MARKOM MICROWAVES

MG25-1500BU GENERATOR
with additional equipment

Short manual

2024

Siemianowice, Poland

1 APPLICATIONS

In most materials, microwaves cause a very rapid increase in temperature. This applies to both inanimate matter and living organisms. An important characteristic of microwaves is their ability to penetrate deeply into the structure of a material. Therefore, they interact with both its surface and deeper layers. As a result, the material is heated almost uniformly throughout its entire cross-section.

MG25-1500BU is a portable set designed for performing specialized tasks and services, where other methods are ineffective or cannot be applied. The presented version of the *Microwave Generator* is most commonly used for:

- eliminating wood pests in building structures, roof trusses, furniture, and historical elements,
- drying foundations, walls, and building structures made of brick, stone, concrete, wood, etc.

Additional equipment facilitates performing services in hard-to-reach or high locations. The ***MG25-1500BU*** *Generator* is designed for operation in:"

- multi-family residential buildings (apartment blocks, terraced houses),
- single-family houses,
- industrial facilities (production halls, stores),,
- office buildings (offices, conference rooms),
- hotels, motels, inns,
- farm buildings (barns, stables, granaries, threshing barns),
- warehouses, sheds,
- sacred buildings (churches, temples, chapels),
- historical buildings (castles, palaces, manor houses),
- public utility buildings (schools, hospitals).

These are just selected examples of applications; it is up to the user to decide where and how to use our devices.

2 MG25-1500BU MICROWAVE GENERATOR

2.1 Technical data

The *Microwave Generator* is the main component of the ***MG25-1500BU*** set.
The *Generator* is the actuating component, whose main task is to deliver microwave energy to the selected location.
It can operate as a standalone device "SINGLE" or in a system of two devices simultaneously "DOUBLE". The information in the table *TECHNICAL DATA* refers to a single ***MG25-1500BU*** *Generator* "SINGLE". Data concerning the system of two cooperating *Generators* is labeled as "DOUBLE".

TECHNICAL DATA

Frequency of operation	2450 ±50 MHz
Output power *Single* Output power *Double*	max. 1500 W max. 2 x 1500 W
Regulation and control	power and operating time; HMI touchscreen panel
Power regulation	from 400 to 1500 W
Microwave output	open waveguide; standard WR340
Supply voltage *Single* Supply voltage *Double*	1 x 230 V 50 Hz 3 x 400 V 50 Hz
Power consumption from the network	max. 8 A
Power supply protection	slow blow fuse; 10 A
Cooling	forced air circulation; ≈ 400 m^3/h
Noise level	max. 65 dB
Hazard warning	red warning light
Degree of protection	IP33
Microwave generator dimensions	≈ 40 x 30 x 28 cm
Microwave generator weight	≈ 9 kg
Power cable *Single* Power cable *Double*	3 x 1,5 mm^2; 3 m 3 x 2,5 mm^2; 3 m
Cable to the generator	hybrid (3 x 2,5 + FTP); 10 m
Cable connecting generators *Double*	hybrid (3 x 2,5 + FTP); 2 m
Cable to the control panel	FTP cat.7; 5 m
Mains power plug *Single*	CEE 7/4
Mains power plug *Double*	CEE 32
Power – supply and control connectors	industrial; 10 PIN
Control panel connector	M12, industrial

