Guidance Antenna for Inductive Power Transmission

– with CANopen / all Variants –

HG G-19334-A

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1 Introduction

The track guidance antenna HG G-19334-A was especially developed for FTS facilities, which use inductive power transmission in such a way that the available ground installation is also used for track guiding vehicles.

1.1 Variants Overview

The antenna HG G-19334-A exists in several versions that are differentiated by the second to last character of the type identifier, e.g. HG 19334**O**A. You can detect the variant of a given antenna by looking for the type identifier on the label. These versions are available:

Vers.	Nominal reading height above loop (approx.)	Loop frequency	Loop distance	Loop current	Casing	Working area
JA	35 mm	20 kHz	80 mm	75 A	Small (s. Figure 8 on page 27)	±30 mm
OA	35 mm	20 kHz	100 mm	75 A	Big (s. Figure 9 on page 27)	±40 mm
RA	35 mm	20 kHz	100 mm	125 A	Big (s. Figure 9 on page 27)	±40 mm
XA	35 mm	25 kHz	140 mm	60 A	Small (s. Figure 10 on page 28)	±50 mm
YA	50 mm	25 kHz	140 mm	85 A	Small (s. Figure 11 on page 28)	±50 mm

Table 1 Variants overview

NOTE! For small casings (s. Table 1 above) it is not possible to have the connectors on the top.

1.2 Functional Principle

The guidance antenna consists of three systems with one cross-coil antenna each. Each of these systems generates one “Detect” signal and two output values for the measured sum and difference signal that are proportional to the horizontal or vertical components of the magnetic field. In addition to this in **a working area of max. ±30 / ±40 / ±50 mm at nominal reading height** the two values for sum and difference voltage are used to calculate and output the actual offset (in millimeters) from the nominal track.

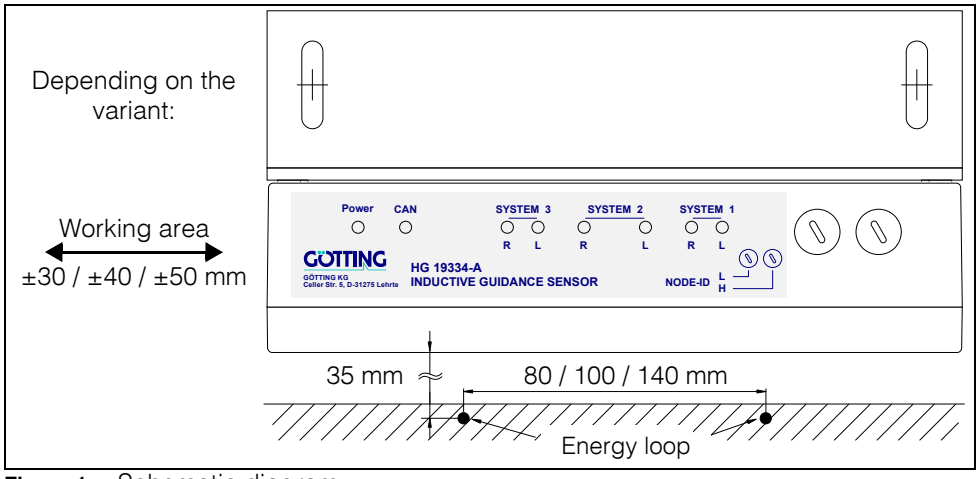

Figure 1 Schematic diagram

Example

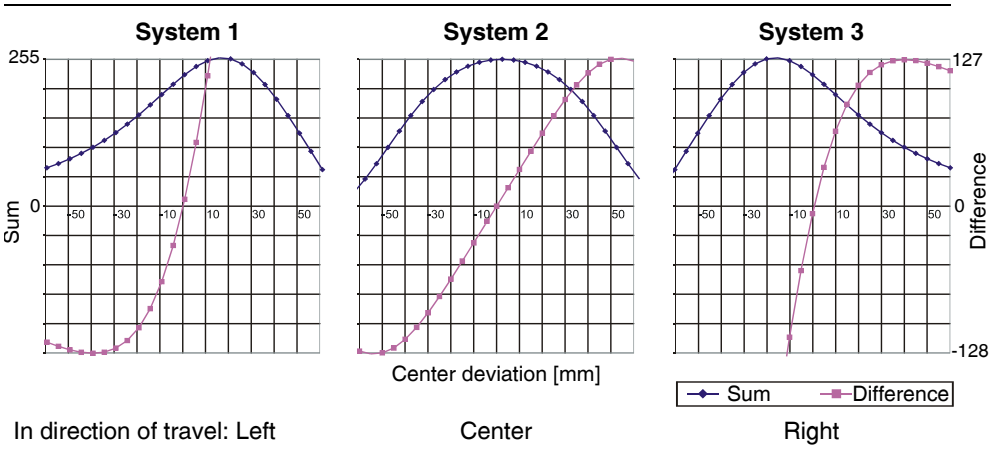

Figure 2 Diagram: Voltage curve of the three antenna systems (example)

By using three antenna systems, branching from the main course is made possible. The three antenna systems work synchronously and their measured values are permanently cyclically transmitted via CAN-Bus and via the serial interface. The decision which of the signals is to be evaluated at a particular time is carried out by the vehicle controller.

2 Device Description

2.1 Casing Dimensions

The casing dimensions including the mounting angle are listed in section A on page 27 in the appendix.

2.2 Mounting Guideline

The guidance antenna HG G-19334-A is calibrated for a fixed height 35 mm above the energy loop. The guidance antenna should be mounted on the vehicle in such a way, that the monitor mode shows values of approx. 0 digits for all three systems in the middle of the track (see markers in Figure 6 on page 23). Also you should make sure that there are **no metal parts** in an area of 50 mm around the mounting place of the guidance antenna!

ATTENTION! Make sure that there are **no closed metal frames** around the guidance antenna!

If, due to construction needs, you can't avoid closed metal frames close to the guidance antenna those metal frames should be sliced with a cut that then is re-screwed using nonconductive material. **Pickup coils** also distort the electrical field during load cycles and should not be mounted close to the guidance antenna.

