Customer Service

If, despite correct handling, faults or malfunctions occur or if the product was damaged, please contact the company at the address below:

ELDAT GmbH
Im Gewerbepark 14
15711 Zeesen/Deutschland
Telefon: + 49 (0) 33 75 / 90 37-310
Telefax: + 49 (0) 33 75 / 90 37-90
Internet: www.eldat.de
E-Mail: info@eldat.de

Repeater RTR01

Operating Instructions

RTR01-4101M-03 12 V DC
RTR01-4101M-06 230 V AC

ELDAT

Connection Diagram

Fig. 1 - RTR01-4101M-06 (230 V AC)

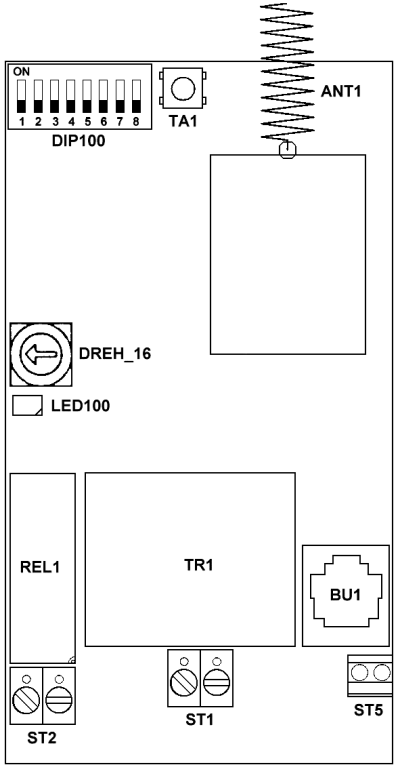
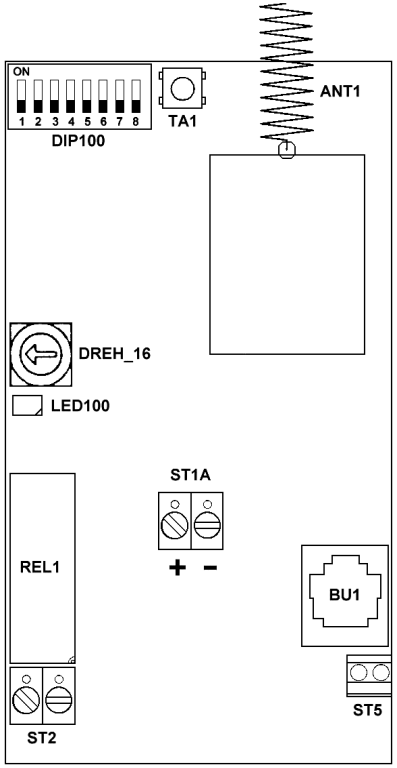


Fig 2 - RTR01-4101M-03 (12 V DC)



Power supply:	ST1	Connection 230 V AC
	ST1A	Connection 12 V DC
Output:	ST2	Relay output NO
Input:	ST5	Input for external button
Settings:	DIP100	Setting for transmission level / transmission delay
	DREH_16	Setting operation mode
	TA1	Learn-telegram button
	BU1	Serial interface
	LED100	Mode indicator
	TR1	Mains transformer

Notes:

Cleaning

- Carefully wipe the case with a damp lint free cloth.
- Do not use cleansing agents containing organic solvents. These are dangerous to your health and may damage the surface of the casing.

Disposal

Waste electrical products may not be disposed of with household waste!

Dispose of the waste product via a collection point for electronic scrap or via your specialist dealer.

Put the packaging material into the recycling bins for cardboard, paper and plastics.

Warranty

Within the statutory warranty period we undertake to rectify free of charge by repair or replacement any product defects arising from material or production faults.

Any unauthorized tampering with, or modifications to, the product shall render this warranty null and void.

Conformity

This product conforms to the basic requirements of the R&TTE Directive 1999/5/EC.

CE

For use in: EU/CH/FL/IS/N

The Declaration of Conformity can be found on the Internet at: www.eldat.de.

Technical Details

Frequency:	433 MHz
Range:	approx. 350 m (free field conditions)
Power Supply:	
RTR01-4101M-03:	12 V DC ± 20 %
RTR01-4101M-06:	230 V AC ± 10 %
Power Consumption:	
RTR01-4101M-03:	approx. 1 VA
RTR01-4101M-06:	approx. 3 VA
Relay Output:	floating (normally open)
Maximal Load:	230 V AC / 1.800 VA
bzw.	30 V DC / 240 W
Degree of Protection	IP65
Operating Temperature:	-20 °C to+60 °C
Dimensions:	70 x 162 x 38 mm
Weight:	
RTR01-4101M-03:	approx. 100 g
RTR01-4101M-06:	approx. 200 g

Intended Use

The repeater is exclusively developed and manufactured as a receiver and transmitter module for 48-bit telegrams!