2.2 Construction

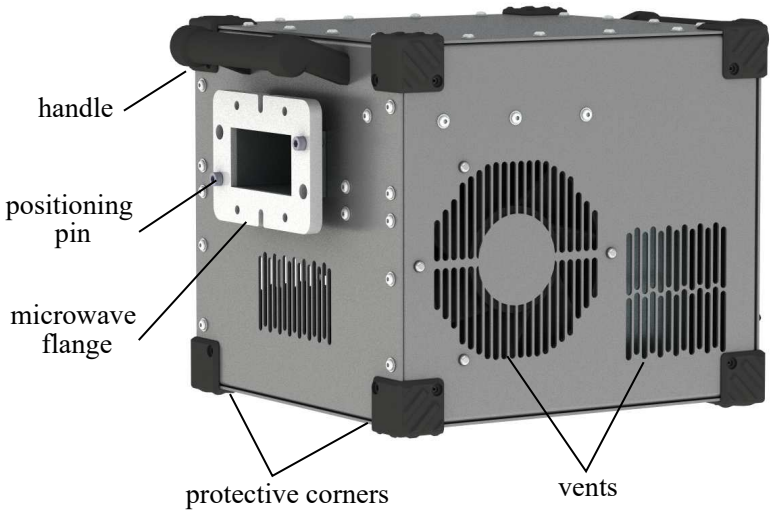
The generator's construction is self-supporting, ensuring adequate stiffness and mechanical strength. All components of the metal structure are made of aluminum, which reduces the weight of the device and minimizes corrosion. The casing is powder-coated, with the standard color being RAL9006.

Plastic corners protect the device's edges and prevent injury. The *Generators* can be stacked on top of each other. Grooves in the corners limit the possibility of them sliding against each other. However, in this configuration, the *Generators* are not permanently connected.

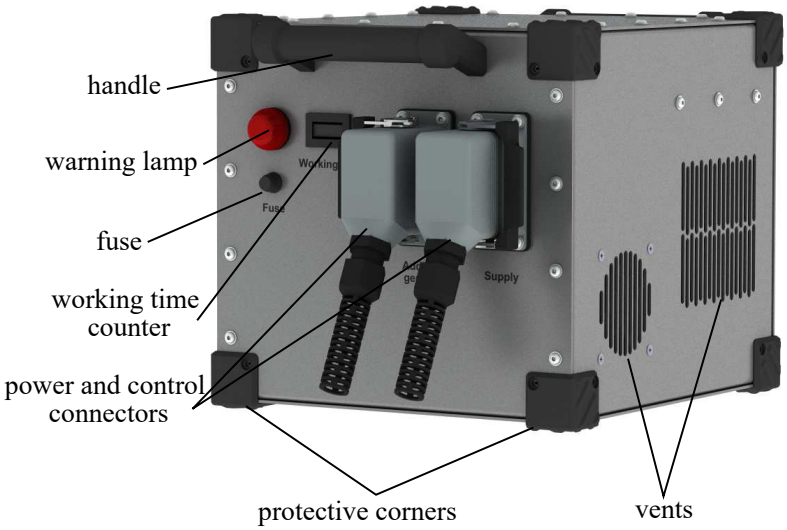
The ***MG25-1500BU*** is equipped with ergonomic handle brackets for easy transportation.

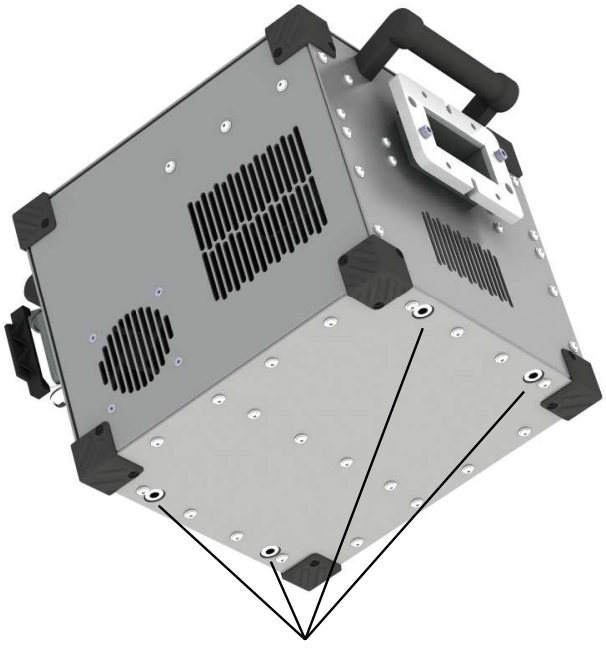
The microwave flange allows for the attachment of passive microwave components (radiator and waveguides) using two eccentric clamps. This is described in more detail in another section of the manual.