In general all metal parts distort the magnetic field, which means that there's no uniform magnetic field around the guidance antenna. In those cases the guidance antenna should be mounted somewhere else or the offsets have to be adjusted (section 3.2.1 on page 23)!

2.3 LEDs on the Front Plate

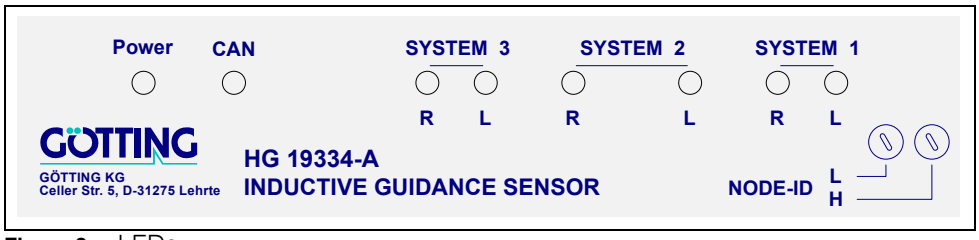

Figure 3 LEDs

On the front plate you can find two LEDs per antenna system (red + green) that indicate the zero crossing point of the difference signal (both LEDs are lit at once). In addition to those you can find one LED that indicates sufficient power supply (Power) and a LED that indicates CAN communication:

CAN	- Is lit continuously in the state „operational“ - Blinks in the state „pre-operational“ - Flashes in the state „stopped“ - Stays dark in case of CAN bus errors

Table 2 Dsiplay options of the CAN LED

2.4 Pin Allocations

Depending on the version of the guidance antenna (see Table 1 on page 4) the circular connectors are placed on the top resp. the back side of the casing. The following interfaces are available.

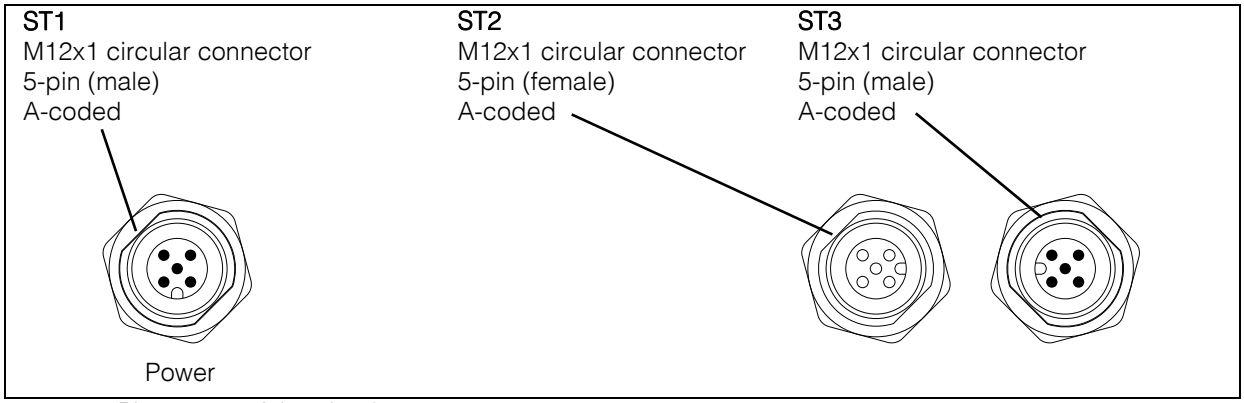

Figure 4 Placement of the circular connectors

Connector		Pin	Function
ST1 (plug) 	A-coded	1	+UB
		2	–
		3	TxD
		4	RxD
		5	GND
ST2 (socket)  ST3 (plug) 	A-coded	1	Shielding
		2	+UB
		3	CAN_GND / GND
		4	CAN_H
		5	CAN_L

Table 3 Pin allocations ST1, ST2 and ST3

2.5 CANopen® Interface

The transfer rate has to be selected by using the serial monitor (see 3 on page 23) or the corresponding SDOs. The default baud rate is 125 kBaud.

The measured values of the system are transmitted via 2 so called TxPDOs. They can be parametrized using the SDOs. The CAN identifier can be deduced from the node address (1 to 127), it can be set using two Hex switches. Selecting address 0 the CAN bus will be deactivated.

2.5.1 Description of the Process Data Objects (PDOs)

2 transmission data objects are available. The measured data are allocated to particular places in the PDO, a dynamic mapping is not envisaged. The PDO operating mode can be set to cyclical-synchronous or to asynchronous. To avoid high bus loads due to permanent alteration during non- cyclical transmission (asynchronous mode) (Event_Time=0) the inhibit time in the CAN menu can be adjusted (see section 3.2.2 on page 24). A PDO can also be transmitted cyclically. The corresponding event time has to be selected accordingly and the inhibit time has to be set to 0.

A TxPDO can be activated permanently by choosing the asynchronous mode (255) with `Inhibit-Time` = 0, `Event_time` = 0.

Additionally it can be activated / deactivated temporarily by setting / deleting the highest bit in the corresponding PDO-COB- identifier [1800,01] or [1801,01].

PDO_1 is sent with the identifier 0x180 + node address. It contains 4 bytes in which the displayed status on the serial monitor as well as three distance values are included. The transmission sequence is XL, XM, XR, status.

Value	Type	Value range	Function
XL	signed 8	-128 ... +127	Lateral deviation left system [mm]
XM	signed 8	-128 ... +127	Lateral deviation center system [mm]
XR	signed 8	-128 ... +127	Lateral deviation right system [mm]
Status	unsigned 8	0 ... 0xff	Detect signals and error message (s. Table 5 below)

Table 4 CAN: Numerical representation for PDO_1

The meaning of the status bits is specified as follows:

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Error		System 1 Left	System 1 Right	System 2 Left	System 2 Right	System 3 Left	System 3 Right

Table 5 CAN: Meaning of the status bits

PDO_2 is sent with identifier 0x280 + node address. It contains exactly seven 8 bit values in the order SL, DL, SM, DM, SR, DR, status.

