



Magnetic Tape Installation

Straight guide tape, embedded magnetic bar,
curve segments

HG 19600-A

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1 Safety Instructions for the Track Placement

WARNING! Risk of injury due to improper installation!



Improper execution of and errors during installation can lead to severe injuries on the job and to perilous situations during commissioning and operation.

- Any installation work may only be carried out by trained personnel that is authorized by the operator.
- Ensure that there is sufficient space for the mounting work.
- Always ensure that the working area is clean and uncluttered!

WARNING! Risk of injury due to improper track placement!



Improper design of the traveling route can lead to severe injuries during commissioning and operation.

- Ensure that there is sufficient space between the track and footpaths.
- Always ensure that the working area is clean and uncluttered!

WARNING! Risk of injury due to pollution and wear-out of the track!



Pollution and wear can lead to severe injuries on the job and to perilous situations during operation.

- Mend or replace damaged or worn parts of the track immediately.
- Always ensure that the working area is clean and uncluttered!

Personnel Trained qualified personnel authorized by the operator.

Personal protective equipment

- ♦ Protective clothes
- ♦ Sturdy safety gloves for work on components, chemical resistant safety gloves when dealing with hazardous substances
- ♦ Anti-slip safety boots

2 Overview of the Traveling Route

2.1 Traveling Route

„Traveling route“ refers to a path that the Automated Guided Vehicle (AGV) follows automatically. A traveling route should be laid out with great consideration given to the following elements in order to allow the AGV to travel along the route automatically: a route layout, path, selection at a crossing or junction, the command to stop and traffic control. The traveling route consists of guide tape.

2.2 Guide Tape

Guide tape refers to surface-mounted magnetic tape with adhesive back, and is used to guide the Drive Unit with the sensor HG 19600. Alternatively a recessed magnetic bar can be used for areas where vehicles cross the track frequently. Place the guide tape on the floor according to the route layout. The Drive Unit is designed to use the guide sensors to read the guide tape and select a path to follow.

Place the guide tape directly on the surface of the floor that the Drive Unit travels on. The tape is 50 mm wide. In most cases it is possible to stretch the band to also lay curves. However there is a choice of 3 different kinds of curved guide tape with radii of 600 mm, 800 mm and 1,000 mm. The curved guide tape is divided into 30°. Thus, joining pieces of curved guide tape together forms an angle in increments of 30°.

2.3 Procedures for Setup of a Traveling Route

Follow the steps below to set up a traveling route:

1. The magnetic system is for indoor use only.
2. Have a floor surface and its surrounding area ready to set up a traveling route.
3. Place the guide tape temporarily according to the route layout.
4. Cut the guide tape to the required length.
5. Check that there is no problem with actual traveling. Place the guide tape on the floor permanently, see section 3.2 on page 6.
6. If necessary, apply protective coating over the tape and finish the traveling route, see section 3.4 on page 7.

3 Tape Placement Procedure

Check a location where a traveling route is to be set up before placing the tape permanently. Check all the following items and improve the location in advance if any problem is identified.

3.1 Route Location Checklist

1. Is the floor surface soiled with dirt or dust? Is the floor surface wet or soiled with oil?
 - ♦ A wet or soiled floor surface makes the tape come off easily, causes the Drive Unit to skid, and consequently makes traveling unstable. Mop or vacuum to keep the floor surface clean.
2. Are there any floor irregularities, slopes, or steps on the floor surface?
 - ♦ If there are floor imperfections, steps, or slopes on the floor surface, the tape may not be placed firmly. Also, be aware that the Drive Unit cannot travel if a slope or step exceeds a maximum permissible value. Repair the floor surface to the specifications.
3. Is the floor surface hard enough to ensure stable travel of the Drive Unit?
 - ♦ The Drive Unit may not be able to travel properly on a soft floor surface such as a carpet. The drive wheels may skid or get caught in the carpet. As a result, drive force may not be conveyed successfully.
4. Is the stopping position kept flat?
 - ♦ If an intended stopping position of the AGV is inclined, the AGV may run under its own weight and loads. Be sure to keep the stopping position flat.
5. Is there any debris along the route?
 - ♦ Remove all debris as it may damage the tape. Particularly if there are magnetic substances such as iron along the route, they may affect the magnetic force from the guide tape and interfere with proper traveling of the AGV. Thus, remove all magnetic substances along the route that may cause improper operation of the Drive Unit.
6. Are there any obstacles along the route?
 - ♦ Remove all objects that may block the path that the Drive Unit follows. Be sure to check that the guide tape is placed properly in relation to the surrounding objects before placing the tape on the floor permanently (refer to section 3.2 on page 6).
7. Is there any magnetic leakage along the route?
 - ♦ In the event of an occurrence of magnetic leakage along the route, it may make traveling of the Drive Unit unstable, or bring it to a complete stop. Thus, if magnetic leakage occurs along the route, relocate the route or eliminate magnetic leakage.