The manufacturer does not assume any liability for damage caused as a result of improper or non-intended use!

General Information

The repeater works within the 433 MHz range which is also used by other radio services. The operation and range can therefore be affected by devices working on the same or an adjacent frequency.

The reception quality can be affected by a number of factors:

- location
- equipment and systems without interference suppression
- other transmitters within the same frequency range
- atmospheric conditions and other factors.

In case of malfunctions, contact your specialist dealer or the manufacturer.

Safety Advice

Before connecting and operating the unit, carefully read these operating instructions!
We will not accept any liability for personal injury or damage to property caused by failure to observe the operating instructions and in particular the safety advice!

<u>Caution!</u> The device may only be installed and started up by a qualified electrician!
Keep to the specified operating voltage during installation!

Warning!
While being programmed, the RTR01-4101M-06 repeater is live!
Do not touch the connecting terminal ST1!
Use only suitable tools!

Have faulty units checked by the manufacturer!

Do not make any unauthorized alterations or modifications to the unit!

Scope of Delivery

Repeater
Mounting accessories (screws and mollies)
Operating instructions

Function

The repeater is a 433 MHz receiver and transmitter module. It can be used to increase the transmission range.

The repeater receives 48-bit telegrams with ELDAT coding and passes them on to a subsequent repeater or receiver. This way the transmission range is extended over a longer distance.

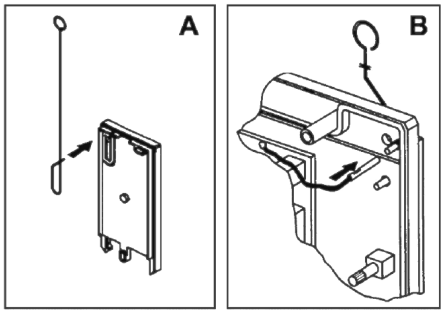
By setting a transmission level and a transmission delay, it is possible to use several repeaters (cascade operation) to extend the range still further.

Connecting and Mounting

3. Unscrew the housing cover.
4. According to the connection diagram connect the power supply cable to the connecting terminal ST 1 (230 V AC - **Fig. 1**) or ST1A (12 V DC – **Fig. 2**) .

Max. load:

- The max. load for the relay contacts is:
  230 V AC 1.800 VA
  30 V DC 240 W



5. Connect the rod antenna **(Fig. A).**
6. Connect the arial wire **(Fig. B).**
7. Mount the housing bottom at the chosen location.
8. Put the housing cover back on.

Notes:

- Do not mount the repeater in the proximity of metal parts.
- If reception is weak or interference occurs, realign the antenna or install the device in a different location.
- Before finally fastening the repeater in place, initiate a trial run to optimize the location.

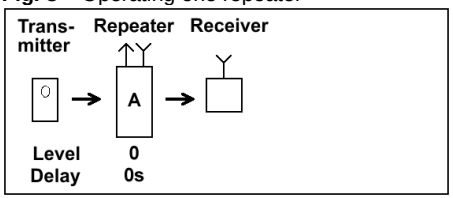
Start-Up

Once the supply voltage is switched on, the receiver is ready for operation:

1. Transfer the hand transmitter telegram to your receiver (learning procedure). For this read the operating instructions of the receiver.
2. Set up the transmission path in accordance with figure 3 or 4.
3. Transmit a telegram to the repeater.
4. The repeater retransmits the incoming telegram to the receiver.

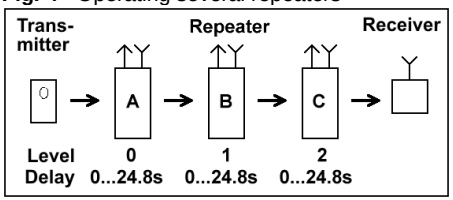
Note:
Only repeaters with the level set to 0 can receive and relay transmitter telegrams.

Fig. 3 – Operating one repeater



To operate with several repeaters, the **transmission level** and, if necessary, **transmission delay** must be set. For this read the relevant chapters.

Fig. 4 - Operating several repeaters



Setting the Transmission Level

In case several repeaters are supposed to be used together (cascade operation), the levels are important to make sure that a telegram is sent in the correct direction.

