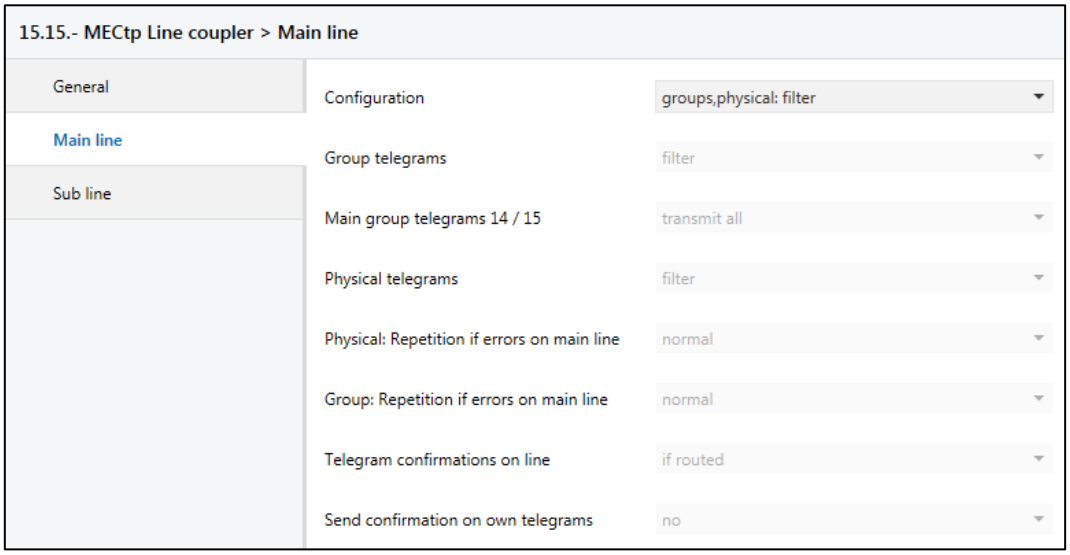
7.2 General



Picture 4: General

ETS-Text	Selection **[Factory default]**	Comment
Fallback time for manual operation	10 min, 1 hour, 4 hours, 8 hours **[1 hour]**	After this time period the “Manual Function” is switched off automatically.
Manual function	disabled pass all telegrams pass physical telegrams pass group telegrams **[pass all telegrams]**	Telegram routing configuration for the “Manual Function”.

7.3 Main Line



Picture 5: Main line configuration

Important note:

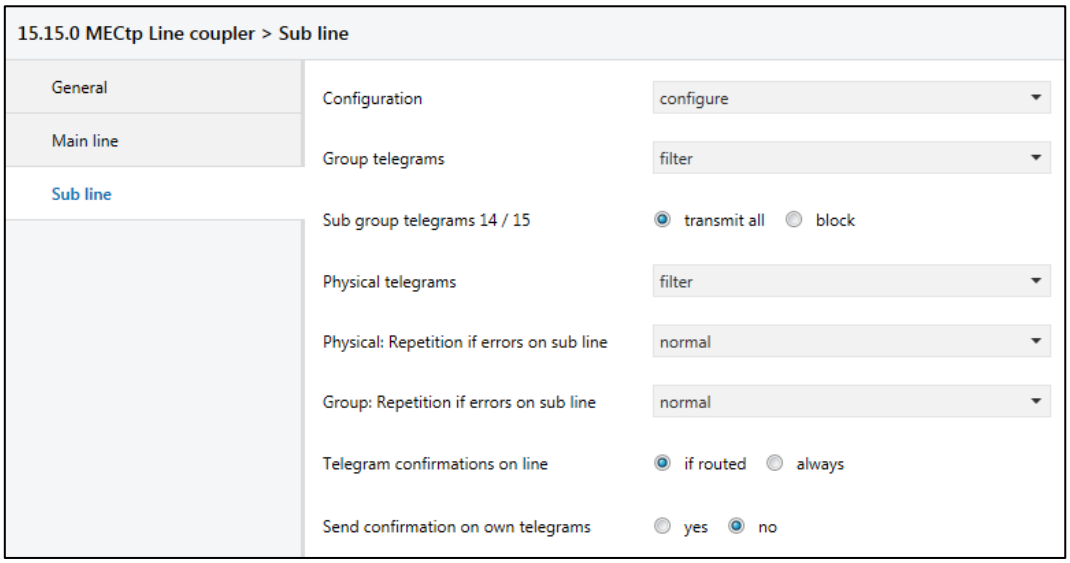
The parameter “transmit all” for Group telegrams or Physical telegrams is intended only for testing purposes. This setting should not be used during normal operation.