3.2 Placing the Straight Guide Tape

1. Partially remove the backing paper and place the guide tape flush with the adjacent one so that there is no gap between them or they do not overlap each other.

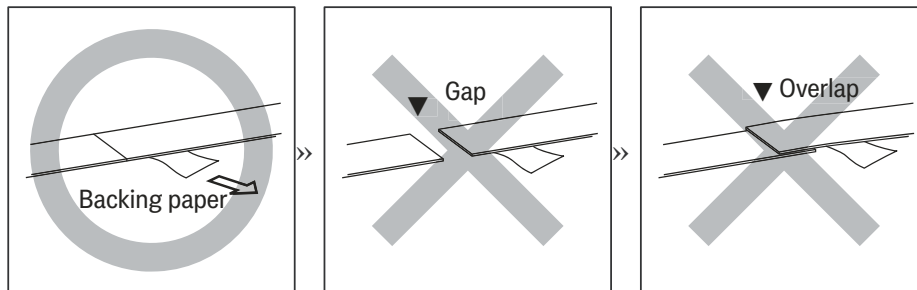


Figure 1 Magnetic band installation, error avoidance

2. Ensure that the guide tape is placed properly in relation to the entire route. Also, check for straightness of the guide tape.

Tip! Use adhesive tape to place the guide tape temporarily or have someone hold the guide tape in place.



3. Slowly remove the backing paper while pressing firmly on the guide tape by hand to maintain the position of the guide tape.

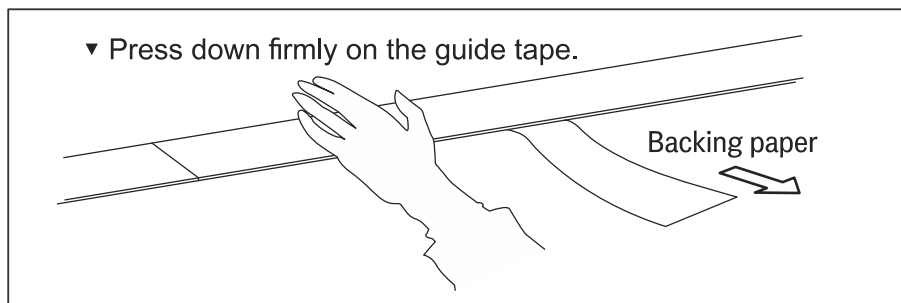
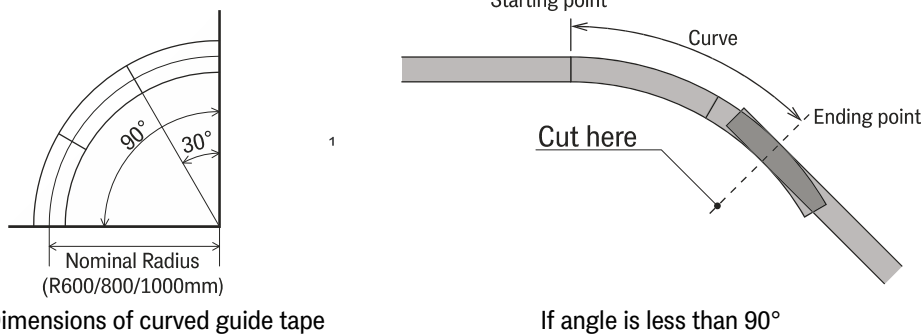


Figure 2 Permanently applying the guide tape

3.3 Placing Curved Guide Tape

Usually the magnetic band HW MAT0003 is flexible enough to be used to lay curves with a higher radius. In order to do so mark the curve radius on the ground. Afterwards lay the magnetic band onto the marking while pressing onto the roll. At the same time remove the backing paper underneath the pressing point.