Telegram set-up “Transmitter telegram to PC“:

Byte	Content	Description
1	A5h	Start ID for telegram
2	08h	Number of following bytes
3	30h	Telegram type ID of transmitter telegram
4	000000xx = 0Xh	Serial number Bit 24-25 | | | | | | 25 | 24 |
5	xxxxxxxx = XXh	Serial number Bit 16- 23 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
6	xxxxxxxx = XXh	Serial number Bit 8-15 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 |
7	xxxxxxxx = XXh	Serial number Bit 0-7 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
8	xxxxxxxx = XXh	Input or label information Bit 0-7 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
9	0Ah	End ID 1
10	0Dh	End ID 2

Telegram set-up “Data telegram to PC“:

Byte	Content	Description
1	A5h	Start ID for telegram
2	08h	Number of following bytes
3	F0h	Telegram type ID of data telegram
4	000000xx = 0Xh	Serial number Bit 8-9 | | | | | | 9 | 8 |
5	xxxxxxxx = XXh	Serial number Bit 0-7 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
6	xxxxxxxx = XXh	Datas Bit 8-15 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 |
7	xxxxxxxx = XXh	Datas Bit 0-7 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
8	xxxxxxxx = XXh	Input or label information Bit 0-7 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
9	0Ah	End ID 1
10	0Dh	End ID 2

Telegram set-up “Transmitter telegram from PC “:

Byte	Content	Description
1	A5h	Start ID for telegram
2	05h	Number of following bytes
3	30h	Telegram type ID of transmitter telegram
4	000000xx = 0Xh	Serial number Bit 8-9 | | | | | | 9 | 8 |
5	xxxxxxxx = XXh	Serial number Bit 0-7 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
6	0Ah	End ID 1
7	0Dh	End ID 2

Serial Interface

Telegrams received by the repeater can be relayed to a PC for evaluation via the serial interface (BU1).

Likewise, telegrams created on a PC (serial numbers 0 - 1023) can be generated and transmitted via the repeater.

Functions:
- Full repeater functionality
- Receiving telegrams and relaying to the PC
- Possibility of transmission of up to 1024 telegrams via PC
- Special operating mode A (switch setting DREH_16) to learn PC-generated telegrams into receivers
- Cyclic transmission request for test and PC-transmission synchronization

Operation:
Connect the repeater with the cable supplied to the serial interface of your PC. Configure the chosen interface in accordance with the following table:

Settings for the serial interface of the PC:

Transmission speed:	9600 Bd
Start bit:	1
Data bits:	8
Stop bit:	1
Parity:	none
Hardware handshake:	no
XOn/XOff:	no

Pin configuration 9-pole Sub-D socket:

Pin	Repeater	PC
2	TXD ->	-> RXD
3	RXD <-	<- TXD
5	GND	GND

According to the following tables, different transmitter and data telegrams can be evaluated:

Receiving telegrams:
Start a corresponding terminal program with hexadecimal display option. The repeater sends the command "Transmission request to PC“ (A5h 04h 1Bh 00h 0Ah 0Dh) to the PC every 2 seconds. This way the interface setting can be checked quite easily.

Transmitting telegrams:
It is also possible to transmit PC-generated telegrams with the serial numbers 0 - 1023 via the repeater.
The transmission of these numbers is synchronized by the command “Transmission request to PC“. This means that every time this command is received, the PC telegram is to be transmitted.
To program the serial numbers into the receivers, the DREH_16 rotary switch must be set to operating mode B. During this process the repeater function is switched off and only the telegram to be learned is transmitted.

Important!
In order to ensure that the repeater operates properly, reset the rotary switch to the setting for the required operating mode.

Telegram set-up „Transmission request to PC“:

Byte	Content	Description
1	A5h	Start ID for telegram
2	04h	Number of following bytes
3	1Bh	ID for „Transmission request to PC“
4	00h	ID for „Transmission request to PC“
5	0Ah	End ID 1
6	0Dh	End ID 2

A telegram is always transmitted to a repeater of the next highest level. Acknowledgement telegrams are transmitted in the opposite direction.

Notes:
- Only repeaters with the level set to 0 can receive hand transmitter telegrams.
- Therefore, the first repeater should always be set to level 0.
- From repeater to repeater the level setting needs to be increased by 1 **(see figure 4).**

With the DIP100 dip switch the level of the repeater is set via DIP 1-2-3. All switches set to OFF signify level 0 and all switches set to ON level 7.

