

GAT Reader 550 AA

Reading Station for Active Data Carriers



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- The installation, commissioning, and servicing of our products must be performed only by suitably trained personnel. In particular, electrical connections must only be made by correspondingly qualified specialists. Always observe the relevant installation regulations in accordance with the national Electrical Engineers Association.

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- It is prohibited to alter the products (devices, cabling, etc.).
➔ Alterations to the products may subsequently result in personal injury, property damage, or damage to the products.
- Do not remove protective shields and covers.
➔ Removing protective shields and covers may result in personal injury or property damage.
- Do not attempt to repair a product after a defect, failure, or damage is detected. In addition, do not put the product back into operation. In such cases, it is essential to contact your GANTNER representative or the GANTNER support hotline.



- The installation, commissioning, operation, and maintenance of the product must be carried out in accordance with the technical conditions of operation as described in the corresponding documentation. Therefore, it is essential to read the corresponding chapter of this manual and observe the instructions and information therein.
- If there are still some points that are not entirely clear, please do not take a chance. All queries can be clarified by your GANTNER representative or by ringing the GANTNER support hotline.
- Directly on receipt of the goods, inspect both the packaging and the product itself for any signs of damage. Also check that the delivery is complete and includes all accessories, documentation, auxiliary devices, etc.



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- GANTNER Electronic GmbH accepts no responsibility for any injuries or damage caused as a result of improper use.

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1. INTRODUCTION

1.1. System Components



Figure 1.1 – GAT Reader 550 AA

This manual describes only the GAT Reader 550 AA read station. Descriptions of some of the other system parts are to be found in other documentation (see also "6. Replacement Parts And Accessories").

Active Data Carrier
GAT Active Tag 552



Active Data Carrier
GAT Active Tag 554

Antenna with connection cable
(Part No.: 630413)

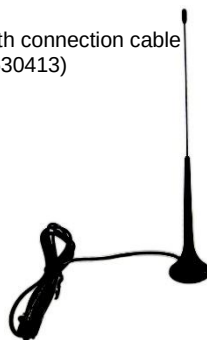


Figure 1.2 - System Components

1.2. Brief Description

The GAT Reader 550 AA is used in access control systems as a read station for the GAT Active Tag 552 and GAT Active Tag 554 active data carriers. These data carriers serve as a personal means of identification. Transmission between the data carriers and the GAT Reader 550 AA is by radio communication with a range of up to 15 m.

Note: The radio transmission range varies depending on the installation and antenna.

The GAT Reader 550 AA receives the signals from the data carriers via the antenna connected to it, decodes the signals, and forwards the information (code) as a digital signal via a serial interface to a connected terminal. The latter performs an authorization check and controls the unlocking of doors, gates, barriers etc. accordingly.

The interface of the GAT Reader 550 AA can be disabled or enabled via the digital input provided by means of a switch (induction loop).

1.3. System Design

The illustration below shows the basic design of an access control system with the GAT Reader 550 AA and a GANTNER terminal.

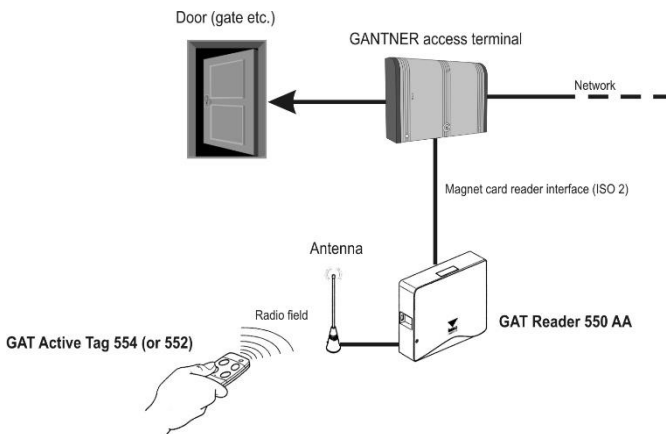


Figure 1.3 - System design (basic diagram)

2. INSTALLATION

2.1. Operating Conditions

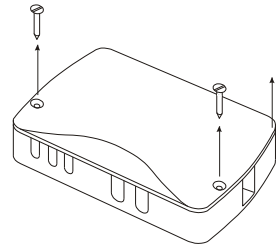
The GAT Reader 550 AA read station is intended for installation indoors. It must be protected from water, impacts and malicious damage. The read station should, as far as possible, be placed in a position that is easily accessible by a technician for maintenance work.