ETS-Text	Selection **[Factory default]**	Comment
Configuration	groups: filter, physical: block groups, physical: filter groups: route, physical: filter groups, physical: route configure **[groups, physical: filter]**	- 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 manually.** This parameter is to be set depending on the planed configuration.
Group telegrams	1. transmit all (not recommended) 2. block 3. filter **[filter]**	1. All group telegrams are transmitted. 2. No group telegram is transmitted. 3. Only Group telegrams entered in the filter table are routed. ETS3/4 produces the filter table automatically.
Main 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 (not recommended) 2. block 3. filter **[filter]**	1. All Physical telegrams are transmitted. 2. No Physical telegram is transmitted. 3. Depending on the physical address only Physical telegrams are routed.
Physical: Repetition when errors on main line	1. no 2. normal 3. reduced **[normal]**	If a transmission error (e.g. due to missing receiver) is found after sending a Physical telegram on the main line: 1. Physical telegrams are not repeated. 2. Physical telegrams are repeated up to three times. 3. Physical telegrams will be repeated only once.
Group: Repetition when errors on main line	1. no 2. normal 3. reduced **[normal]**	If a transmission error (e.g. due to missing receiver) is found after sending a Group telegram on the main line: 1. Physical telegrams are not repeated. 2. Physical telegrams are repeated up to three times. 3. Physical telegrams will be repeated only once.
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.*

Please note:

If the parameter "Send confirmation on own telegrams" is set to yes the line coupler will send an ACK systematically on any own routed telegram.

7.4 SUB LINE



Picture 6: Sub line configuration

ETS-Text	Selection **[Factory default]**	Comment
Configuration	groups: filter, physical: block groups, physical: filter groups: route, physical: filter groups, physical: route configure **[groups, physical: filter]**	- 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 manually.**
Group telegrams	1. transmit all (not recommended) 2. block 3. filter **[filter]**	1. All group telegrams are transmitted. 2. No group telegram is transmitted. 3. Only group telegrams entered in the filter table are routed. ETS3/4 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 (not recommended) 2. block 3. filter **[filter]**	1. All Physical telegrams are transmitted. 2. No Physical telegram is transmitted. 3. Depending on the physical address only Physical telegrams are routed.
Physical: Repetition if errors on the sub line occur	1. no 2. normal 3. reduced **[normal]**	If a transmission error (e.g. due to missing receiver) is found after sending a physical telegram on the main line: 1. Physical telegrams are not repeated. 2. Physical telegrams are repeated up to three times. 3. Physical telegrams will be repeated only once.

Group: Repetition if errors on the sub line occur	1. no 2. normal 3. reduced **[normal]**	If a transmission error (e.g. due to missing receiver) is found after sending a group telegram on the main line: 1. Physical telegrams are not repeated. 2. Physical telegrams are repeated up to three times. 3. Physical telegrams will be repeated only once.
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

8 Application Description Line Repeater

Line repeaters do not use a filter table. A received telegram is routed to all lines irrespective of in which line it is processed. It is therefore not important whether the telegram is triggered within a line or whether it is sent from an upper line to a lower line via a coupler.

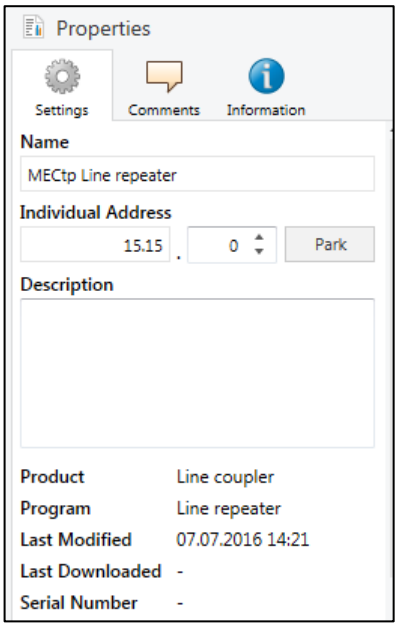
When an error occurs during transmission of a telegram according to the physical address of a receiver the line repeater is able to repeat the telegram. With the parameters „Physical: Repetition if errors on main line/on sub line“ this function can be set separately for both lines.

In case of routing a group telegram with not receiving an acknowledgement or in case of a bus device detecting 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 function can be adjusted separately for both lines.