A series of ventilation holes ensure an adequately large airflow to cool the internal systems of the *Generator*. Wentylator magnetronu uruchamiany jest po podłączeniu zasilania. he magnetron fan is activated when the power supply is connected. The power supply fan starts operating as soon as the *Microwave Generation* system is turned on.



On the rear panel of the generator's casing, there are: a multi-pin industrial socket, a warning light, and an operating time counter. The industrial socket is used to connect the cable from the control panel. When the microwave generation system is activated, the warning light turns on. The operating time counter displays the number of hours the device has been in operation since it was manufactured. The counter is not resettable.





The bottom of the device features four mounting points — threaded M8 holes. These allow the *Generator* to be screwed onto the *Mounting platform* on the *Lifter*.

3 CONTROL PANEL

The operation of the ***MG25-1500BU*** *Generators* is controlled using an FTP cable and communication according to the RS-485 standard.
A 5-meter long FTP cable is routed through a conduit from the *Control Panel* and connected to the *Distribution Box* using an M12 connector.
The *Control Panel* can operate simultaneously with two *Generators*, provided that one *Generator* has port #1 and the other *Generator* has port #2.

The most important component of the control system is the touchscreen. It is divided into two sections: “Microwave power” and “Timer”.

3.1 Microwave power adjustment

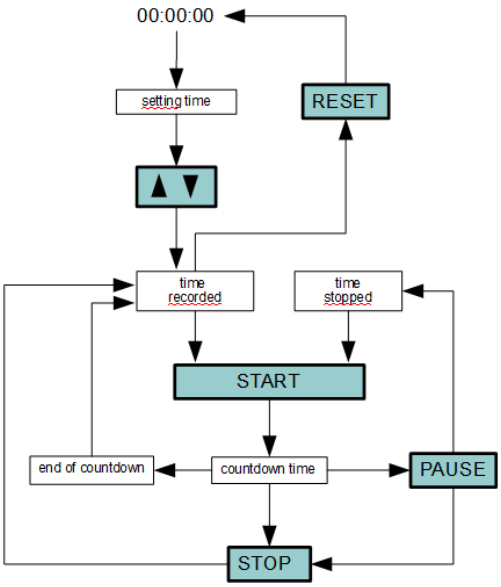
The ***MG25-1500BU*** *Generator* is equipped with a system for continuous microwave power adjustment. When two *Generators* are connected in series, both will operate at the same power level. The microwave power adjustment is controlled by the magnetron power supply system SMPS (*Switch Mode Power Supply*). Information is transmitted to the *Generator* from the *Control Panel* using the Modbus communication protocol.

3.1.1 Power setting

When the power is turned on, the microwave power is automatically set to 400 W. The user can adjust the value to any level within the range of 400 to 1500 W.
Microwave power can be adjusted regardless of whether the microwave system is on or off.

3.2 Timer

The ***MG25-1500BU*** is equipped with a system for programming the operation time of the *Generator*. If two *Generators* are connected in series, the same operation time is set for both.
On the touchscreen of the *Control Panel*, there is a designated "TIMER" section. This allows the user to program the operation time of the microwave system within the range from 00:00:01 to 09:59:59 (from 1 second to 10 hours).
Once the programmed time has elapsed, the microwave system will be turned off.



3.2.1 Time programming

When the power is connected, the clock is set to **00:00:00**.
During programming, the clock displays the currently set time.
Three seconds after programming, the set value will be automatically saved and stored in the register. The time settings can be changed as many times as needed. Each change to the time resets the previous setting and saves the new value.
Turning off the power erases all previous settings.