Value	Type	Value range	Function
SL	unsigned 8	0 ... 255	Sum left system
DL	signed 8	-128 ... +127	Difference left system
SM	unsigned 8	0 ... 255	Sum center system
DM	signed 8	-128 ... +127	Difference center system
SR	unsigned 8	0 ... 255	Sum right system
DR	signed 8	-128 ... +127	Difference right system
Status	unsigned 8	0 ... 0xff	Detect signals and error message (s. Table 5 on page 9)

Table 6 CAN: Numerical representation for PDO_2

2.5.2 Synchronous Identifier

The synchronous identifier to be received is 0x80. It can be read from index [1005,00].

2.5.3 Heartbeat

The device supports the heartbeat mode. If a heartbeat time > 0 is set in the CAN menu the device status is sent to the identifier 0x700 + node address after the heartbeat timer expires.

Device state	Code
stopped	0x04
pre-operational	0x7f
operational	0x05

Table 7 CAN: Heartbeat device states

2.5.4 Description of Service Data Objects (SDOs)

To access the object directory the service data object (SDO) is used. An SDO is transferred with an acknowledgement, i.e. each incoming message is confirmed. The identifiers for read and write access are:

Read access: 0x600 + Node-address,

Write access: 0x580 + Node-address.

The SDO telegrams are described in CiA standard DS-301. The error codes which may occur due to an erroneous communication are listed in the following table.

Name	Number	Meaning
SDO_ABORT_UNSUPPORTED	0x06010000	Non-supported access to an object
SDO_ABORT_READONLY	0x06010001	Write access to read-only object
SDO_ABORT_NOT_EXISTS	0x06020000	Object is not implemented
SDO_ABORT_TRANSFER	0x08000020	During saving / loading of parameters the signature "load" or "save" has not been used. When calling calibration, signature "cali" has not been used.
SDO_ABORT_PARA_VALUE	0x06090030	Parameter value range exceeded
SDO_ABORT_PARA_TO_HIGH	0x06090031	Parameter value too high

Table 8 CAN: SDO error codes

2.5.5 Object Directory

The CANopen object directory comprises all relevant objects for the device. Each entry is marked by a 16 bit index. Sub components are marked by a 8 bit subindex. Read only entries are marked by RO.

NOTE! In the tables parameters that can be stored in the EEProm are marked with a '✓'.

The object directory is divided into the following parts:

2.5.5.1 Communication Specific Entries

Communication Specific Entries located from 0x1000 to 0x1FFF				
Index	**Subindex**	**Access**	**Content**	**EEProm**
0x1000	0	RO	Device Type	
0x1001	0	RO	Error Register	
0x1005	0	RO	COB ID Sync Message	
0x1008	0	RO	Number of Entries of Device Name	
	1	RO	Device Name 1	
	2	RO	Device Name 2	
	3	RO	Device Name 3	
0x1009	0	RO	Hardware Version	
0x100A	0	RO	Software Version	
0x1010	0	RO	Number of entries of Save Parameter	
	1	RW	Save all	
0x1011	0	RO	Number of entries of Restore Default Parameter	
	1	RW	Restore Default all	
0x1017	0	RW	Producer Heartbeat Time	✓
0x1018	0	RO	Number of entries of Identity Object	
	1	RO	Vendor ID	
	2	RO	Product Code	
	3	RO	Revision	
0x1800	0	RO	Number of entries of Transmit PDO_1	
	1	RW*	COB-ID	
	2	RW	Transmission Type	✓
	3	RW	Inhibit Time	✓
	5	RW	Event Time	✓

Table 9 CAN: Overview of object directory, communication specific entries in the range of 0x1000 to 0x1FFF (part 1 of 2)

Communication Specific Entries located from 0x1000 to 0x1FFF				
Index	**Subindex**	**Access**	**Content**	**EEProm**
0x1801	0	RO	Number of entries of Transmit PDO_2	
	1	RW*	COB-ID	
	2	RW	Transmission Type	✓
	3	RW	Inhibit Time	✓
	5	RW	Event Time	✓
0x1A00	0	RO	Number of Objects mapped to Transmit PDO_1	
	1	RO	Specification of Appl. Object 1	
	2	RO	Specification of Appl. Object 2	
	3	RO	Specification of Appl. Object 3	
	4	RO	Specification of Appl. Object 4	
0x1A01	0	RO	Number of Objects mapped to Transmit PDO_2	
	1	RO	Specification of Appl. Object 1	
	2	RO	Specification of Appl. Object 2	
	3	RO	Specification of Appl. Object 3	
	4	RO	Specification of Appl. Object 4	
	5	RO	Specification of Appl. Object 5	
	6	RO	Specification of Appl. Object 6	
	7	RO	Specification of Appl. Object 7	
*) Here only the highest bit can be changed to (de-)activate the PDO temporarily.				

Table 9 CAN: Overview of object directory, communication specific entries in the range of 0x1000 to 0x1FFF (part 2 of 2)

2.5.5.2 Manufacturer Specific Entries

Manufacturer specific entries from 0x2000				
Index	**Subindex**	**Access**	**Content**	**EEProm**
0x2000	0	RO	Number of Parameter	
	1	RW	Detect Level	✓
	2	RW	Offset Left	✓
	3	RW	Offset Center	✓
	4	RW	Offset Right	✓
0x2001	0	RO	Number of Parameter	
	1	RW	Node Baud rate	✓
	2	RW	Node Config	✓

Table 10 CAN: Overview of object directory, manufacturer specific entries from 0x2000

2.5.5.3 Standardized Device Profile Area

Standardized Device Profile Area 0x6000			
Index	**Subindex**	**Access**	**Content**
0x6000	0	RO	Number of 8 Bit Digital Inputs
	1	RO	System status
0x6400	0	RO	Number of 8 Bit analog Inputs
	1	RO	Analog Input XL
	2	RO	Analog Input XM
	3	RO	Analog Input XR
	4	RO	Analog Input SL
	5	RO	Analog Input DL
	6	RO	Analog Input SM
	7	RO	Analog Input DM
	8	RO	Analog Input SR
	9	RO	Analog Input DR

Table 11 CAN: Overview of object directory, standardized device profile area ab 0x6000

2.5.5.4 CANopen Object Dictionary

2.5.5.4.1 Device Type

Index	Subindex	Name	Type	Attr.	Map	Default	Meaning
0x1000	00	Device Type	unsigned 32	RO	No	0x00050191	Digital/analog inputs - DS 401