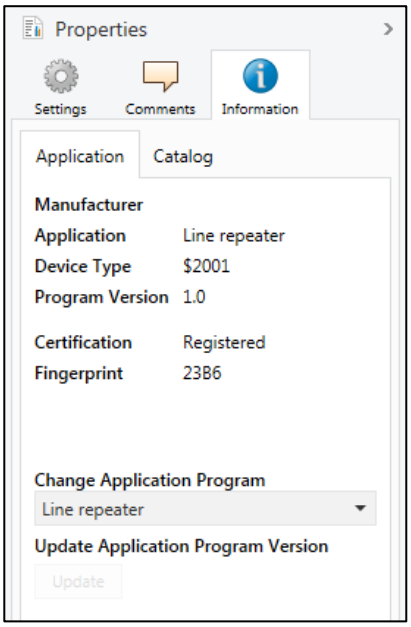
9 ETS-Parameters Line Repeater

9.1 Settings

In the properties window the basic settings of the **MEC*tp*** can be adjusted and checked. Under the Settings tab the device name and the physical address (individual address) can be changed and downloaded to the device.



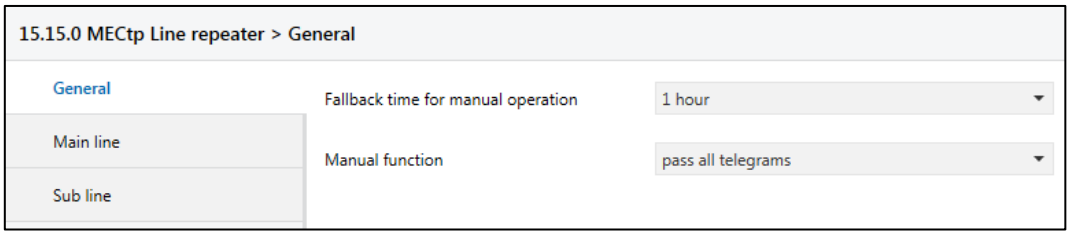
Picture 7a: Properties/Settings



Picture 7b: Properties/Information

When not already configured as “Line repeater”, the application program for “Line repeater” has to be downloaded to the device. Under the Information tab this configuration can be changed by the menu “Change Application Program”. After changing the configuration the filter table entries can be added manually. Also updating the application program can be done here.

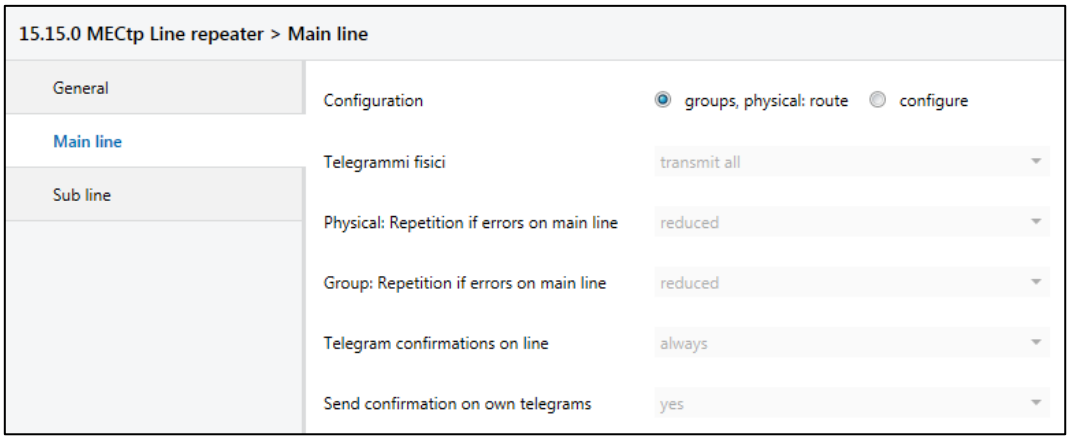
9.2 General



Picture 8: General

ETS-Text	Selection **[Factory default]**	Comment
Fallback time for manual operation	10 min, 1 hour, 4 hours, 8 hours **[1 hour]**	After this time period the “Manual Function” is switched off automatically.
Manual function	disabled pass all telegrams pass physical telegrams pass group telegrams **[pass all telegrams]**	Telegram routing configuration for the “Manual Function”.

