The GoPal® System

Operator's Manual

Robotize

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1 General information

This manual contains a description of the GoPal System and the safety risks related to its use.

A GoPal Robot System consists of a self-driving robot designed to move pallets. The pallets can be moved between GoPal Pallet Stations located in the facility where one wants to collect or deliver a pallet.

Beyond the GoPal robots, the GoPal System consists of a range of accessories completing the fully automatic transport solution. A GoPal system can include the following parts:

- **GoPal 400** – self-driving robot designed to move EUR or ½ EUR pallets loaded with a maximum weight of 400 kg.
- **GoPal E24** – self-driving robot designed to move EUR or ½ EUR pallets with a maximum weight of 1000 kg.
- **GoPal E24W** – self-driving robot designed to move EUR, ½ EUR or Industrial EUR pallets with a maximum weight of 1200 kg.
- **GoPal U24W** - self-driving robot designed to move US/UK or similar box pallets with a maximum weight of 1200 kg.
- **GoPal Power Station** – a charging station used by GoPal robots for automatic battery charging.
- **GoPal Pallet Station** – a rack designed to hold EUR pallets at the correct pick-up height for the GoPal robots to off-load and load a pallet.
- **GoPal Conveyor Pallet Station** – pallet station with interface to conveyor systems.
- **GoPal Elevation Pallet Station** – pallet station with lifting function with control box to move a pallet to floor level or elevate it to 90 cm. The station has an integrated GoPal Call Button.
- **GoPal Call Button** – an electronics box with a button to summon a GoPal robot to move a pallet from a specific GoPal Pallet Station to another.
- **GoPal AUX Interface –** an electronics box with axillary interfaces for the GoPal system.
- **GoPal Pallet Sensor** – a sensor used to detect pallet status on a pallet station. Used in combination with GoPal AUX Interface
- **GoControl** – computer with specific software operating as the central control unit for the GoPal system.

1.1 Purpose of the Manual

This manual is an integral part of the GoPal System and was prepared by Robotize, the manual provides the needed information for GoPal operators to operate the GoPal robots and associated equipment throughout its expected lifetime.

In addition to using the appropriate techniques, the recipient should carefully study this manual and follow all instructions. Taking the time to read this manual will minimise risks to health and personal safety and financial losses due to equipment damage.

Store this manual in a place which is known and easily accessible throughout the lifetime of the product so that it is always available if it becomes necessary to refer to it.

Some information and drawings in this manual may differ slightly from the product acquired, but this will not influence the description of the product functions.

To highlight certain elements of the text of relevance and to indicate important specifications, specific symbols are used:

☠ Danger – Attention	This symbol indicates situations of danger which may involve a serious health risk and risk to personal safety if the directions are not complied with.
☝ Caution – Warning	The symbol indicates the necessity to adjust your use of the equipment to avoid risks to health and personal safety and to avoid causing equipment damage.

ⓘ Important	The symbol indicates particularly important technical information which must be complied with.

1.2 Technical assistance

In case of issues, which cannot immediately be resolved by following the instructions in this manual, technical assistance can be requested via Robotize Service Center.

Robotize Service Center
Email: support@robotize.com
Telephone: +45 31 16 80 00

The support department can be reached on business days between 07:00 and 17:00 (CET) and will provide support at current rates.

2 The GoPal system

2.1 General description

The GoPal system is a fully automated system for moving different types of pallets. The GoPal system contains of one or more self-driving robots (GoPal 400 and/or GoPal E24 and/or GoPal E24W and/or GoPal U24W).

The GoPal robot navigates using integrated sensors. This allow the GoPal robots to autonomously move around, e.g., in a factory building or a warehouse.

For a GoPal robot to collect a pallet, it must be placed in a GoPal Pallet Station which is a rack for pallets. Similarly, depositing can only be done in a GoPal Pallet Station. There are several types of pallet stations:

- A basic station, functioning as a rack
- A pallet station with interface to conveyor tracks
- A pallet station with lifting function.