Table 12 CAN: Device Type

2.5.5.4.2 Error Register

Index	Subindex	Name	Type	Attr.	Map	Default	Meaning
0x1001	00	Error Register	unsigned 8	RO	No	0x00	Error register

Table 13 CAN: Error Register

Always returns 0 (no error)

2.5.5.4.3 COB-ID SYNC message

Index	Subindex	Name	Type	Attr.	Map	Default	Meaning
0x1005	00	COB-ID SYNC	unsigned 32	RO	No	0x80000080	Sync consumer, Sync ID = 0x80

Table 14 CAN: COB-ID SYNC message

2.5.5.4.4 Device Name

Index	Subindex	Name	Type	Attr.	Map	Default	Meaning
0x1008	00	Device Name	unsigned 8	RO	NO	3	Number of sub indexes
	01	Name 1	Vis.-String	RO	NO	„G_19“	„Name of the device“
	02	Name 2	Vis.-String	RO	NO	„334–“	
	03	Name 3	Vis.-String	RO	NO	„A “	

Table 15 CAN: Device Name

2.5.5.4.5 Hardware Version

Index	Subindex	Name	Type	Attr.	Map	Default	Meaning
0x1009	00	Hardware Version	Vis.-String	RO	NO	„A2“	„Version of the circuit board“

Table 16 CAN: Hardware Version

2.5.5.4.6 Software Version

Index	Subindex	Name	Type	Attr.	Map	Default	Meaning
0x100A	00	Software Version	Vis.-String	RO	NO	„1.00“	„Version of the controller firmware“

Table 17 CAN: Software Version

2.5.5.4.7 Save Parameter

Index	Sub Index	Name	Type	Attr.	Map	Default	Meaning
0x1010	00	Save Parameter	unsigned 8	RO	No	0x01	Number of sub indexes
	01	Save All	unsigned 32	RW	No	0x00000001	Save all is possible

Table 18 CAN: Save Parameter

By writing the signature „save“ in ASCII code (hex-Code: 0x65766173) or „evas“ (hex-Code: 0x73617665) on subindex 1 the current parameters are permanently stored. A successful saving process will be confirmed after 2 ms by the TxSDO (1st Byte = 0x60).

2.5.5.4.8 Restore Default Parameter

Index	Sub Index	Name	Type	Attr.	Map	Default	Meaning
0x1011	00	Restore Parameter	unsigned 8	RO	No	0x01	Number of sub indexes
	01	Restore All	unsigned 32	RW	No	0x00000001	Restore all is possible

Table 19 CAN: Restore Default Parameter

By writing the signature „load" in ASCII- Code (hex-Code: 0x64616F6C) or „daol" (hex-Code:0x6CdF6164 on sub index1 the corresponding default parameters are loaded. A reset is recommended. Additionally „Restore All“ sets the baud rate to 125 Kbaud.

2.5.5.4.9 Producer Heartbeat Time

Index	Sub Index	Name	Type	Attr.	Map	Default	Meaning
0x1017	00	Producer Heartbeat Time	unsigned 16	RW	No	1000	Heartbeat time in ms (approx.) 0, 10 ... 65535

Table 20 CAN: Producer Heartbeat Time

If 0 is entered for the time, this feature is disabled.

2.5.5.4.10 Identity Object

Index	Sub Index	Name	Type	Attr.	Map	Default	Meaning
0x1018	00	Identity Object	unsigned 8	RO	No	0x03	Number of sub indexes
	01	Vendor ID	unsigned 32	RO	No	0x00000202	Manufacturer number assigned by CiA
	02	Product Code	unsigned 32	RO	No	0x00019334	Name of the device
	03	Revision	unsigned 32	RO	No	0x00000001	Revision of the device

Table 21 CAN: Identity Object

2.5.5.4.11 Transmit PDO_1 Parameter

Index	Sub Index	Name	Type	Attr.	Map	Default	Meaning
0x1800	00	TxPDO_1 Parameter	unsigned 8	RO	No	0x04	Number of sub indexes
	01	COB ID	unsigned 32	RW	No	0x40000180 + Node-ID	PDO_1 valid, ID = 0x180 + Node-ID
	02	Transmis-sion Type	unsigned 8	RW	No	255	Asynchronous event controlled
	03	Inhibit Time	unsigned 16	RW	No	100	Shortest time period between two transmis-sions in multiples of 100 µs
	05	Event Time	unsigned 16	RW	No	10	Cycle time in ms

Table 22 CAN: Transmit PDO_1 Parameter

2.5.5.4.12 Transmit PDO_2 Parameter

Index	Sub Index	Name	Type	Attr.	Map	Default	Meaning
0x1801	00	TxPDO_2 Parameter	unsigned 8	RO	No	0x04	Number of sub indexes
	01	COB ID	unsigned 32	RW	No	0x40000280 + Node-ID	PDO_2 valid, ID = 0x280 + Node-ID
	02	Transmis-sion Type	unsigned 8	RW	No	255	Asynchronous event controlled
	03	Inhibit Time	unsigned 16	RW	No	100	Shortest time period between two transmis-sions in multiples of 100 µs
	05	Event Time	unsigned 16	RW	No	10	Cycle time in ms

Table 23 CAN: Transmit PDO_2 Parameter

2.5.5.4.13 Mapping TxPDO_1

Index	Sub Index	Name	Type	Attr.	Map	Default	Meaning
0x1A00	00	Number of mapped objects	unsigned 8	RO	No	0x04	Number of sub indexes
	01	1st mapped object	signed 8	RO	No	0x64000108	mapped to Index 0x6400,01 with 8 Bit length (XL)
	02	2nd mapped object	signed 8	RO	No	0x64000208	mapped to Index 0x6400,02 with 8 Bit length (XR)
	03	3rd mapped object	signed 8	RO	No	0x64000308	mapped to Index 0x6400,03 with 8 Bit length (XR)
	04	4th mapped object	unsigned 8	RO	No	0x60000108	mapped to Index 0x6000,01 with 8 Bit length (Sta-tus)