If the read station is installed outdoors, it must be fitted in a waterproof enclosure. It is essential that the operating conditions in the technical data (see "5. Technical Data") are observed.

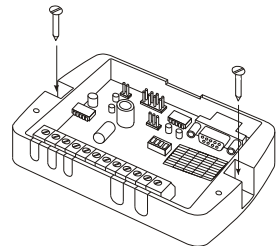
2.2. Mounting

The GAT Reader 550 AA is mounted on a rigid surface using two screws. For mounting proceed as follows:

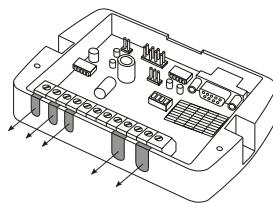
1. Remove the two screws holding the cover to the case and remove the cover.



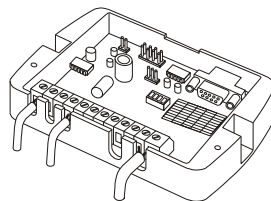
2. Position the base of the GAT Reader 550 AA in the required mounting position and mark the positions of the two fixing holes. Secure the case with the two M4 self-tapping screws. Use suitable wall plugs for a secure fixing (according to the surface).



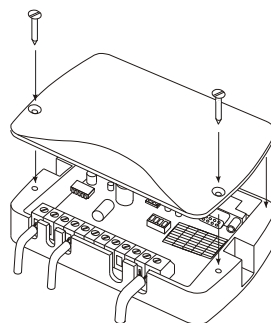
3. Remove the plastic protective coverings from the cable entries so that the connecting cables can be inserted.



4. Connect all cables. This is described in the sections that follow.



5. Replace the cover on the base and secure it again with the two screws removed earlier.



2.3. Cable Connection

Screw terminals are used to connect the power supply, antenna, access terminal and, if required, the enabling switch (induction loop) to the GAT Reader 550 AA. A DB 9 plug is used to connect to a PC using the RS 232 serial configuration interface.

2.3.1. Connection of the External Antenna

The antenna is needed to receive the signals transmitted by the data carriers. The appropriate antenna from GANTNER Electronic GmbH should be used (see also sections "1.1. System Components" and "6. Replacement Parts And Accessories").

The antenna should be positioned in such a way that no partitions (such as walls, metal structures etc.) are situated between the antenna and the data carriers to be read. Such obstacles would interfere with signal reception, meaning that correct operation could no longer be guaranteed. In addition, the antenna should not be mounted directly on metal structures and should be fitted at the highest possible point.

The antenna should be connected by means of the RG 174 coaxial cable (impedance 50 Ω) permanently attached to the antenna. The cable must be no longer than 15 m. To connect the cable to the screw terminals on the GAT Reader 550 AA, the plug fitted to the cable must be snipped off. The central conductor of the cable is then connected to terminal 2 and the screen to terminal 1.

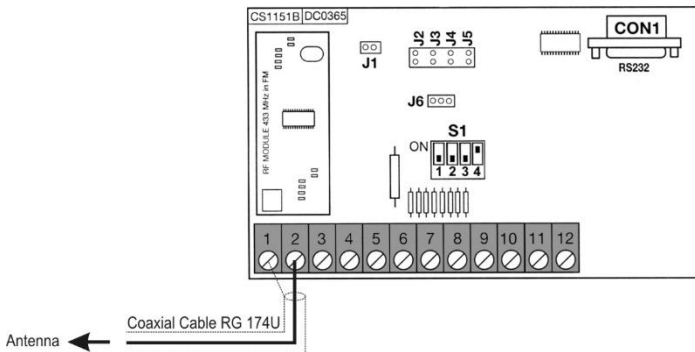


Figure 2.1 – Connecting the antenna

2.3.2. Connecting the Power Supply

Either 12 VAC/DC or 24 VAC/DC may be used to supply the GAT Reader 550 AA. The ground is connected to terminal 3. 12 VAC/DC must be connected to terminal 4 and 24 VAC/DC on terminal 5.