The GoPal system may include one or more GoPal Call Buttons used to instruct the GoPal system to move a pallet from one pallet station to another. The GoPal system may also include a GoPal AUX box which provide a generic interface to e.g., sensors or equipment like automatic doors or fire alarm systems.

Charging of the GoPal robots is handled in the GoPal Power Station. Charging is fully automatic. The GoPal robots are directed by GoControl to dock in the GoPal Power Station and the fully automatic charging is performed.

The system is designed for indoor use, on level floors, in temperatures from -10 to 45 degrees Celsius in a non-condensing environment.

Control, monitoring, and configuration of the system is performed with the GoControl located in the company. The GoControl operation is not described in this manual.

GoPal system parts communicate via Wi-Fi if needed. It is therefore crucial to the functioning of the GoPal system that the company's Wi-Fi covers the entire GoPal operating area and is of a suitable quality.

2.2 Transport area

It is the responsibility of the GoPal operator that the entire surface of the robot operation area has the correct coefficient of friction (see Table 1 General technical data of the GoPal models). If, e.g., oil or water has been spilled in the transport area, the area must be closed off for GoPal robots until the driving surface has the necessary friction.

Prior to installation of the GoPal system, it must be ensured that the floor in the transport area has adequate strength, and that it is level (near-level), see Table 1 General technical data of the GoPal models.

A GoPal robot is equipped with two 3D cameras pointing in the forward driving direction, one of which detects objects in the driving area while the other detects overhangs which may potentially be struck by a GoPal robot or its cargo. At the rear of the GoPal robot is a single 3D camera, used to detect objects in the driving area when reversing.

3D detection is not 100% reliable, meaning that the GoPal operator must perform a daily walk-through of the GoPal operating area to check for objects which may potentially be struck. Any objects must be either removed or safely marked for GoPal by blocking the areas at LIDAR detection height (14 cm off the floor), e.g., via the use of warning cones. The distance between cones must not exceed 80 cm to ensure that GoPal will not go beyond the markings.

2.3 Transportation of pallets

Pallets to be transported by the GoPal system must be loaded in such a way that the centre of gravity is located reasonably centrally on the pallet and as low as possible. The permitted centre of gravity volume is indicated in Appendix A. Loading the pallets as indicated in Appendix A ensures that:

1) GoPal Pallet Stations can tolerate the load.
2) The GoPal robots can lift and load pallets.
3) GoPal can safely carry the load both with the lifting mechanism in the upper and lower position.
4) GoPal has enough load on the driving wheels for safe manoeuvring, particularly during emergency braking.

It is a requirement that the maximum load of the GoPal robot and accessories is not exceeded.

Pallets used for transportation must be in a good condition. If the pallet condition is too poor, it may collapse during use.

☠ Danger – Attention

It is the important to ensure that the pallet used can handle the load and use that they are subjected to in the GoPal system.

In addition to load and pallet condition requirements, the load on the pallets must also not protrude beyond the GoPal bumper or the GoPal emergency stops. If the load protrudes beyond this, parts of the GoPal safety functions will no longer function correctly.

2.4 Installation of the GoPal system

Installation of a GoPal system must be approved by a service technician authorised by Robotize.

2.5 Servicing and replacement of parts

☠ Danger – Attention

All replacement of parts of the GoPal system must be performed by Robotize or a person authorised by Robotize to carry out the replacement. This ensures the high safety level of the GoPal system. If parts of the GoPal installation break down your local dealer or Robotize Service Center must be contacted

3 Safety information

3.1 General safety directions

During the design and construction phase of the GoPal system, Robotize has paid particular attention to risks to the safety and health of those working with the GoPal system. In addition to complying with relevant legislation, Robotize has adhered to all requirements relating to good construction techniques.

The purpose of the information in this manual is to make GoPal operators aware that they must exercise special care to prevent all risks. Caution is always a requirement.

Prior to using the GoPal system for the first time, it is recommended to read the entire manual and to ensure that the contents has been fully understood. Particularly information related to safety.