3.2.2 Control buttons

START
After programming the time, pressing the **START** button will activate the microwave system, and the clock will start counting down. The operation of the microwave system can be stopped by pressing **STOP** or **PAUSE**.
Once the programmed time has elapsed, the microwave system will be automatically turned off. The clock will be set to the last programmed value. The TIMER will await further actions from the User.

STOP
During the operation of the microwave system, its work can be stopped at any time by pressing the **STOP** button. The clock will stop and revert to the last programmed value. The TIMER will await further actions from the User.

PAUSE
During the operation of the microwave system, the **PAUSE** button can be pressed at any

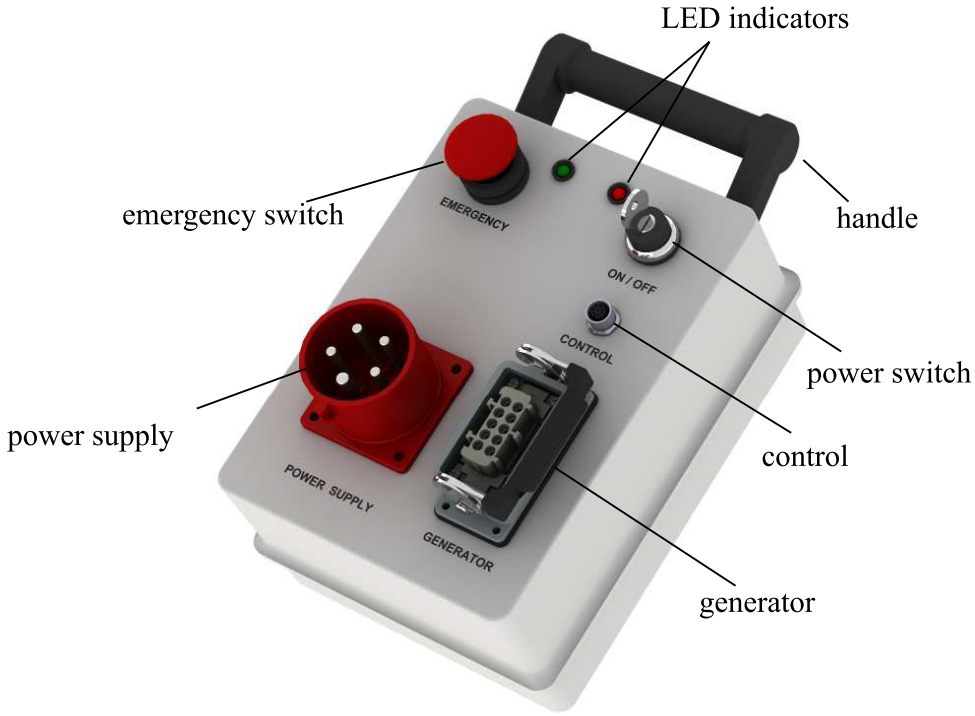
time. The microwave system will be turned off, and the clock will be paused at the currently displayed value. The TIMER will await further actions from the User.
After pressing the **START** button, the microwave system will resume operation, and the clock will start counting down from where it was paused. If the **STOP** button is pressed, the microwave system will **remain off**, and the clock will reset to the last programmed value. The TIMER will await further actions from the User.

RESET
Pressing the **RESET** button will set the clock to **00:00:00**, and any previous time settings will be erased. arrows will become active. The TIMER will await time programming.

4 DISTRIBUTION BOX

4.1 Description of components

The ***MG25-1500BU*** *Generator* is equipped with a *Distribuion Box*, to which all circuits and signals are routed. From there, the power supply voltages are distributed, and the control transmission for the *Generators* is transmitted. The casing is made of ABS plastic.



The power supply is routed to a 3-phase 32A connector.
The ***MG25-1500BU*** *Generator* is connected to the industrial connector.
The *Control panel* is connected to the control socket, type M12..
The power switch with a removable key activates the power supply to the *Generators*.
The emergency switch is used to disconnect the power supply in case of emergency.
When the cable is connected to the power network, the green indicator light turns on.
After turning the key, the red LED indicator lights up, signaling that power has been supplied to the *Generators*.
The foldable handle facilitates the transportation of the *Distribution Box*.

