

Frequency Generator

HG 57500-C

& Accessory 19" Racks HG 93160-A/HG 93161-A

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1 Introduction

Figure 1 Photo of the frequency generator

The frequency generator HG 57500-C generates an AC current in a conductive loop for track guiding Automated Guided Vehicles (AGV). The board in Eurocard format hosts two independent generators with power amplifiers and a transformer for dc-de-coupling. Therefore the loop current is separately adjustable and is set to a fixed output level. Short circuit and circuit breaks will be detected and indicated by the LEDs on the front panel (see section 2.7 on page 7).

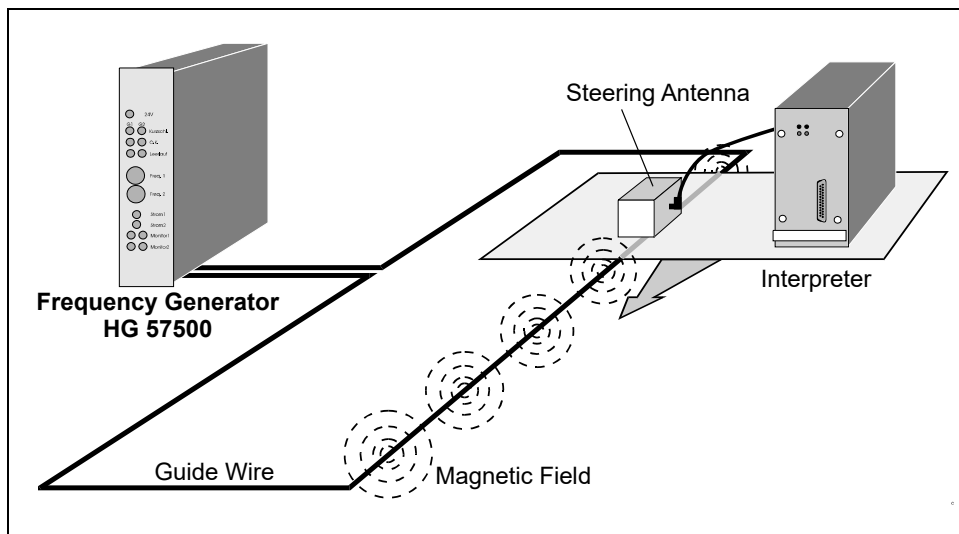
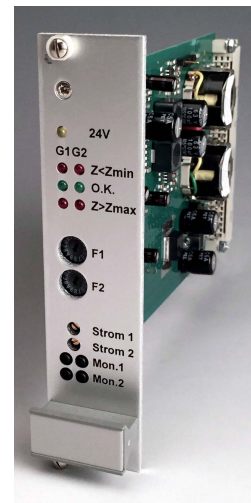


Figure 2 Functional principle: Track guidance system with frequency generator

2 Frequency Generator (dual-channel)

2.1 Variants / Frequency Tuning

The frequency generator exists in different variants that can be distinguished by looking at the next to last position in the product number, e.g. HG 57500YD. For all variants the frequencies of the generators 1 and 2 can be selected either via two internal HEX switches on the front plate or externally via the frequency select pins of the 32 pin connector (see Table 6 on page 13).

NOTE! When using the internal HEX switch the frequency select inputs have to be set to 0, when using the frequency select inputs the HEX switches have to be turned to 0.



The levels for these inputs are defined as follows (the input impedance is approx. 10 kOhm):

- log. 0/Zero 0 Volt or open
- log. 1/One approx. 24 Volt

HEX Switch	Freq. Sel. Inputs				Frequency [Hz]								
	F8	F4	F2	F1	57500PD	57500RD	57500SD	57500UD	57500VD	57500WD	57500XD	57500YD	57500ZD
0	0	0	0	0	2412	0	4700	5500	5500	4096	4000	1	1
1	0	0	0	1	3108	5000	5100	6250	6250	6554	6000	5000	5000
2	0	0	1	0	4040	5710	5500	7000	7000	10923	8000	5100	5100
3	0	0	1	1	5213	6670	5700	8400	8400	16384	10000	5200	5200
4	0	1	0	0	6216	8000	6300	10100	10100	26214	16000	5700	5700
5	0	1	0	1	5000	8890	7000	12200	12200	16000	26000	6000	6000
6	0	1	1	0	5100	10000	7800	15200	15200	17000	4700	6300	6300
7	0	1	1	1	5700	11430	8400	18100	5700	18000	5100	6500	6500
8	1	0	0	0	6000	13300	9000	22600	7000	19000	5700	7000	7000
9	1	0	0	1	6300	16000	10000	26700	7500	20000	7000	7500	7500
A	1	0	1	0	7000	20000	10100	8333	7800	21000	7500	7800	7800
B	1	0	1	1	7800	0	12000	26700	8000	22000	7800	8000	8000
C	1	1	0	0	8000	0	12200	26700	8500	23000	8000	8500	8500
D	1	1	0	1	9000	0	15200	26700	9000	24000	8500	9000	9000
E	1	1	1	0	10000	0	18100	26700	9500	25000	9000	9500	9500
F	1	1	1	1	12000	0	26700	22600	10000	26000	9500	10000	10000
Loop current long [mA]					100	100	100	100	100	100	100	30	100
Loop current short [mA]					200	200	200	200	200	200	200	50	200