Take notice of the symbols on any labels and what they mean. Their shape and colours specifically relate to safety. You should make sure that they remain legible, and you should comply with the information provided in them. If one or more labels cease to be legible, you can order new labels from your local dealer or from Robotize Service Center.

Only use GoPal and its accessories for the purposes prescribed by Robotize. Using it for other purposes for which it is not suitable may constitute a health and safety risk for persons involved as well as risk of equipment damage. This manual detail the purposes for which the GoPal system is suited and approved for.

It is not permitted to alter, remove, or bypass the installed safety devices. It is also required to perform the service inspections prescribed on time. Failure to comply with these requirements may result in serious health and safety risks for individuals as well as risk of equipment damage.

Ensure that GoPal and its accessories are kept in a good and functional state by following the maintenance instructions provided by Robotize. Good maintenance will increase the operational security and lifetime of the products.

In general, all GoPal system repairs must be performed by Robotize Service Center staff or persons authorised by Robotize to carry out the repair. Failure to secure such credentials may result in risk to personal health and safety.

A limited number of repairs may be performed by GoPal operators or other persons without authorisation from Robotize if specifically stated in this manual.

It is expressly forbidden to use any element of the GoPal system in areas with an explosive or flammable atmosphere.

3.2 Warning labels

The GoPal system has warning labels placed in areas of particularly high risk when operating the system. These are described in the following:

Figure 1 Risk of trapping/crushing

The safety label in Figure 1 is used where there is a risk of trapping fingers, hands, arms, or feet.

Figure 2 Do not step

The safety label in Figure 2 is used where it is prohibited to step or sit on the equipment.

Figure 3 Do not enter

The safety label in Figure 3 is used where it is prohibited to enter the equipment.

3.3 General description of the safety system

The primary safety system of GoPal robots consists of two safety approved lasers scanners (LIDAR) emitting laser beams around the entire circumference of the robot at a height of approx. 14 cm above the floor.

The safety laser monitors the GoPal robot surroundings. The safety system continuously determines the potential collision risk with objects or people. In case of such risk, the robot's safety function initiates a safety stop to avoid a collision. The slower the robot speed, the closer objects or people can be without triggering a safety stop.

When an object or a person has activated the GoPal robot's LIDAR protection, a safety stop is initiated. The GoPal robot will automatically resume operation after confirming that the path is clear again.

At low speeds, the LIDAR systems safety function is disabled to allow for tight manoeuvring such as in doorways etc.

The GoPal robots features a secondary safety system consisting of a mechanical bumper covering the entire robot circumference. This safety system will always remain active, including when the LIDAR safety is disabled.

If the GoPal robots' bumper is activated by contact, an emergency stop is performed. Subsequently, GoPal robot must be re-started manually by activating the re-start button located at the rear of the robot. The GoPal robot will then resume moving once its path has been cleared.

In addition to the primary and secondary safety systems, GoPal robots are equipped with 4 mechanical emergency stops. They are activated by a firm push on one of the red emergency-stop buttons. If an emergency-stop is activated, the robot will remain immobile until the emergency stop is released by turning the knob and returning to its original position. The GoPal robot must then be re-started by pressing the re-start button located at the rear of the robot. The GoPal robot will resume its task once the path has been cleared.

When a GoPal robot performs an emergency or safety stop, the robot will emit audio warning signals and at the same time flash the lights at the front and rear of the robot.

The audio and light signals will also be utilised as attention-getting signals when a GoPal robot performs actions associated with potential safety risk to individuals.

GoPal robots are equipped with a green warning light, at the front, which floods the path to alert other traffic that a GoPal robot is approaching. This is particularly relevant at corners and doorways.

With the integrated safety systems, Robotize has endeavoured to minimise the risk of accident and personal injury as the result of using the system.

3.4 GoPal operators' safety responsibility

Every GoPal system must have at least one nominated GoPal operator with the overall responsibility for operating the GoPal system and for the safety in connection with the use of GoPal. It is the operator's responsibility to be familiar with all safety aspects described in this manual and to ensure that the service intervals specified for the robot are complied with.