Jumper J6 must be set accordingly, depending on the voltage (see section "3.1.3. Setting the Output Voltage").

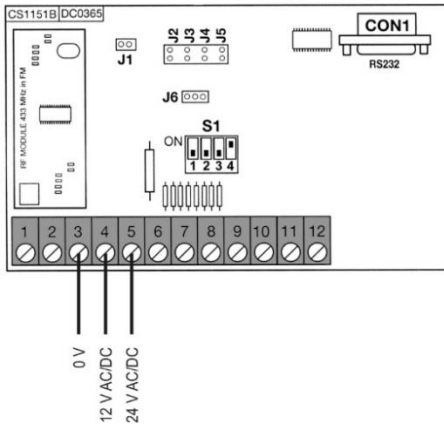


Figure 2.2 - Connecting the Power Supply

For the power supply use a safety mains adaptor that supplies at least 45 mA.

2.3.3. Connecting a GANTNER Access Terminal

A GAT Terminal 2500, GAT Terminal 3000 or GAT Terminal 3100 are used for access control. These terminals are connected to the GAT Reader 550 AA and use the signals received to check access authorization.



The GAT Reader 550 AA can also be used with the older terminals of the 1000 generation like for example GAT Terminal 1002 and GAT Terminal 1015.

The connecting cable is connected to the GAT Reader 550 AA on screw terminals 6, 7, 8 and 9. At the Terminals 3100 the connecting cable is connected to the screw terminals of the synchronous reader interface. At the door controller GAT DC 7200 the connecting cable is connected to the screw terminals of the synchronous reader interface of the GAT SR 7000 Wiegand module. This module is then connected to a "Reader" interface at the GAT DC 7200.

Note: The max. cable length from the GAT SR 7000 Wiegand Module to the Wiegand reader is 10 meters.