Table 24 CAN: Mapping TxPDO_1

2.5.5.4.14 Mapping TxPDO_2

Index	Sub Index	Name	Type	Attr.	Map	Default	Meaning
0x1A01	00	number of mapped objects	unsigned 8	RO	No	0x07	Number of sub indexes
	01	1st mapped object	unsigned 8	RO	No	0x64000408	mapped to Index 0x6400,04 with 8 Bit length (SL)
	02	2nd mapped object	signed 8	RO	No	0x64000508	mapped to Index 0x6400,05 with 8 Bit length (DL)
	03	3rd mapped object	unsigned 8	RO	No	0x64000608	mapped to Index 0x6400,06 with 8 Bit length (SM)
	04	4th mapped object	signed 8	RO	No	0x64000708	mapped to Index 0x6400,07 with 8 Bit length (DM)
	05	5th mapped object	unsigned 8	RO	No	0x64000808	mapped to Index 0x6400,08 with 8 Bit length (SR)
	06	6th mapped object	signed 8	RO	No	0x64000908	mapped to Index 0x6400,09 with 8 Bit length (DR)
	07	7th mapped object	unsigned 8	RO	No	0x60000108	mapped to Index 0x6000,01 with 8 Bit length (Status)

Table 25 CAN: Mapping TxPDO_2

2.5.5.4.15 Manufacture Parameter - Antenna Parameters

Index	Sub Index	Name	Type	Attr	Map	Default	Meaning
0x2000	00	number of parameter	unsigned 8	RO	No	0x04	Number of sub indexes
	01	Detect level	unsigned 8	RW	No	50	Detection threshold
	02	Offset left	signed 8	RW	No	0	Offset left system [mm]
	03	Offset center	signed 8	RW	No	0	Offset center system
	04	Offset right	signed 8	RW	No	0	Offset right system [mm]

Table 26 CAN: Manufacture parameter - antenna parameters

2.5.5.4.16 Manufacture Parameter - Node Parameters

Index	Sub Index	Name	Type	Attr.	Map	Default	Meaning
0x2001	00	Number of Parameter	unsigned 8	RO	No	0x02	Number of sub indexes
	01	Node Baud-rate	unsigned 8	RW	No	0x04	125 Kbaud *)
	02	Node Config	unsigned 8	RW	No	0x01	Start in state „operational“ **)

*)

Input/output value	Baud rate / kBaud
7	20
6	50
4 (Default)	125
3	250
2	500
1	800
0	1000

Table 27 CAN: Coding of the node baud rate

**)

Value	Meaning
xxxx.xxx0	Start in state „pre-operational“
xxxx.xxx1	Start in state „operational“

Table 28 CAN: Coding of the node config byte

Table 29 CAN: Manufacture parameters - node parameters

2.5.5.4.17 8 Bit Digital Input (transmitted in TxPDO 1)

Index	Sub Index	Name	Type	Attr.	Map	Default	Meaning
0x6000	00	number of 8 bit inputs	unsigned 8	RO	No	0x01	Number of 8 bit inputs
	01	8 bit digital input	unsigned 8	RO	Yes	./.	System status

Table 30 CAN: 8 Bit digital input (transmitted in TxPDO 1)

2.5.5.4.18 8 Bit Analog Inputs (transmitted in TxPDO 1 and TxPDO 2)

Index	Sub Index	Name	Type	Attr.	Map	Default	Meaning
0x6400	00	number of 8 bit analog inputs	unsigned 8	RO	No	0x09	Number of 8 bit analog inputs
	01	XL	signed 8	RO	Yes	./.	XL / TxPDO_1
	02	XM	signed 8	RO	Yes	./.	XM / TxPDO_1
	03	XR	signed 8	RO	Yes	./.	XR / TxPDO_1
	04	SUM_L	unsigned 8	RO	Yes	./.	SL / TxPDO_2
	05	DIF_L	signed 8	RO	Yes	./.	DL / TxPDO_2
	06	SUM_C	unsigned 8	RO	Yes	./.	SM / TxPDO_2
	07	DIF_C	signed 8	RO	Yes	./.	DM / TxPDO_2
	08	SUM_R	unsigned 8	RO	Yes	./.	SR / TxPDO_2
	09	DIF_R	signed 8	RO	Yes	./.	DR / TxPDO_2

Table 31 CAN: 16 Bit analog inputs (transmitted in TxPDO 1 and TxPDO 2)

2.6 Serial Communication via RS-232

Independently from the CAN bus interface the communication can be carried out through the built-in RS-232 interface. In order to do so a terminal program (e.g. Hyper-Terminal on MS Windows) using the following parameters is needed.

Interface parameters: Baud rate 38400 bits/second
8 Data bits, parity even, 1 stop bit
Protocol: Xon/Xoff

Terminal parameters: ANSI emulation

By default raw data is output when the device is turned on respectively the monitor mode is turned off. The update rate is 6 ms (the same as the output on the CAN bus interface). The serial telegrams have the following configuration:

Output byte	Data
1	Start character STX (ASCII 2)
2	Sum left system (1) high nibble
3	Sum left system (1) low nibble
4	Difference left system (1) high nibble
5	Difference left system (1) low nibble
6	Sum center system (2) high nibble
7	Sum center system (2) low nibble

Table 32 Configuration of the serial telegrams (part 1 of 2)

Output byte	Data
8	Difference center system (2) high nibble
9	Difference center system (2) low nibble
10	Sum right system (3) high nibble
11	Sum right system (3) low nibble
12	Difference right system (3) high nibble
13	Difference right system (3) low nibble
14	Detect signals and error message high nibble (see Table 33 below)
15	Detect signals and error message low nibble (see Table 33 below)
16	Deviation left system high nibble
17	Deviation left system low nibble
18	Deviation center system high nibble
19	Deviation center system low nibble
20	Deviation right system high nibble
21	Deviation right system low nibble
22	Check sum

Table 32 Configuration of the serial telegrams (part 2 of 2)

For detect signals and error message see Table 33 below.