The GoPal operator's safety responsibility is described in this manual.

3.5 Safety instructions – Transportation area

☠ Danger – Attention

Braking GoPal relies on the friction between the GoPal wheels and the floor. It is a requirement that the surface friction coefficient is at least as indicated in Table 1.

If, for example, liquids or many small elements have been spilled in the robot operating area, the friction coefficient may change drastically, dropping below the required limit and dangerously limiting the GoPal robots from operating safely. This may constitute a health and safety risk for persons involved as well as risk of equipment damage.

It is the obligation of the GoPal operator to ensure that the surface of the entire GoPal driving area always maintains the required friction coefficient.

☠ Danger – Attention

The GoPal robots does not have an integrated stair or ramp detector, meaning that the robot driving areas must always be limited so that GoPal robots does not get near stairs, ramps, or floors with an inclination exceeding what is indicated in Table 1.

If a robot does not register e.g., a stair descent, it may result in a health and safety risk for persons involved as well as significant risk of equipment damage.

☠ Danger – Attention

The GoPal robots are approved for operation on near-level floors (see Table 1 General technical data of the GoPal models). Operation on inclinations greater than indicated results in the robot or load becoming unstable which may result in a risk to the health and safety of persons involved and the risk of equipment damage. The maximum inclination of the floor of the robot transportation area must be checked as part of the installation process.

☝ Caution – Warning

Objects protruding into the GoPal robots driving path but at an elevation above the LIDAR detection area (see Table 1 General technical data of the GoPal models) may be potentially struck by the robot or its load at full speed. This can result in serious damage to GoPal robot, its load, and the object being struck.

The GoPal robots driving area must therefore always be kept free of protruding objects which the GoPal robot might strike.

It is the responsibility of the GoPal operator to ensure that the area is clear of protruding objects which have not been clearly marked for the robot (see section *Transport* area)

☝ Caution – Warning

Objects too low to be detected by LIDAR (see Table 1 General technical data of the GoPal models*)* may potentially be struck by the robot at full speed which can result in serious equipment damage to the GoPal robot and its load.

It is the responsibility of the GoPal operator that the GoPal robots driving area is always kept free of small objects which GoPal might strike.

3.6 Safety instructions – staff and trucks

☠ Danger – Attention

Avoid placing hands or feet below the GoPal robot or its load. This may constitute a health and safety risk for persons involved as well as risk of equipment damage.

☠ Danger – Attention

Under no circumstances may GoPal robots be used to transport people. Similarly, no GoPal system pallet station may be stepped or sat on. This may result in risk to personal health and safety. See warning symbol Figure 2.

☠ Danger – Attention

The GoPal robots are designed to avoid all immobile objects and people. People on foot and, e.g., trucks may trigger situations where GoPal emergency brakes. During emergency braking, the robot will continue its path and the braking distance required means that a collision may not be avoidable. During emergency braking, GoPal will use audio and light warnings. The robot is particularly sensitive to crossing traffic, meaning that particular care must always be applied when the robot's path is crossed.

This may constitute a health and safety risk for persons involved as well as risk of equipment damage.

In certain instances, GoPal robots may fail to detect the forks on a forklift truck. It is therefore the responsibility of the truck operators to keep a safe distance to GoPal robots.

3.7 Safety directions – Load

☠ Danger – Attention

If the maximum transport load weight for a specific GoPal model is exceeded, the robot may be damaged or potentially break down. The driving stability of the robot may also be reduced.

If the maximum load weight for a specific GoPal pallet station is exceeded, the pallet station may be damaged or potentially break down.

This may constitute a health and safety risk for persons involved as well as risk of equipment damage.

It is the GoPal operator's responsibility to ensure, e.g., via suitable training of the staff, that pallets to be transported by the GoPal system do not exceed the permitted maximum weight.