DIP100	1	2	3	Level
	-	**-**	**-**	0
	ON	**-**	**-**	1
	-	**ON**	**-**	2
	ON	**ON**	**-**	3
	-	**-**	**ON**	4
	ON	**-**	**ON**	5
	-	**ON**	**ON**	6
	ON	**ON**	**ON**	7

„**-**” = Switch Position OFF

Setting the Transmission Delay

The transmission delay causes the received signal to stored in the repeater for a brief phase. After the set time delay it is transmitted to the next repeater on the same frequency.

In order to exclude interferences on longer ranges, while using several repeaters on the same transmission level, a different time delay should be set for each repeater.

The time delay can be set on the DIP100 dip switch via DIP 4-5-6-7-8 in 800 ms steps (**Table 2**).

DIP100	4	5	6	7	8	Delay
	-	**-**	**-**	**-**	**-**	0 s
	ON	**-**	**-**	**-**	**-**	0.8 s
	-	**ON**	**-**	**-**	**-**	1.6 s
	ON	**ON**	**-**	**-**	**-**	2.4 s
	-	**-**	**ON**	**-**	**-**	3.2 s
	ON	**-**	**ON**	**-**	**-**	4 s
to						
	ON	**ON**	**ON**	**ON**	**ON**	24.8 s

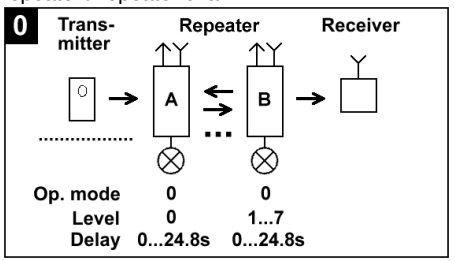
„**-**” = Switch Position OFF

Operation Modes

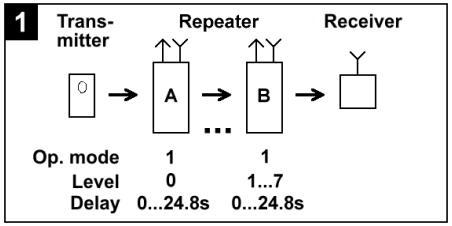
With the DREH_16 rotary switch you can set the opeartion modes of the repeater:

Operation Mode:	DREH_16 switch position
PULSE_OPERATION	0
ONLY_REPEATER	1
LEARN_ACKNOWLEDGEMENT	2
LEARN_ON	3
LEARN_OFF	4
DELETE_ON_OFF_ACKNOWL.	5
ON_OFF_ACKNOWLEDGEMENT	6
ON_OFF_LOG_ ACKNOWLEDGEM.	7
INPUT_SEND_A_TELE	8
MIRROR	9
ON_IMPULSE_ ACKNOWLEDGEM.	10

0: PULSE_OPERATION
Function: The repeater relays every received telegram after the preset time delay. In case a telegram is received which has been learned under switch setting 2 or 3, the relay output is triggered for approx. 1 s.
Application: Function and reception test of a repeater / repeater chain.



1: ONLY_REPEATER (factory setting)
Function: The repeater transmits every received telegram again after the preset time delay.
Application: Retransmission or transmission amplification of ELDAT telegrams.



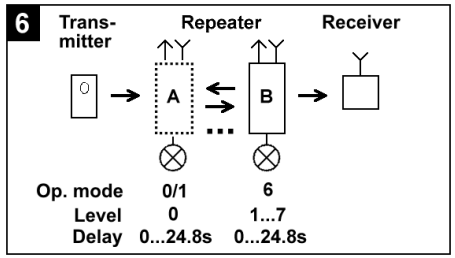
2: LEARN_ACKNOWLEDGEMENT
Learning a telegram which after reception is sent back as an acknowledgement telegram in the operation modes ON_OFF_ACKNOWLEDGEMENT and ON_OFF_LOG_ ACKNOWLEDGEMENT (see "Learning Telegrams").

3: LEARN_ON
Learning a telegram which after reception switches the relay on (see "Learning Telegrams").

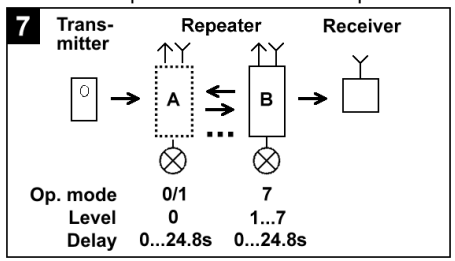
4: LEARN_OFF
Learning a telegram which after reception switches the relay off (see "Learning Telegrams").