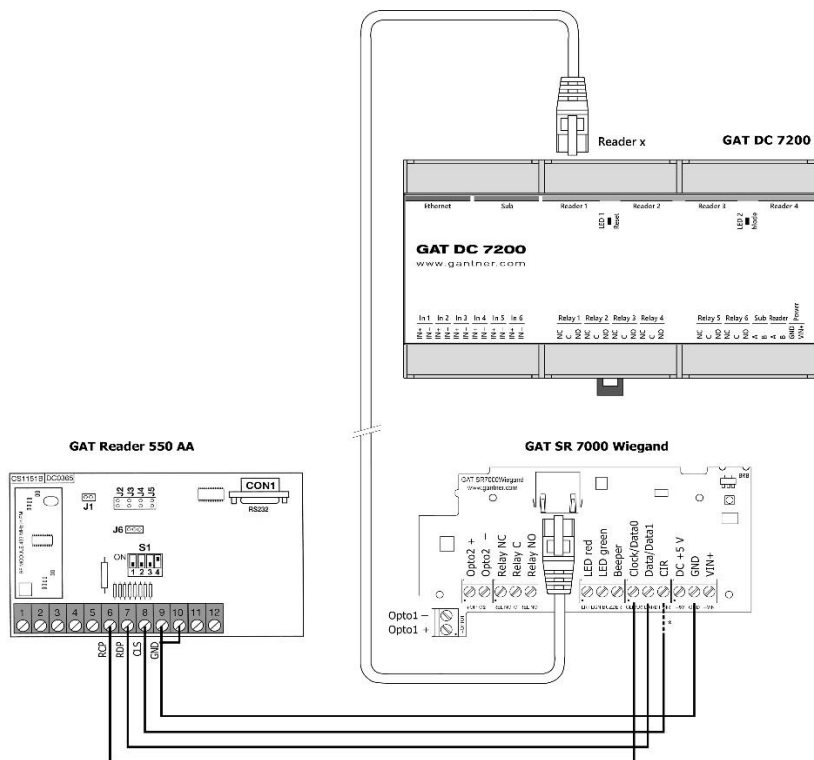


Figure 2.3 - Connecting the Power Supply

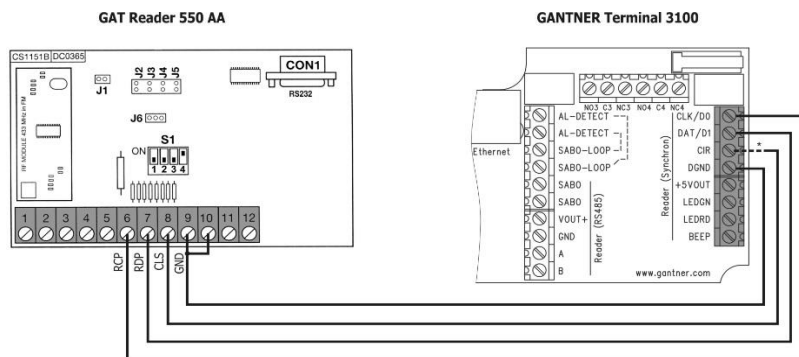


Figure 2.4 - Connecting the GAT Reader 550 AA to a GAT Terminal 3100

* ... CIR is connected if GAT Reader 550 AA is used as the main reader.

2.3.4. Connecting a Contact to Disable and Enable the GAT Reader 550 AA

It is possible to disable (deactivate) or enable (activate) the GAT Reader 550 AA manually. A volt-free contact (induction loop) is connected to terminals 9 and 10 for this. When the "EN" (terminal 10) is grounded, the GAT Reader 550 AA is enabled, otherwise it is disabled.

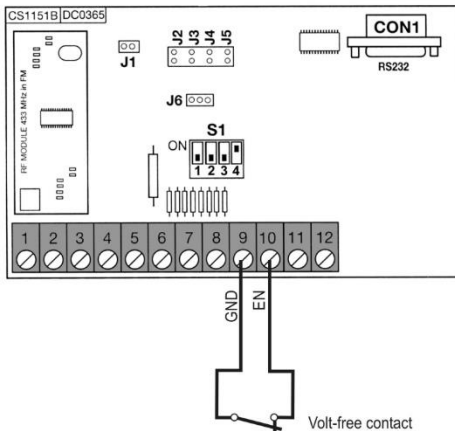


Figure 2.5 - Connecting a contact to disable/enable the GAT Reader 550 AA



Important: If no device is connected to terminals 9 and 10, the two terminals **must** be connected by means of a wire bridge in order to ground terminal 10. Otherwise the GAT Reader 550 AA will be disabled.

3. CONFIGURATION

Before putting into operation, the GAT Reader 550 AA must be set to the correct function using the jumpers and DIP switch. The authorised data carrier numbers must also be specified for the GAT Reader 550 AA.

3.1. Jumper and DIP Switch Settings

Various settings can be configured using 6 jumpers and a DIP switch on the GAT Reader 550 AA PCB.

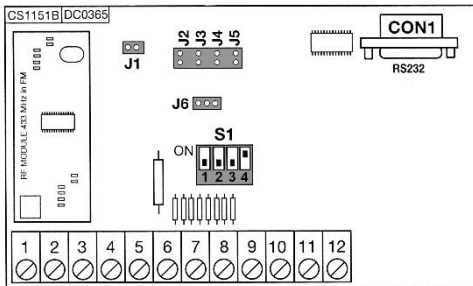


Figure 3.1 - Jumper and DIP switch on the GAT Reader 550 AA PCB

3.1.1. Enabling the channels

The GAT Active Tag 552 has two push-buttons and the GAT Active Tag 554 has four. Each of these buttons can be used to transmit on a different channel. This means that two or four different GAT Reader 550 AAs can be operated with one data carrier of this type.

The jumpers J2, J3, J4 and J5 of a GAT Reader 550 AA are used to set the channel or channels to which it should respond.