☠ Danger – Attention

As described in section "3.3 General description of the safety system", the main safety elements of GoPal robots are the LIDAR and bumper detection of objects or persons within a dangerously close vicinity of the GoPal robot. It is therefore important that pallets (or their load) transported by GoPal robots do not protrude beyond the dimensions of the robot on any side. If a load, e.g., is wider than the GoPal robot, the load will not be sufficiently protected by the robot's safety function and may therefore collide with its surroundings.

This may constitute a serious health and safety risk for persons involved as well as risk of equipment damage.

It is the GoPal operator's responsibility to ensure, e.g., via suitable training of the staff, that pallets and their loads do not protrude beyond the GoPal bumper or covers the GoPal emergency stops.

☠ Danger - Attention

The GoPal robots' movements - including, in particular, emergency braking - have been designed on the basis of guidelines for the load's centre of gravity and stability. If these guidelines are not adhered to, the GoPal robots load may fall off the robot during transportation and strike people or equipment. An incorrect centre of gravity may also significantly affect the robot's braking capacity. This may constitute a health and safety risk for persons involved as well as risk of equipment damage.

It is the responsibility of the GoPal operator to ensure that GoPal robots loading guidelines are complied with (see Appendix A).

☠ Danger - Attention

When the GoPal robot's pallet lifting mechanism has been activated, there is a risk of people or goods becoming trapped and crushed between the pallet and GoPal. The robot will warn of the danger via both audible and light signals. Special care must be shown when the robot lowers the pallet onto the GoPal robot or GoPal Pallet Stations.

Trapping and crushing risk areas are marked by a safety label.

If a situation with an acute danger of personal injury or equipment damage arises, the robot and its lifting mechanism can be brought to an immediate stop using one of the four emergency stops located on the robot or by activating the bumper at any location.

3.8 Safety directions - GoPal accessories

☠ Danger - Attention

When a GoPal robot is parked in one of the different GoPal Pallet Stations or GoPal Power Stations, the LIDAR safety function is disabled to enable parking in the limited space available. The mechanical bumper is still active, but there will be areas of the robot not protected by automatic safety functions and these areas present a risk of personal health and safety or equipment damage.

To draw attention to the potential dangers, the robot will emit continuous audible and light signals.

In case of potential risk of trapping, the robot's manual emergency stop must be used to stop the robot. Trapping risk areas are marked by a safety label.

☠ Danger - Attention

When a pallet is placed in one of the different GoPal Pallet Stations, it is important that the pallet is correctly placed in the station (see Figure 16). If the pallet is incorrectly placed, it will also be incorrectly placed on the robot when collected and this may lead to a risk of the load falling off the robot during transportation, potentially resulting in a health and safety risk for persons involved and a risk of equipment damage.

☠ Danger - Attention

People must not be present either partially or entirely under the pallet in a GoPal Elevation Pallet Station, as the pallet may potentially be mistakenly lowered by another person at the control panel. This can represent a health and safety risk.

☠ Danger - Attention

People must not be present either partially or entirely under the pallet in a GoPal Automatic Elevation Pallet Stand, as the pallet may potentially be mistakenly lowered by another person at the control panel or by the GoControl. This can represent a health and safety risk.

☝ Caution – Warning

A GoPal Conveyor Pallet Station initiates movement of the pallet when requested by the conveyor system with which it is integrated. Caution must therefore be exercised when in the vicinity of the station as the sudden movement of the pallet may present a health and safety risk.

☝ Caution – Warning

Pallets to be placed in GoPal Pallet Stations must be in good condition. The use of pallets in a poor condition can result in the risk of the pallet collapsing in the station when loaded with goods. This can present a health and safety risk or a risk of equipment damage.

It is the GoPal operator's responsibility to ensure, e.g., via suitable training of the staff, that pallets to be transported by the GoPal robots are in a satisfactory condition.

3.9 Safety directions - Maintenance

ⓘ Important

In order to avoid permanent damage to the electrical and electronic components, a GoPal robot and its accessories must not be washed with running water as it is not waterproof.

3.10 Safety directions - Disposal

Do not leave pollutants in the environment. Make sure that materials are disposed of in accordance with relevant legislation.