4.2 Power supply

The ***MG25-1500BU*** *Generator* is powered from a single-phase 230 VAC 50 Hz electrical network. A single *Generator*can be supplied from a network with a three-wire cable (“L”, “N” and “PE”), each with a cross-sectional area of at least 1,5mm^2 (AWG15). The ***MG25-1500BU*** can be connected to a typical household socket. It is important that the socket is equipped with

a grounding pin (earth pin). The power line supplying the household socket should be protected by a fuse (circuit breaker) with a rating of $\geq$ 10A.
The *Distribution Box* can be connected to a single-phase 1 x 230 VAC network or a three-phase 3 x 400 VAC network. This is made possible by the two types of power cables supplied with the *Generator*. These cables are connected to the "Power supply" network connector. The internal wiring system will ensure proper power supply to the ***MG25-1500BU*** *Generator* in each of these cases.

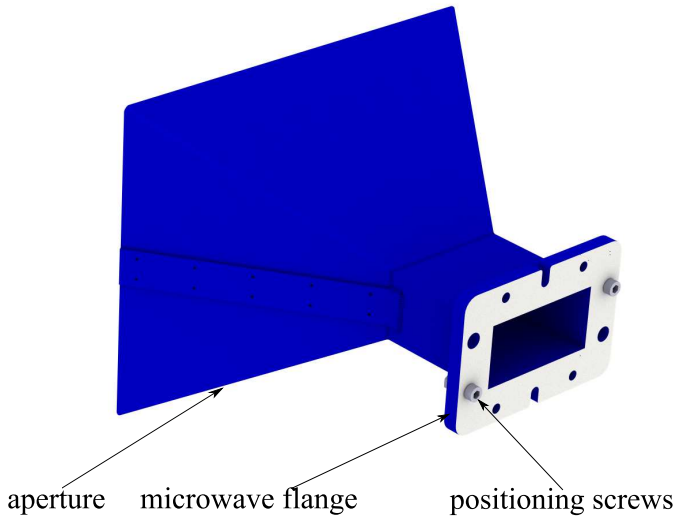
5 RADIATOR AND WAVEGUIDES

5.1 MR13-006BU radiator

The *MR13-006BURadiator* is a standard component of the ***MG25-1500BU*** *Generator*.
Its purpose is to focus and direct microwave energy in a selected direction.
The *Radiator and Generator* have compatible microwave flanges. The flanges are equipped with positioning screws, which facilitate the correct alignment of the flanges.
The flanges are connected without the use of tools, using eccentric clamps. The appropriate clamps are included with the *Radiator*.

SPECIFICATION OF THE RADIATOR

Operating Frequency	2450 ±50 MHz
Inpou power	max. 3000 W
Radiator dimensions	230 x 290 x 218 mm
Aperture dimensions	284 x 215 mm
Microwave input	WR340 waveguide and flange
Weight	0,5 kg



5.2 Waveguides

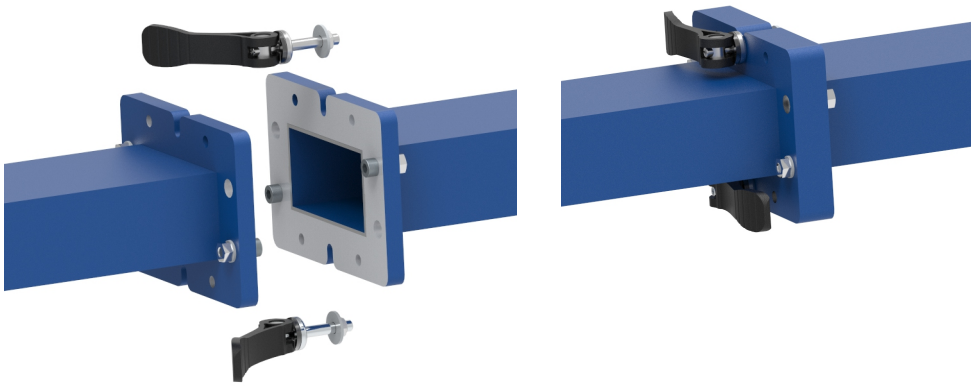
A *Waveguide* is a metal profile, typically with a rectangular cross-section, through which microwaves are transmitted with minimal loss. In the ***MG25-1500BU*** *Generator*, *Waveguides* compliant with the WR340 standard are used.