Figure 3.2 - Enabling the channels with jumpers J2, J3, J4 and J5 on the GAT Active Tag 552

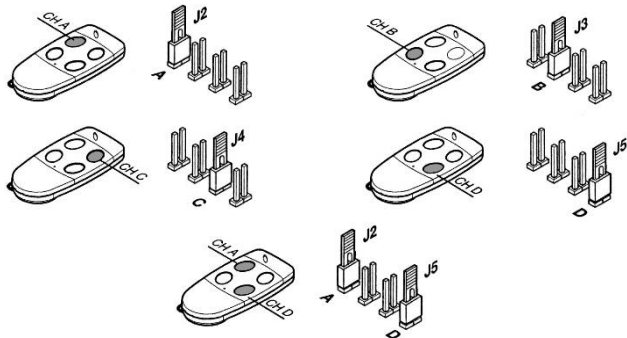
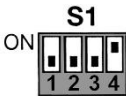


Figure 3.3 - Enabling the channels with jumpers J2, J3, J4 and J5 on the GAT Active Tag 554

3.1.2. Selection of the Output Protocol

The GAT Reader 550 AA can use three different protocols to communicate with a device that is connected at the output (terminals 6, 7, 8 and 9). For the **GANTNER Terminals** the **ISO 2** protocol (also magnetic card reader protocol) is used. The **WIEGAND** protocol with 11 different formats and a serial protocol are also available.

DIP switch S1 is used to select the protocol to be used (see Figure 3.1).



DIP 1	DIP 2	DIP 3	DIP 4	Protocol
ON	OFF	OFF	OFF	WIEGAND 26 BIT
ON	OFF	ON	OFF	WIEGAND 26 BIT SITE
ON	OFF	ON	ON	WIEGAND 26 BIT SITE + CH
OFF	ON	OFF	OFF	WIEGAND 37 BIT
OFF	ON	OFF	ON	WIEGAND 37 BIT + CH
OFF	ON	ON	OFF	WIEGAND 37 BIT SITE
OFF	ON	ON	ON	WIEGAND 37 BIT SITE + CH
OFF	OFF	ON	OFF	WIEGAND 37 BIT D10302
OFF	OFF	ON	ON	WIEGAND 37 BIT D10302 (BCD)
ON	ON	OFF	OFF	WIEGAND 50 BIT
ON	ON	OFF	ON	WIEGAND 50 BIT + CH
OFF	OFF	OFF	ON	ISO 2 (setting for GANTNER terminals)
ON	ON	ON	ON	SERIAL

Table 3.1 – Setting the Output Protocol

3.1.3. Setting the Output Voltage

Each output protocol requires a different output voltage. Jumper J6 is used to set the output voltage of the signals.

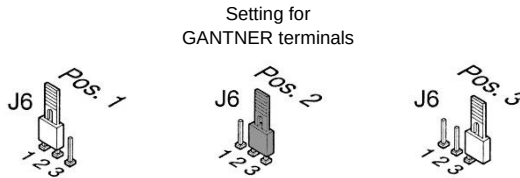


Figure 3.4 - Using jumper J6 to set the output voltage

The **GANTNER access terminals** communicate using the ISO 2 protocol (magnetic card reader protocol) and therefore require 5 VDC, i.e. jumper J6 is set to **position 2**.

Position 1 provides 12 VDC output signals and in position 3 a TTL signal level (open collector - open contact) is present at the output.

3.2. Data Carrier Numbers

The GAT Active Tag 552 and 554 data carriers each have a fixed unique number printed on the reverse of the data carrier. These numbers must be set in the GAT Reader 550 AA and in the GANTNER access control software, GAT Access, as the data carriers are identified by means of these numbers.

The number printed on the data carrier will be a 6 or 7-digit number. When this number is entered in GAT Access it must be expanded to a total of 11 digits with leading digits. The first figure here will **always be a 9** and the remaining places are filled up with "0", as shown in the two following examples.

Example 1:

6-digit number on the data carrier: 123456

-> Entry in GAT Access = "90000123456"

Example 2:

7-digit number on the data carrier: 1234567

-> Entry in GAT Access = "90001234567"

4. INTERFACE DESCRIPTION

4.1. ISO 2 Protocol

Communication between the GAT Reader 550 AA and the GANTNER terminal is via the ISO 2 protocol (magnetic card reader protocol). The data stream transmitted from the GAT Reader 550 AA consists of 16 characters. Each character consists of 5 bits with bit 4 as MSB and bit 1 as LSB. The parity bit is the odd parity over bits 1 to 4.