Check sum: Nibble-wise addition of the output bytes 2 to 21 with final negation

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Error		System 1 left	System 1 right	System 2 left	System 2 right	System 3 left	System 3 right

Table 33 CAN: Detect signals and error messages

Example of a serial telegram

Start char. STX	Sum left		Difference left		Sum center		Difference center		Sum right		Difference right		Detect + error		Deviation left		Deviation center		Deviation right		Check sum
2	B	3	0	D	D	E	0	A	B	5	1	2	1	5	0	E	0	A	1	0	D

Table 34 Serial telegram (example)

Hexadecimal coding of the telegram content: 2B30DDE0AB512150E0A10D

Calculation of the check sum:

Nibble-wise addition of the output bytes 2 to 21:

B + 3 + 0 + D + D + E + 0 + A + B + 5 + 1 + 2 + 1 + 5 + 0 + E + 0 + A + 1 + 0 = 72

Negation: 72 ---> 8D

Check sum = **D**

3 Monitor Mode

The monitor mode is available via the serial interface. The Götting Adapter HG 01933ZA may be used to connect the guidance antenna to a PC. Alternatively you can use a self-made adapter (pin assignment of the serial interface: Table 3 on page 8 / interface parameters: s. 2.6 on page 21).

3.1 Switching to Monitor Mode

In order to switch to the monitor mode please follow the cycle shown below:

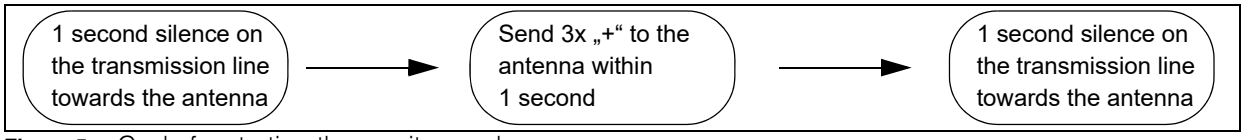

Figure 5 Cycle for starting the monitor mode

3.2 Terminal Program Display in Monitor Mode

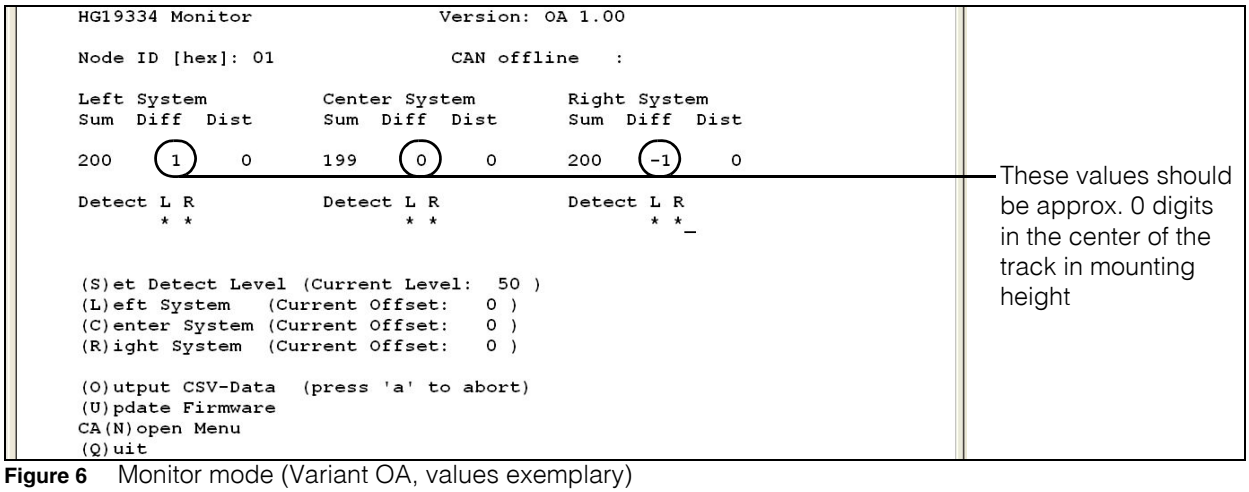

Figure 6 Monitor mode (Variant OA, values exemplary)

3.2.1 Commands in Monitor Mode

(S)et Detect Level — Set threshold for „Detect“.

(L)eft System
(C)enter System
(R)ight System
} Define individual offsets for each system.

(O)utput CSV-Data — Comma separated serial data output.

CAUTION! (U)pdate Firmware: **Flash memory is deleted!** New hex file has to be sent to the antenna as a text file.

CA(N)open Menu — CANopen® menu (see below).

(Q)uit — Quit monitor.

3.2.2 Commands in the CANopen® Menu

The CAN menu is structured as follows:

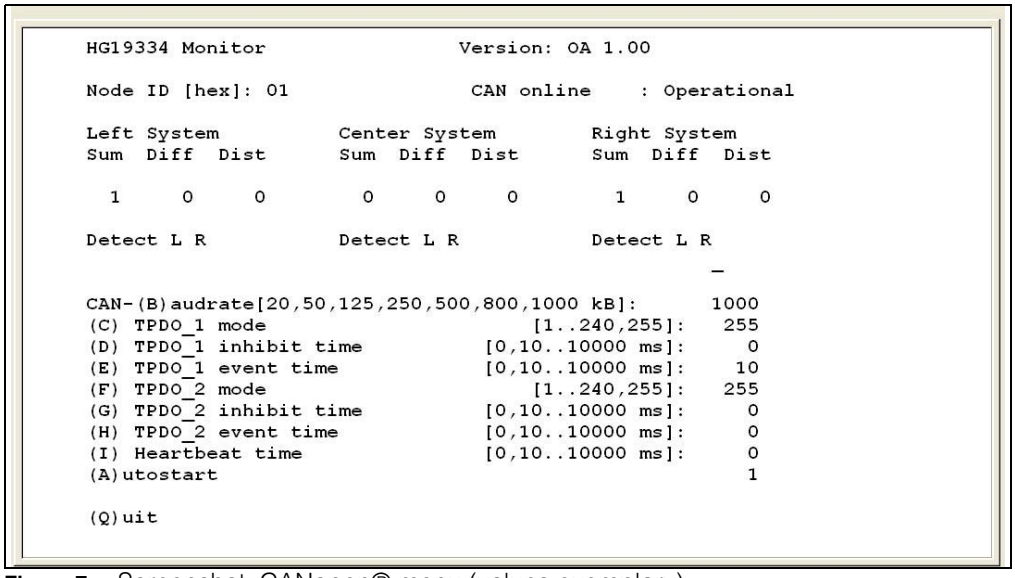

Figure 7 Screenshot: CANopen® menu (values exemplary)

In the second line the status of the CAN bus is displayed: `Bus online` changes to `Bus offline` if e.g. the bus is unplugged or switches to the BUSOFF state due to the lack of a terminator. In addition the `CAN open Node` states `stopped`, `preoperational` or `operational` are shown.