Table 1 Variants / frequency selection

2.2 Jumper

On the circuit board of the generator there are two jumpers that have the following functions:


Figure 3 Position of the jumpers

2.2.1 Jumper J3 (Generator 1)

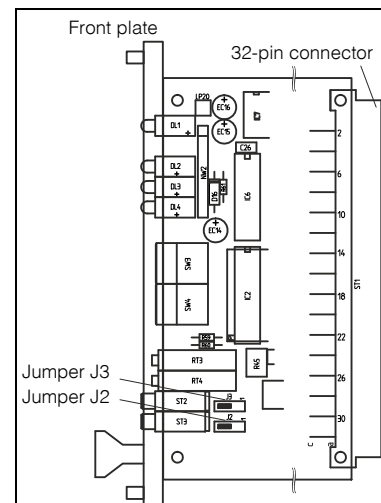
 Via Pin 12a and 18a of the 32-pin connector the current of generator 1 can be measured (1 Ω resistance)

 Via Pin 18a generator 1 can be externally switched off

2.2.2 Jumper J2 (Generator 2)

 Via Pin 12c and 18c of the 32-pin connector the current of generator 2 can be measured (1 Ω resistance)

 Via Pin 18c generator 2 can be externally switched off



2.3 Synchronization

If both generators on one card are set to the same frequency then the frequencies are generated synchronously and in phase.

2.4 Loop Current and Impedance

Long loop: Impedance 0 to 100 Ohm

Short loop: Impedance 0 to 30 Ohm

In short loops the loop current may be up to 200 mA_{eff}. For long loops the maximum current amounts to 100 mA_{eff}. The distinction between long and short loops does not refer to the actual length but to the selected connectors.

For loop currents up to 100 mA_{eff} loops of any length up to an impedance of 100 Ohm can be connected to the outputs „Loop closure long“ and „Loop start“.

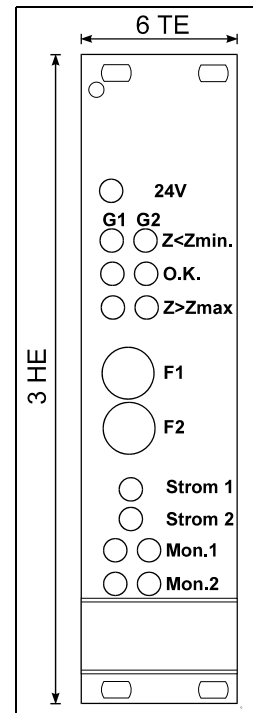
For currents higher than 100 mA_{eff} the outputs „Loop closure short“ and „Loop start“ are to be used. In this case the maximum impedance for a current of 200 mA_{eff} is 30 Ohm.

For load impedances higher than 100 Ohm the inductive reactive component can be balanced by a capacitor which has to be assembled on the board. In this case the loop must be connected to the output „loop closure long balanced“. The capacity of the capacitor has to be determined separately for each application.

2.5 Front Panel Elements / LEDs

Figure 4 Front panel HG 57500-C

- LED 24V Shows operating voltage
- LED Z<Zmin Short circuit or load impedance too low (generator 1/2)
- LED O.K. Correct load impedance (generator 1/2)
- LED Z>Zmax Breach of wire or load impedance too high (generator 1/2)
- F1, F2 Frequency selection (generator 1/2)
- Strom 1, 2 Loop current adjustment via potentiometers (generator 1/2)
- Mon.1, 2 Test sockets for loop current adjustment (generator 1/2)



2.6 Loop Current Adjustment

An AC voltage measuring unit is to be connected to each test socket on the front panel. This measures the voltage drop of the conductor current over a 1 Ohm resistance. Therefore the device has to have an AC range from 0 to 200 mV for currents to be set from 0 to 200 mA and a frequency range higher than 10 kHz. The current can be adjusted separately at the corresponding spindle potentiometer for each generator with a small screw driver.