Characters	Bit 4	Bit 3	Bit 2	Bit 1	Parity
0	0	0	0	0	1
1	0	0	0	1	0
2	0	0	1	0	0
3	0	0	1	1	1
4	0	1	0	0	0
5	0	1	0	1	1
6	0	1	1	0	1
7	0	1	1	1	0
8	1	0	0	0	0
9	1	0	0	1	1
START	1	0	1	1	0
SEP	1	1	0	1	0
END	1	1	1	1	1

Table 4.1 – Coding of characters for the ISO 2 protocol

Bit 1 is output first, then bit 2, bit 3, bit 4 and finally the parity bit:

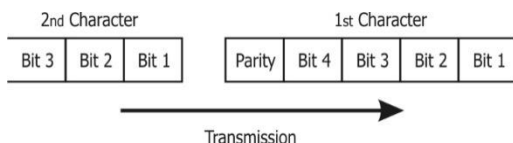


Figure 4.1 - Bit sequence at data transmission

The data stream is "START + CHANNEL (1 character) + SEP + CODE (10 characters) + SEP + END + LRC", that is 16 characters in total.

Example: Creating a data stream restricted to 6 characters, transmission of the code "452".

Characters	Bits	Parity
START	1 0 1 1	0
4	0 1 0 0	0
5	0 1 0 1	1
2	0 0 1 0	0
END	1 1 1 1	1
LRC	0 1 1 1	0

Table 4.2 – Example of a data stream

The control character LRC is transmitted at the end of the data stream. This is calculated such that the lengthwise parity (in the columns) of the corresponding bits is even, as shown in the table.

4.2. Time Diagrams for the ISO 2 Signals

When the ISO 2 protocol is used for transmission, the three signals CLS (Card Loading Signal), RCP (Read Clock Pulse) and RDP (Read Data Pulse) are used. These signals are active low (level 0).

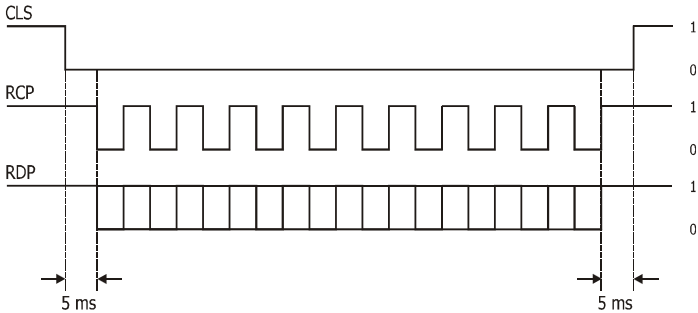
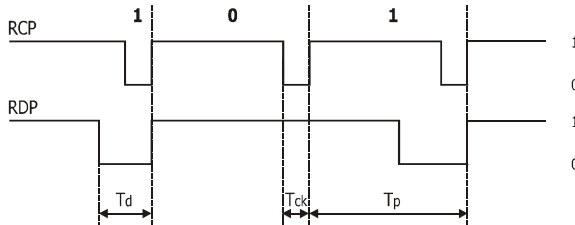


Figure 4.2 - Time diagram of the ISO 2 signals

First CLS is set to active (to "0"). After 5 ms 10 clock impulses (RCP) and the data packet (RDP) are transmitted. There is then a delay time of 5 ms before CLS is reset to inactive.

The clock period is 1 millisecond:

- first RCP and RDP are inactive for **400 μ s** ("1").
 - then there is a period of **300 μ s** during which RDP is set to active (to "0") for a bit with the value 1. For a bit with the value 0, RDP remains inactive ("1").
 - then RCP is activated for **300 μ s** (set to "0"). RDP remains unchanged.
- At the end of the clock period RCP and RDP are deactivated again ("1").