In this menu the following keys have a specific function:

- With B the listed baud rates can be chosen, the function autobaud is not implemented.
- C selects the `TPDO_1` operational mode. Choosing a value between 1 and 240 the synchronous, cyclical mode or with 255 the asynchronous mode can be picked. The following two entries are only available in the asynchronous mode:
  - D is the Inhibit time of `TPDO_1`. In `TPDO_1` the system status and the calculated distances will be transmitted. The inhibit time is the shortest feasible time interval between two successive transmissions.
  - E is the cycle time of the `TPDO_1` transmission. If both values are 0, `TPDO_1` will not be transmitted.
- With F the operational mode of `TPDO_2` can be chosen. Choosing a value between 1 and 240 the synchronous, cyclical mode or with 255 the asynchronous mode can be selected. The following 2 modes are only available in the asynchronous operation mode:
  - G is the Inhibit time of `TPDO_2`. In `PDO_2` the six analog antenna voltages and the system status are transmitted. The inhibit time is the shortest feasible time interval between two successive transmissions.

  - H is the cycle time of the TPDO_2 transmission. If both values are 0, TPDO_2 will not be transmitted.

- I changes the so-called Heartbeat time. This is the time interval in which a control message is sent. A value of 0 means that no control message will be sent.
- A (de)activates the autostart function.
  - If autostart is deactivated only the Bootup and the Heartbeat message (if activated) are sent after turning on the device. The mode of the device is preoperational.
  - If autostart is activated the Heartbeat message (if activated) and the PDOs are sent immediately after turning on the device. The mode of the device is operational.

4 Technical Data

4.1 Guidance Antenna

Guidance Antenna HG G-19334-A	
Casing	Glass-fibre reinforced (GRP) 4 mm aluminium mounting angle
Dimensions	See section A on page 27 in the appendix
Weight	approx. 750 g
Protection class	IP 65
Operating voltage range	18 to 30 V
Current consumption	130 mA
Interfaces	M12 circular plug-in connectors 5-pin
Relative humidity at 25° C	95 % (without condensation)
Operating temperature range	0 to +50° C
Storage temperature range	-20 to +70° C
Mounting height	approx. 35 mm above the energy loop

Table 35 Technical Data Guidance Antenna HG G-19334-A

4.2 Prerequisites of the Ground Installation

The stationary part of the inductive energy transmission has to match the following prerequisites:

Prerequisites	Version				
	JA	OA	RA	XA	YA
Operating frequency of the inductive energy transmission	20 kHz	20 kHz	20 kHz	25 kHz	25 kHz
Distance of the twin conductor	80 mm	100 mm	100 mm	140 mm	140 mm
Conductor current of the inductive energy transmission	75 A	75 A	125 A	60 A	85 A