2.7 Short Circuit or Loop Breakage

Low load impedances are indicated by the red LED „Z< Zmin. Contact resistances in terminal boxes add to the overall impedance in such a way that short circuits within the application may not be detected. High load impedances will be detected as an interruption and are indicated by the red LED „Z>Zmax“. Within the normal load range the green LED shows „O.K.“. The detection area depends on the outputs selected as well as on the current adjusted.

Load impedance range for connections to the loop closure:

LED	short (I = 200 mA)	long (I = 100 mA)
LED Z<Zmin	-----	0 to 3 Ohm
LED O.K.	1 to 30 Ohm	3 to 100 Ohm
LED Z>Zmax	> 30 Ohm	> 100 Ohm

Table 2 Load impedance ranges

2.8 Stacking

The frequency generator is capable of stacking, that means that both generators can be connected in series. The precondition is that both generators are set to the same frequency. With stacking a loop can be fed with double impedance.

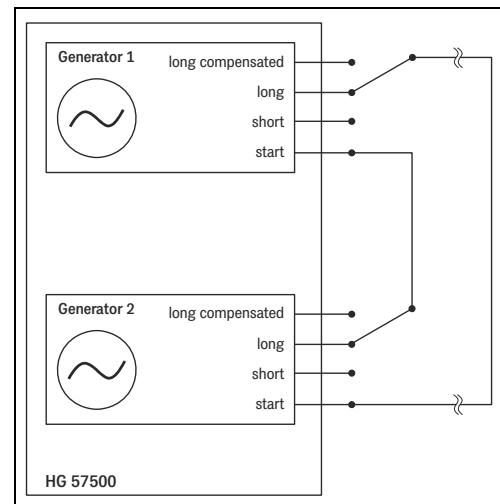
Please follow the sequence shown below when using stacking:

Figure 5 Stacking (example)

1. Set both generators to the same frequency.
2. Set both generators to the same current with the same load.
3. Connect the generators in series (connect loop start generator 1 to loop end generator 2 long, long compensated or short).
4. Close the loop by connecting the remaining pins loop start generator 2 and loop end generator 1 long, long compensated or short..

While doing so loop ends long and short may not be mixed, long and long compensated may be mixed.

5. The output voltage of the stacked arrangement can be between 2 and 23 V_{eff} for the connection „loop long“ and between 1 and 12 V_{eff} for the connection „loop short“. In these areas the green OK LEDs are lit for both generators independently from the set current.



3 Optional Accessory

3.1 Racks HG 93160-A and HG 93161-A

The 19" rack (Backplane) **HG 93160-A** is capable of holding **a power supply unit** type Vero PK 120 24V / 5A and a maximum of five dual-track guidance generators type HG 57500. Rack **HG 93161-A** on the other side provides **no power supply unit** as it is fed by 24 V DC. Of the rack HG 93161-A two versions are available able to carry 5 resp. 3 HG 57500. On the backplanes of all racks connectors for power supply and all connectors required for the track guidance loops are available as listed below.

3.2 Terminal Connection Plan

Supply Voltage			
HG 93160-A		HG 93161-A	
Terminal	Function	Terminal	Function
L	Phase 230 V AC	–	0 V DC
N	Neutral conductor	+	+24 V DC
PE	PE conductor		

Table 3 Supply connections HG 93160-A/HG 93161-A

Generator connection (10-times per rack)	
Terminal	Function
1	Fault signaling output, Relay Changer: opening contact
2	Fault signaling output, Relay Changer: middle contact
3	Fault signaling output, Relay Changer: closing contact
4	Remote off, input: + 24 V DC → generator off
5	Remote off, input: ground
6	Guidance loop: end
7	Guidance loop: start – short (50 / 200 mA)
8	Guidance loop: start – long (30/100 mA)

Table 4 Generator connections HG 93160-A/HG 93161ZA

3.2.1 LEDs on the Backplane

The red LEDs on the terminal blocks indicate if the particular generator outputs a signal (LED off) or if no signal is output (LED on). This is also an indication of the remote off function.

3.2.2 Labeling of Terminal Blocks

Example for the labeling of terminal blocks:

- G2-1 The first number indicates the slot 2 of the rack, the second number the generator 1 of this slot.