1. Join the necessary number of pieces of curved guide tape using adhesive tape in advance. For instance join 3 pieces of curved guide tape to form a 90° curve.
2. Fix the pieces of curved tape while checking that the starting point of the curve is placed properly in relation to the end point, which joins the straight guide tape. If the center angle is less than 90°, cut a section where the curved guide tape overlaps the straight guide tape as illustrated below.



Dimensions of curved guide tape

Figure 3 Forming curves with curved guide tape

3. Slowly remove the backing paper while pressing firmly on the guide tape by hand to maintain the position of the curved guide tape in the same manner as when placing straight guide tape.

3.4 Tape Protection

If the location of the traveling route is also used as an aisle for workers or is frequently accessed by other transport vehicles the guide tape will often be stepped on or driven on and may become damaged or worn out. Consequently, this may possibly cause the improper operation of the Drive Unit. Thus, please take either of the following protective measures:

- Cover the magnetic tape on the floor with protective tape.
- Apply the specified protective coating over the magnetic tape laid on the floor.
- Embed a magnetic bar in the floor (use the embedded magnetic strip HW MAT00004, see section 3.4.2 on page 7).

NOTE! The embedded magnetic strip is strongly recommended if heavy traffic is expected in the route location.



3.4.1 Use of the Protective Tape

Placing protective tape over magnetic tape can minimize wear and tear of the magnetic tape. Place the protective tape over the magnetic tape while aligning the centers of both types of tape. The protective tape is available on request.

ATTENTION! Make sure that there are no air bubbles between the protective tape and the magnetic tape while placing the protective tape! Otherwise the tape may be damaged easily.



3.4.2 Use of the Embedded Magnetic Bar

The embedded magnetic bar (also: strip) is used as a substitute for standard magnetic tape, and placed in a concrete floor. The embedded magnetic strip is strongly recommended if heavy traffic is expected in the route location. The standard magnetic tape is more economical than the embedded magnetic strip, but is not suitable for use in

such an operating environment that causes wear and tear of the magnetic tape (e.g. location exposed to heavy traffic). Choose either the standard magnetic tape or embedded magnetic strip depending on your needs. Use the embedded strip below, and place it in the floor as necessary according to the route layout.

Item Name	Item No.	Description
Embedded magnetic strip	HW MAT00004	Embedded magnetic bar that is used as guide tape

Table 1 Order No. Embedded Magnetic Bar

In general the embedded magnetic strip is placed in concrete floor. Please note that typical concrete cutters so not allow you to cut curved grooves. Thus, cut multiple short straight segments to form a curve.

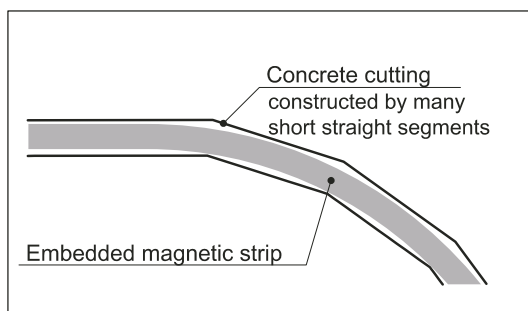


Figure 4 Curve formed using the embedded straight magnetic strips

When joining the embedded magnetic strip to the standard magnetic tape, align the centers of them.

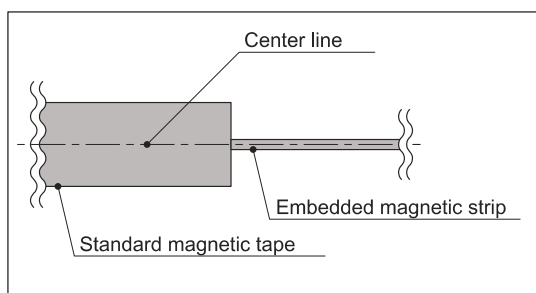


Figure 5 Connection between standard magnetic band & embedded magnetic strip

Follow the steps below to place the embedded magnetic strip in the floor.