9.3 Main Line



Picture 8: Main line configuration

Important note:

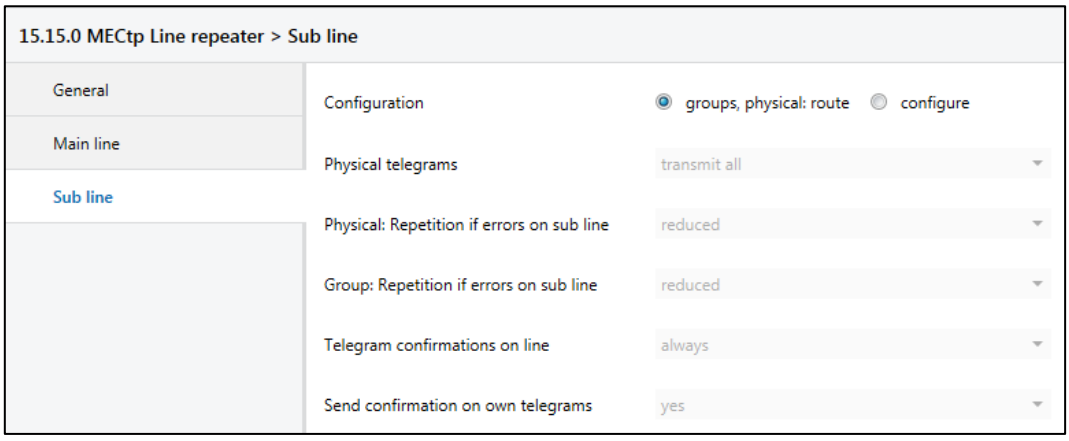
The parameter “transmit all” for Group telegrams or Physical telegrams is intended only for testing purposes. This setting should not be used during normal operation.

ETS-Text	Selection **[Factory default]**	Comment
Configuration	groups, physical: route configure **[groups, physical: route]**	- Route: the telegrams are routed. - **Configure: the following parameters can be set manually.**
Physical telegrams	1. transmit all 2. block **[transmit all]**	1. All Physical telegrams are transmitted. 2. No Physical telegram is transmitted.
Physical: Repetition when errors on main line	1. no 2. normal 3. reduced **[reduced]**	If a transmission error (e.g. due to missing receiver) is found after sending a Physical telegram on the main line: 1. Physical telegrams are not repeated. 2. Physical telegrams are repeated up to three times. 3. Physical telegrams will be repeated only once.
Group: Repetition when errors on main line	1. no 2. normal 3. reduced **[reduced]**	If a transmission error (e.g. due to missing receiver) is found after sending a Group telegram on the main line: 1. Physical telegrams are not repeated. 2. Physical telegrams are repeated up to three times. 3. Physical telegrams will be repeated only once.
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*.

Please note:

If the parameter "Send confirmation on own telegrams" is set to yes the line repeater will send an ACK systematically on any own routed telegram. With the repeater using no filter table it is useful to send an ACK with every routed telegram.

9.4 SUB LINE



Picture 9: Sub line configuration

ETS-Text	Selection **[Factory default]**	Comment
Configuration	groups, physical: route configure **[groups, physical: route]**	- Route: the telegrams are routed. - Configure: the following parameters can be set physically.
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 the sub line occur	1. no 2. normal 3. reduced **[reduced]**	If a transmission error (e.g. due to missing receiver) is found after sending a Physical telegram on the main line: 1. Physical telegrams are not repeated. 2. Physical telegrams are repeated up to three times. 3. Physical telegrams will be repeated only once.
Group: Repetition if errors on the sub line occur	1. no 2. normal 3. reduced **[reduced]**	If a transmission error (e.g. due to missing receiver) is found after sending a group telegram on the main line: 1. Physical telegrams are not repeated. 2. Physical telegrams are repeated up to three times. 3. Physical telegrams will be repeated only once.
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