3.3 Dimensions HG 93160-A

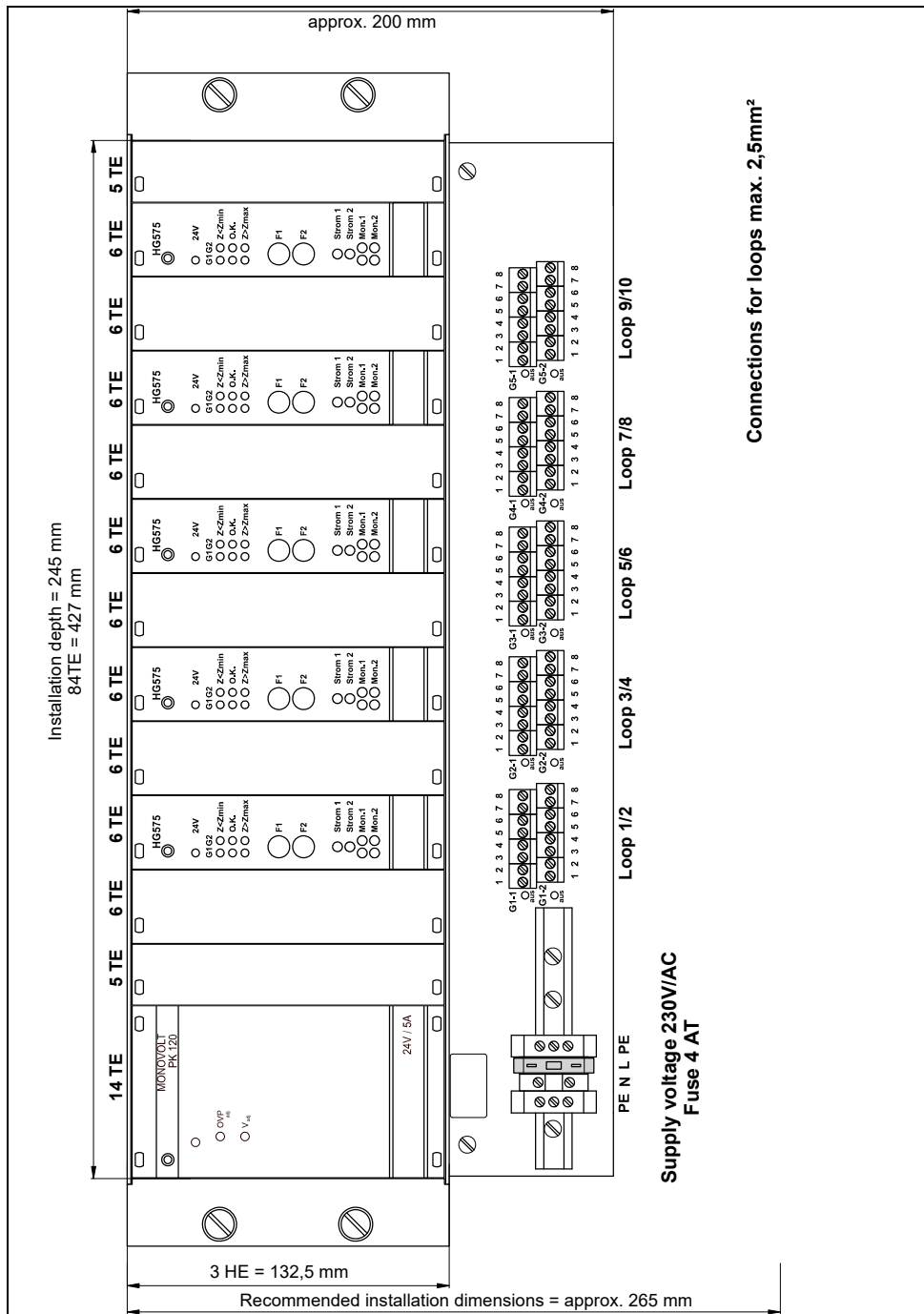


Figure 6 Drawing of rack HG 93160-A with dimensions

3.4 Dimensions HG 93161-A

The rack HG 93161-A is available in two variants whose dimensions are shown below:

1. Variant HG 93161YA for 3 HG 57500
2. Variant HG 93161ZA for 5 HG 57500

3.4.1 HG 93161YA (for 3 HG 57500)

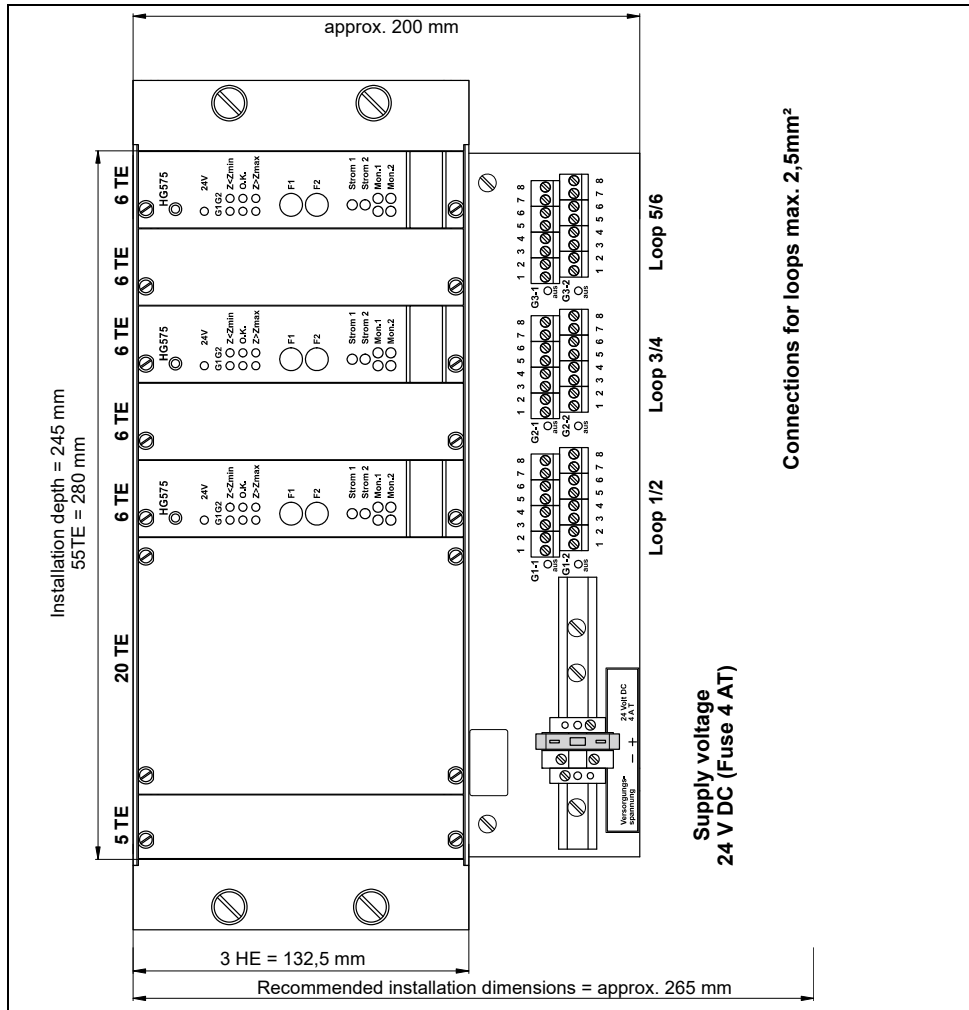


Figure 7 Drawing of rack HG 93160YA (3 HG 57500) with dimensions

3.4.2 HG 93161ZA (for 5 HG 57500)

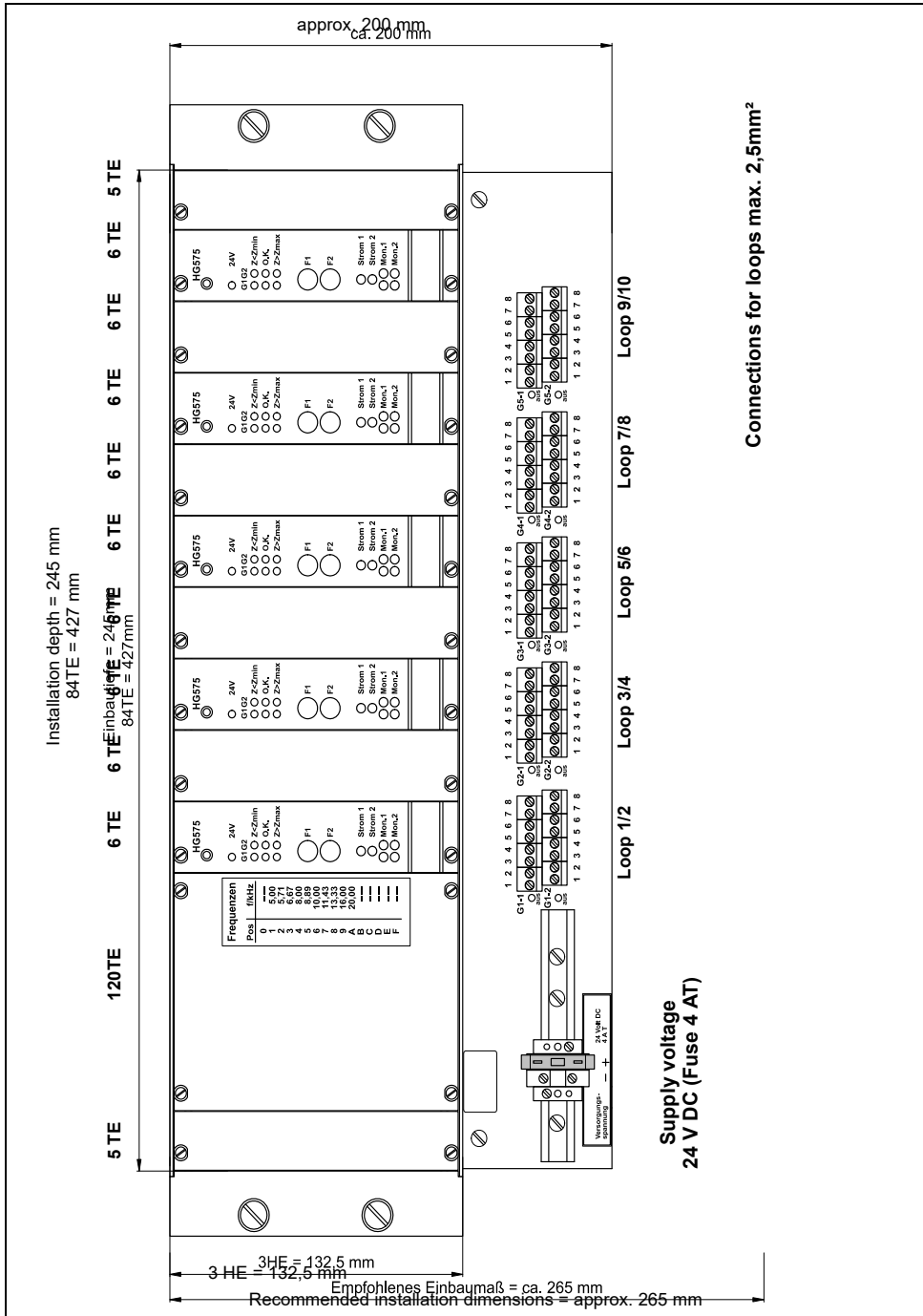


Figure 8 Drawing of rack HG 93161ZA (for 5 HG 57500) with dimensions

4 Appendix

A Technical Data

Technical Data Frequency Generator	
Supply voltage	24 V \pm 5 %
Current consumption	Less than 0,3 A both channels loaded
Load impedance	0 to 100 Ohm on 100 mA connector long 0 to 30 Ohm on 200 mA connector short
Output current	max. 100 mA connector long, max. 200 mA connector short
Environmental temperature	- Operation: 0 to 50 °C - Storage: 0 to 70 °C
Output frequency	See frequency tuning in Table 1 on page 5, upon request user-defined within the range of 4 to 26 kHz, resolution 1 Hz
Frequency deviation	better than 0,02 % crystal controlled

Table 5 Technical Data

B Connector allocation according to DIN 41612 Construction C, 32-pin, AC assembled

Generator 1	Generator 2	Function
2a, 4a	2c, 4c	Loop end long – less than 100 Ohm up to 100 mA
6a, 8a, 10a	6c, 8c, 10c	Loop end short – less than 30 Ohm up to 200 mA
12a	12c	Loop start
14a, 16a	14c, 16c	Loop end long – compensated
18a	18c	Adjustable via jumper (see section 2.2 on page 6)
20a	20c	Ground Supply
22a	22c	+24V Supply
24a	24c	Frequency Selection 8
26a	26c	Frequency Selection 4
28a	28c	Frequency Selection 2
30a	30c	Frequency Selection 1
32a	32c	Fault Signalling Output

Table 6 Connector allocation Generator 1 and 2

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7 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**ey combinations 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.



8 Copyright and Terms of Liability

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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.

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