5: DELETE_ON_OFF_ACKNOWLEDGEM.
All learned telegrams are deleted (see "Learning Telegrams").

6: ON_OFF_ACKNOWLEDGEMENT
(Only repeaters with level setting 1...7)
Function: The repeater relays every telegram received after the preset time delay. When a telegram which was learned under switch setting 3 (LEARN_ON) or 4 (LEARN_OFF) is received, the telegram learned under switch setting 2 (LEARN_ACKNOWLEDGE-MENT) is sent additionally.
Application: Monitoring of a transmission path between several repeaters, switching process with return signal.

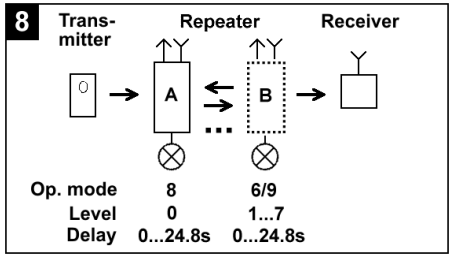


7: ON_OFF_LOG_ACKNOWLEDGEMENT
(Only repeaters with level setting 1...7)
Function: The repeater relays every received telegram after the preset time delay. When a telegram is received which was learned under switch setting 3 (LEARN_ON) and afterwards a telegram is received which was learned under switch setting 4 (LEARN_OFF), the telegram learned under switch setting 2 (LEARN_ACKNOWLEDGEMENT) is sent additionally.
Application (together with other repeaters):
(Care-) emergency calls, interference signals, switching processes with return signal and with local acknowledgement, monitoring of a transmission path between several repeaters.

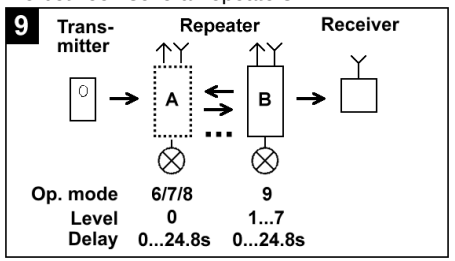


8: INPUT_SEND_A_TELEgram
(Only repeaters with level setting 0)
Function: When the repeater receives a telegram learned under switch setting 2 (LEARN_ACK-NOWLEDGEMENT), a relay is triggered.
When the repeater receives a telegram learned under switch setting 3 (LEARN_ON) or 4 (LEARN_OFF), the corresponding relay is triggered (ON or OFF).

Application (together with other repeaters):
(Care-) emergency calls, interference signals, switching processes with return signal and with local acknowledgement, monitoring of a radio line between several repeaters.



9: MIRROR
(Only repeaters with level setting 1...7)
Function: All repeater telegrams coming from a lower level are mirrored after the preset time delay. In addition all repeater telegrams switch the relay on, only a telegram learned under switch setting 4 (LEARN_OFF) switches the relay off.
Application (together with other repeaters):
(Care-) emergency calls, interference signals, switching processes with return signal and with local acknowledgement, monitoring of a radio line between several repeaters.



10: ON_IMPULSE_ACKNOWLEDGEMENT
In case the repeater receives a telegram learned under switch setting 3 (LEARN_ON), a relay is triggered and an acknowledgement telegram which was learned under switch setting 2 is transmitted back.

Learning Telegrams

Warning!
While being programmed, the RTR01-4101M-05 repeater is live!
Do not touch the connecting terminal ST1!

Operation mode:	DREH_16 switch position
LEARN_ACKNOWLEDGEMENT	2
LEARN_ON	3
LEARN_OFF	4

(see chapter „Operation Modes“)

Learning telegram:

- Set the DREH_16 rotary switch to the suitable operation mode 2, 3 or 4.
- Press button TA1 for approx. 2 s, until LED100 briefly flashes.
- Release button TA1.
- Press the hand transmitter button to be learned within 30 s.

When the LED100 lights up for approx. 2 s, the telegram of the hand transmitter has been learned. A different telegram can be learned for each operation mode.

Deleting Telegrams

Warning!
While being programmed, the RTR01-4101M-05 repeater is live!
Do not touch the connecting terminal ST1!

Operation mode:	DREH_16 switch position
DELETE_ON_OFF_ACKNOWL.	5

(see chapter „Operation Modes“)

Attention: In this operation mode all memorized telegrams are deleted.

- Set the DREH_16 rotary switch to operation mode 5.
- Press button TA1 for approx. 2 s, until LED100 briefly flashes.
- Release button TA1.

As soon as LED100 lights up for approx. 2s all telegrams have been deleted.