At the ends of each *Waveguide*, there are microwave flanges. Thanks to these flanges, *Waveguides* can be connected to the ***MG25-1500BU*** *Generator*, *MR13-006BURadiator*, or other *Waveguides* in any configuration. *Waveguides* are divided into straight and angular (bent) types.

Straight waveguides are sections of rectangular profiles with flanges at both ends. The length of the *straight waveguides* offered by **MARKOM** is a multiple of the wavelength λ. The catalog data provides the length rounded, e.g., 0.5 m lub 1.0 m.
Angular waveguides (bent) are profiles with a rectangular cross-section, bent at angles of 30, 45, or 90 degrees, in the “E” or “H” plane.
The ends of the *angled waveguides* have appropriate mounting flanges.

5.3 Microwave flange

Each passive element (*Waveguide, Radiator*) has flanges of the same type.
The method developed by **MARKOM** allows the flanges to be connected without the use of tools. The relative position of the flanges is determined by centering pins. Once the flanges are assembled, two eccentric clamps are inserted into the profiled slots. After tightening them, the flanges are securely pressed together. The connection is also mechanically durable. This method of connection is particularly useful in situations where *Waveguides* are frequently changed.



6 MOUNTING BEAM

To place the ***MG25-1500BU*** *Generator* in high locations, lifters are used. The lifter must be equipped with a mechanical system for mounting and tilting the *Generator*. This system is an additional accessory – the *Mounting beam*.

6.1 Tilting mechanism

An important component of the entire system is the mechanism that allows the adjustment of the tilt angle around the *X* and *Y* axes. This mechanism is mounted to the base. The tilting capability is provided by two gearboxes connected by brackets. To manually set the desired tilt angle, the appropriate *Rotary wheel* should be used.

6.2 Platform with trolley

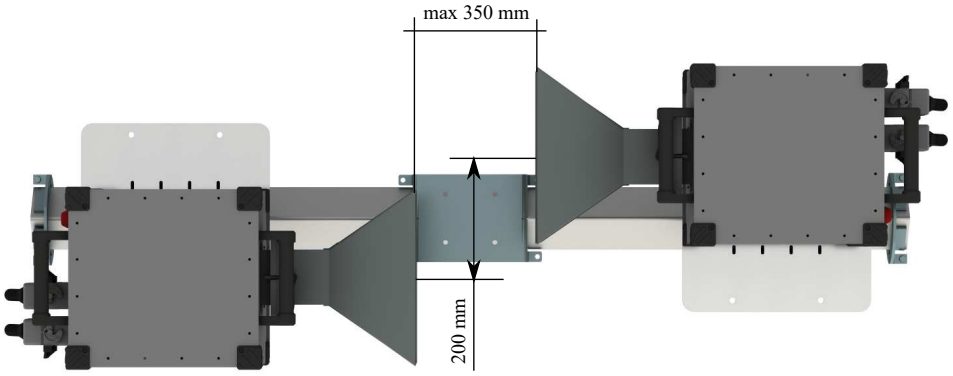
The ability to manually move the *Generator* along the *Beam* is provided by the *Platform with trolley*.Thanks to the use of bearings, the trolley moves smoothly without resistance. The platform attached to the trolley is used to secure the ***MG25-1500BU*** . To maintain even load distribution on the *Beam*two sets of *Trolley with platform* are installed, one on each side of the lifter's axis.