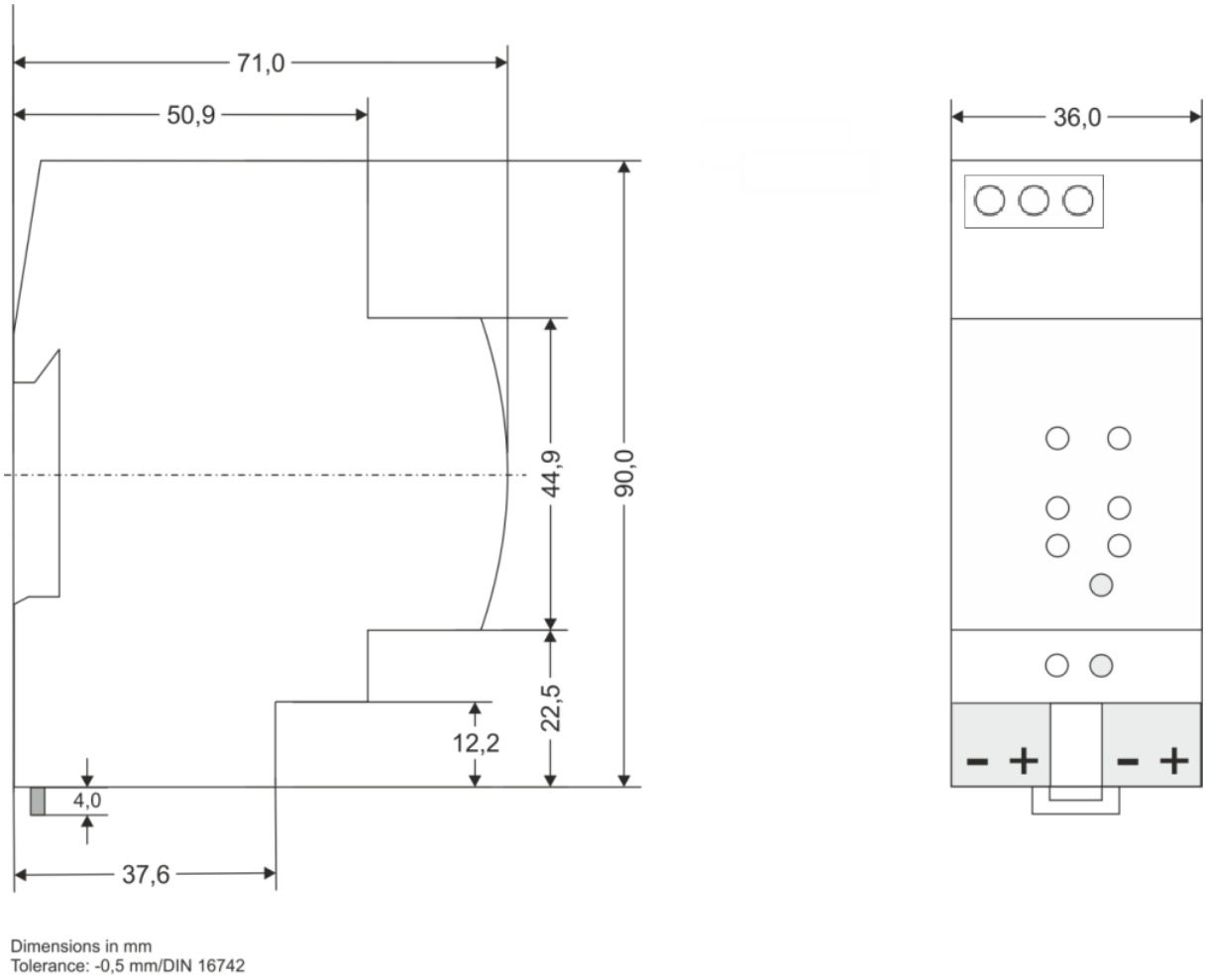
10 TECHNICAL DATA

Warning: device may not be connected to 230V!

Marking/Design	**MEC*tp***	
Current consumption	< 30 mA	
Connections	**KNX main line:** KNX bus WAGO connector (red/black), screwless for single-core cable Ø 0.6…0.8 mm **KNX sub line:** KNX bus WAGO connector (red/black), screwless for single-core cable Ø 0.6…0.8 mm	
Display elements	LED Bus state Main LED Bus traffic Main LED Group Address (GA) LED Programming	LED Bus state Sub LED Bus traffic Sub LED Physical Address (PA)
Control elements	Function button, Programming button	
Mounting	35 mm top-hat rail (TH35) according to IEC60715	
Protection type	IP20 according to IEC60529	
Pollution degree	2 according to IEC60664-1	
Protection class	III according to IEC61140	
Overvoltage category	III according to IEC60664-1	
Approbation	KNX-certified according to ISO/IEC14543-3	
CE-Marking	According to low voltage and EMC guidelines Device complies with EN50581, EN50491-5, EN60669, and EN61000-6	
Power supply	Safety extra low voltage, 21…30V DC (SELV), Main Line	
Housing colour	Plastic PA66 housing grey	
Dimensions	H = 94 mm, W = 36 mm (2 modules), D = 71 mm Mounting depth = 64 mm	
Weight	66 g	
Device temperature	Working temperature: -5…45 °C Storage temperature: -20…60 °C	
Ambient humidity	5…93 %, non-condensing	

11 TECHNICAL DRAWINGS

All dimensions shown here are specified in mm. The device width is 2 modules at 18 mm.



Picture 10: Dimension drawings

12 LEGAL NOTICE

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