$T_{ck} = 300 \mu s$

$T_d = 600 \mu s$

$T_p = 1 ms$

Figure 4.3 - Timing of the signals

5. TECHNICAL DATA

5.1. Power Supply

Power supply:	12 / 24 VAC/DC
Current consumption:	45 mA

5.2. Receiver

Transmission frequency:	433.92 MHz
Maximum range:	10 - 15 m* in open space
Frequency of local oscillator:	423.33 MHz
Tolerance of local oscillator:	±30 PPM from -20 to +75 °C
Emission of local oscillator:	< -57 dBm
Responsiveness (for appr. input signal.):	-110 dBm 0.7 µV
Definition:	±30 kHz
Modulation:	FSK
Modulation with ΔF :	≤20 kHz
Impedance antenna input:	50 Ω

* Radio transmission range varies depending on the installation and antenna.

5.3. Output

Type:	- V _{dd} = 5 V - V _{dd} = 12 V - TTL open collector
Voltage level:	High: 0.85 x V _{dd} Low: 0.4 VDC
Output current:	High: at V _{dd} = 5 V max. 1.2 mA at V _{dd} = 12 V max. 2.9 mA Low: max. 15 mA

5.4. Input

Type:	Optocoupler
Function:	To activate/deactivate the GAT Reader 550 AA

5.5. Housing

Material:	Impact-resistant plastic
Dimensions:	120 x 85 x 20 mm

5.6. Environmental Conditions

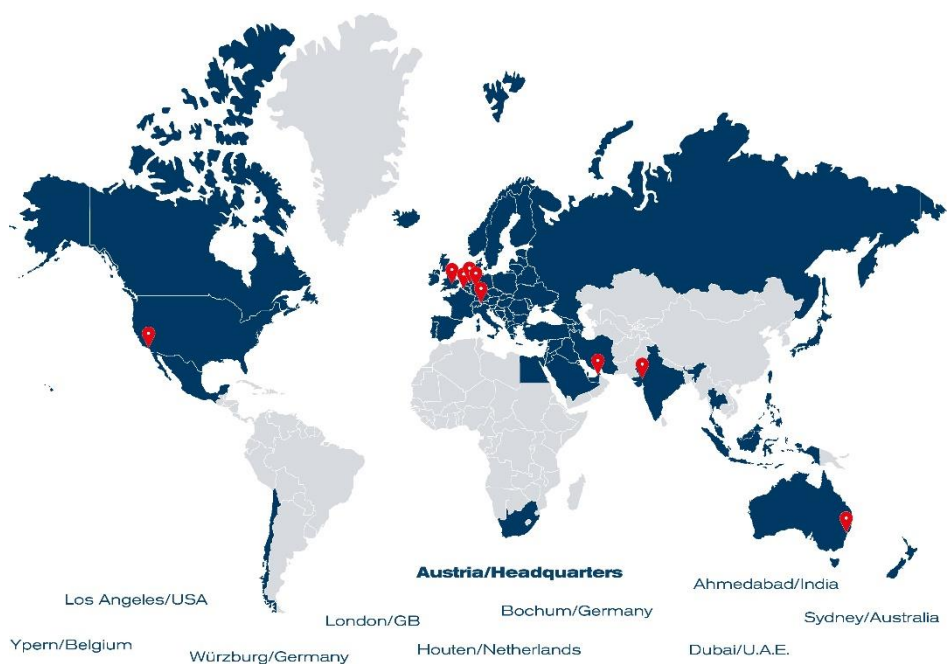
Operating temperature:	-20°C to +75°C
Protection type:	IP 20
Protection class:	III
Environment class based on VDS 2110:	II (conditions in indoor areas)

6. REPLACEMENT PARTS AND ACCESSORIES

- GAT Reader 550 AA (Part No. 304979)
Reading station for the GAT Active Tag 55x data carriers.
- Antenna Reader 550 AA (Part No. 630413)
Antenna for the GAT Reader 550 AA, with magnetic base and RG 147 connection cable.
- GAT Active Tag 552 (Part No. 304777)
Data carrier with two buttons.
- GAT Active Tag 554 (Part No. 304878)
Data carrier with four buttons.
- Batterie 3V Lithium CR2032 (Part No. 410914)
1 x CR 2032 battery for the GAT Active Tag 55x.
NOTE! 2 x batteries required!

Note:

This manual is valid as of 23rd May 2022. It is subject to change.
Amendments and changes can be made without prior notice at any time.



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