Table 36 Prerequisites of the Ground Installation

5 Appendix

A Casing Dimensions of the different Versions including the Mounting Angle

A.1 HG 19334JA

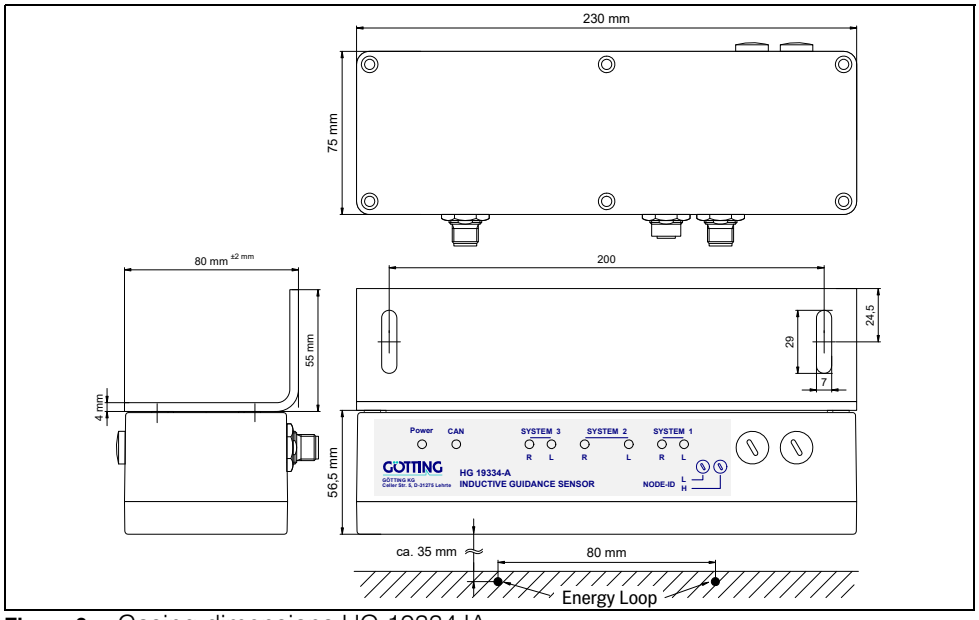

Figure 8 Casing dimensions HG 19334JA

A.2 HG 19334OA / HG 19334RA

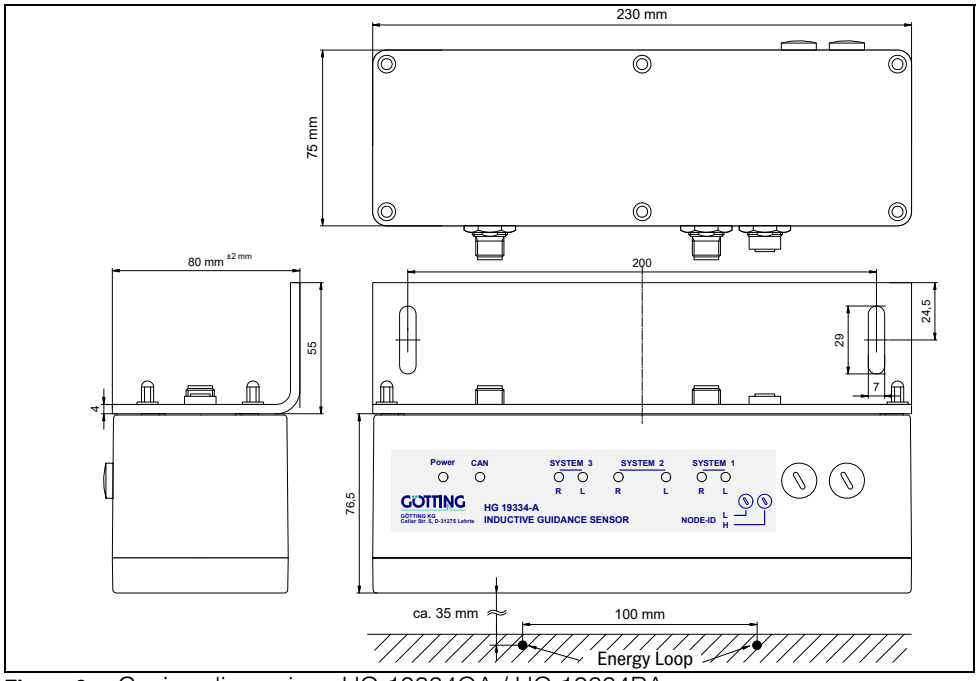

Figure 9 Casing dimensions HG 19334OA / HG 19334RA

A.3 HG 19334XA

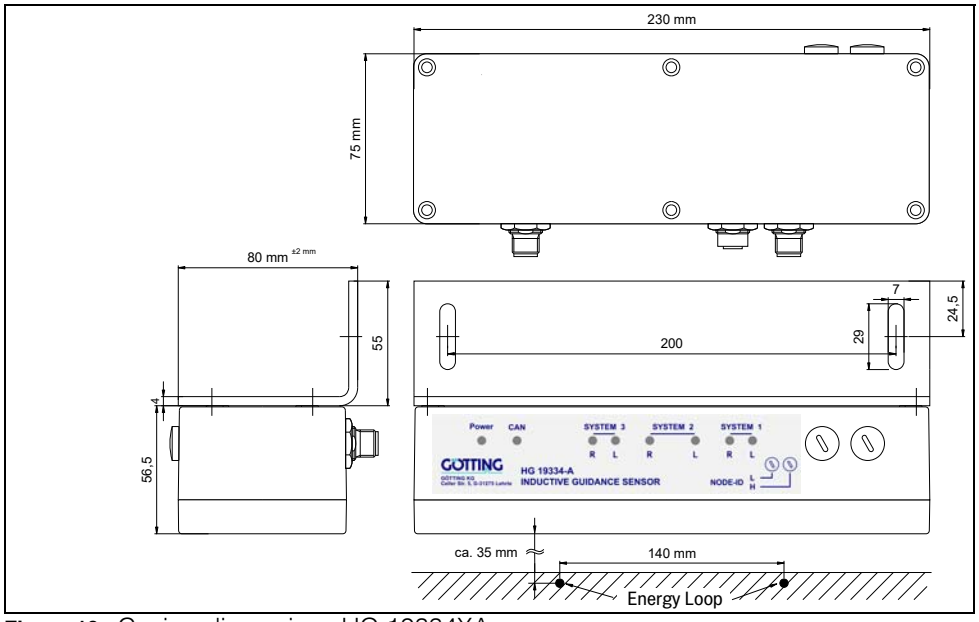

Figure 10 Casing dimensions HG 19334XA

A.4 HG 19334YA

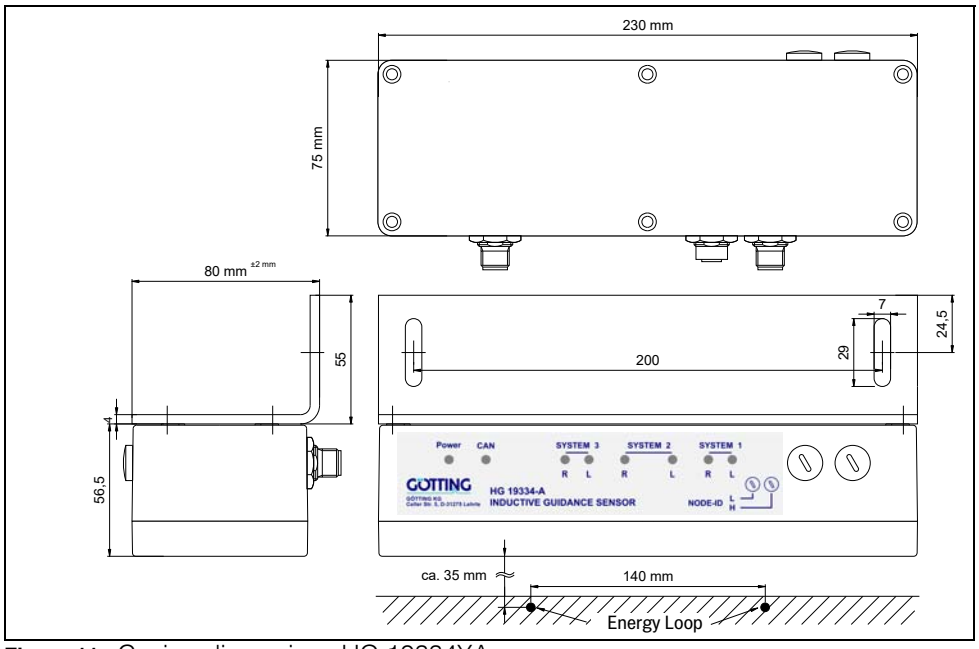

Figure 11 Casing dimensions HG 19334YA

B Electronic Data Sheet (EDS-File)

You can download the latest version of the so-called EDS file for the configuration of the CAN bus interface from our homepage: http://www.goetting-agv.com/components/19334.

6 List of Figures

7 List of Tables

List of Tables

8 Handbook Basics

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 programs, the corresponding [K]eys 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.

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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.

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