1. Check the traveling route and its surrounding area in the same manner as when placing the standard magnetic tape.
2. Cut a groove (6 mm wide, 11 mm deep, see Figure 6 below) in the concrete floor along the determined traveling route using a concrete cutter.
 - ♦ Request an appropriate road constructor to cut the groove in the concrete floor.

Tape Placement Procedure

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- ♦ Cut the groove in such a manner that the depth is consistent across the groove.
- ♦ If there is inconsistency in the depth of the groove, fill the groove with silica sand in approximate size between 0.3 and 0.7 mm in order to adjust the depth of the groove.

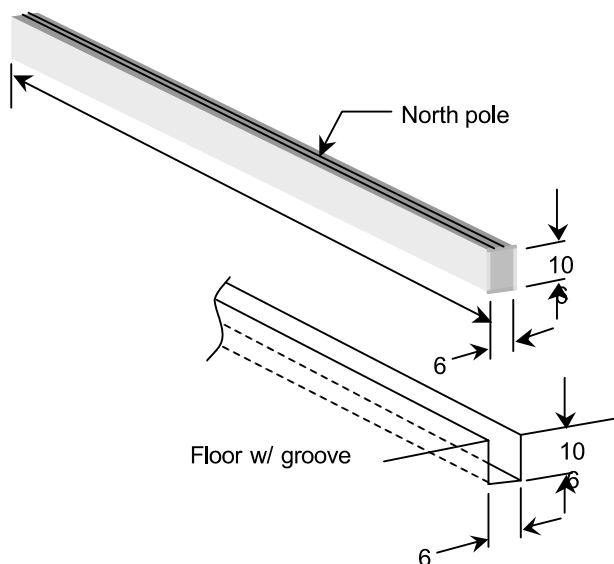


Figure 6 Dimensions of the embedded magnetic bar

3. Position the specified embedded magnetic strip in the groove.
4. Apply the finishing touches with concrete or coating as necessary.

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6 Basic Information Regarding this Manual

In documentations of Götting KG the following symbols and assignments were used at the time of printing this manual:

- ♦ Security advices have the following symbols, depending on the emphasis and the degree of exposure:

NOTE!



ATTENTION!



CAUTION!



WARNING!



- ♦ Continuative information and tips are identified as follows:

Tip!



- ♦ Program texts and variables are highlighted by using the font 'Courier'.
- ♦ Whenever input of key combinations is required for the operation of programmes, the corresponding **K**ey(s) are **H**ighlighted (in Götting KG programs it is usually possible to use small and capitalized characters equally).
- ♦ Sections, figures and tables are automatically numbered consecutively throughout the entire document. In addition, each document has an index listed behind the front page, including pages and - whenever the document has more than 10 pages - following the actual system description a figure and table index in the back. In certain cases (for long and/or complicated documents) a subject index is added.
- ♦ Each document provides a table block with meta-information on the front page, indicating the system designer, author, revision and date of issue. In addition, the information regarding revision and date of issue are included within the footer of each page, enabling the exact allocation of the information with a date and certain a system revision.
- ♦ Online-Version (PDF) and printed manual are generated from the same source. Due to the consistent use of Adobe FrameMaker for the generation of documentation, all directory entries (including page numbers and subject index) and cross references in the PDF file can be clicked on with the mouse and will lead to the corresponding linked contents.



7 Copyright and Terms of Liability

7.1 Copyright

This manual is protected by copyright. All rights reserved. Violations are subject to penal legislation of the Copyright.

7.2 Exclusion of Liability

Any information given is to be understood as system description only, but is not to be taken as guaranteed features. Any values are reference values. The product characteristics are only valid if the systems are used according to the description.

This instruction manual has been drawn up to the best of our knowledge. Installation, setup and operation of the device will be on the customer's own risk. Liability for consequential defects is excluded. We reserve the right for changes encouraging technical improvements. We also reserve the right to change the contents of this manual without having to give notice to any third party.

7.3 Trade Marks and Company Names

Unless stated otherwise, the herein mentioned logos and product names are legally protected trade marks of Götting KG. All third party product or company names may be trade marks or registered trade marks of the corresponding companies.