6.3 Mounting of the Generators

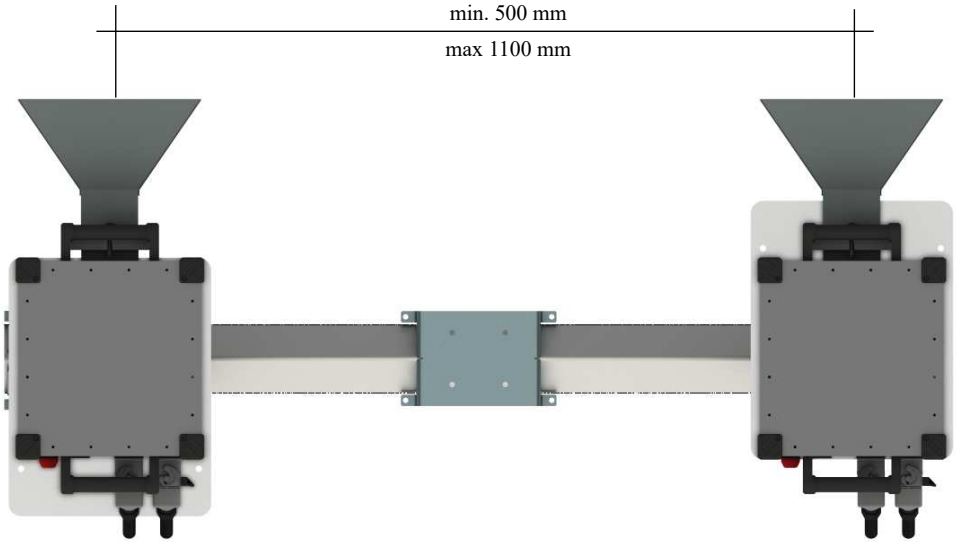
The *Platform* is a plate with a series of holes to which the *Generator* is mounted. The base of the ***MG25-1500BU*** has 4 mounting points (threaded). M8 screws inserted into the holes in the

Platform should be screwed into the mounting points.

When mounting two *Generators* parallel to the beam, their axes are offset by 200 mm. The *Platforms* are specifically designed for this purpose.
In this configuration, the *Generators* with mounted *Radiators* can be spaced a maximum of 350 mm apart.



When mounting two *Generators* perpendicular to the beam, their *Radiators* will be aligned in the same plane. In this configuration, the *Generators* can be spaced between 500 and 1100 mm apart.



7 TELESCOPIC LIFTER

7.1 Features of the lifters

The lifters “TL 340” and“TL520” are dedicated for use with the ***MG25-1500BU*** *Generator*. These lifters are optional equipment. Only basic information is presented here. Along with the lifter, the user receives the “User manual” issued by the manufacturer.
The differences between these two lifters are shown in the table below.

Lifter	**Lifting height**	**Height when folded**	**Maximum leg spread**	**Weight**
TL340	3,3 m	970 mm	1,1 x 1 m	21 kg
TL520	4,9 m	1120 mm	1,4 x 1,4 m	38 kg

The common features of both lifters are:

- construction made of aluminum alloy,
- lifting and lowering using an electric motor,
- smooth and precise height adjustment,
- manipulator (joystick) for controlling lifting/lowering speed,
- telescopic legs, facilitating the setup of the lifter on uneven ground,
- lockable wheels on the legs,

- overload protection,
- power supply from a single-phase 230 VAC network.

7.2 Setting up the TL lifter

Due to the lifting of components to a great height, particular attention should be paid to the vertical alignment of the lifter. The indicator mounted at the top of the lifter's pipe only helps with preliminary vertical alignment.
Both types of lifters, when properly set up, are stable structures. The lifter's maximum deviation from the vertical should not exceed 3°.

8 ADDITIONAL INFORMATION

If you have any questions regarding the operation of the device or if any information in the manual is unclear, please contact us. We will provide thorough answers. On our website, you will find additional information about the applications and capabilities of our devices.

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