According to the WEEE Directive (Waste of Electric and Electronic Equipment), the user must separate electrical and electronic components out during disposal and deliver the parts to an approved collection centre, to the local dealer or to Robotize Service Center.

Irregular disposal of electronic and electrical equipment (WEEE) is punishable by sanctions regulated by relevant legislations in the country of the offence.

☠ Danger - Attention

Electrical and electronic waste may contain dangerous substances which may have a harmful effect on the environment and human health. It is recommended to carry out disposal in the correct manner.

4 The GoPal robots

GoPal is a self-driving robot designed to transport pallets. GoPal is equipped with a lifting function for the lifting and lowering of pallets. The lifting function is used when collecting or depositing pallets from or to a GoPal Pallet Station.

GoPal is CE-approved and therefore also safety approved for operation among people pursuant to the Machine Directive.

Figure 4 GoPal top (GoPal 400, GoPal E24, GoPal E24W)

Figure 5 GoPal top (GoPal U24W)

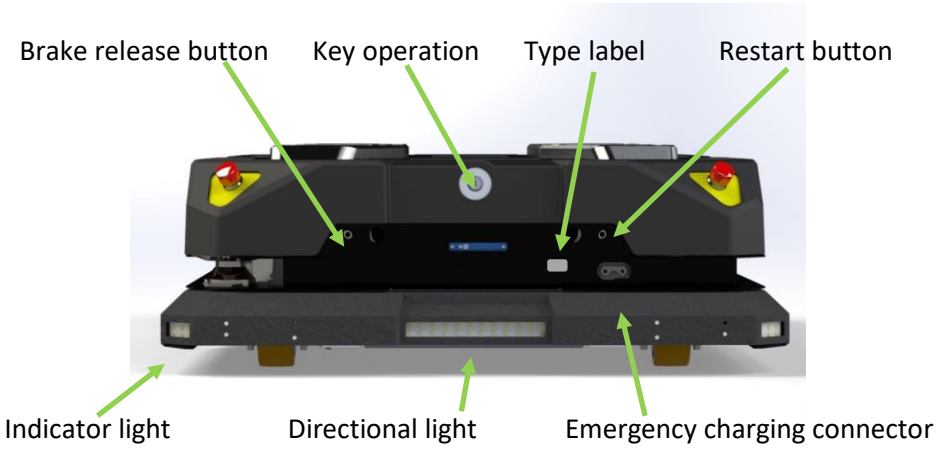


Figure 6 GoPal rear

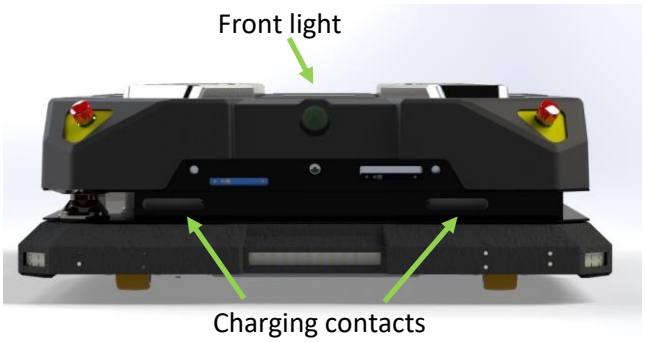


Figure 7 GoPal front

4.1 GoPal models

Four different models of the GoPal robot are available.

- GoPal 400
- GoPal E24
- GoPal E24W
- GoPal U24W

The four models mainly differ in load capacity, lifting mechanism and dimensions but are otherwise almost identical.

4.2 GoPal type label

The type label, located at the rear of the robot, contains information on serial number, model, production date, and approval.

Figure 8 ID label GoPal

4.3 Technical information

	GoPal 400	GoPal E24	GoPal E24W	GoPal U24W
Weight typ. (unloaded)	175 kg	187 kg	215 kg	240 kg
Length	140 cm	140 cm	140 cm	140 cm
Width	86 cm	86 cm	106 cm	106 cm
Height without pallet (lifting mechanism lowered)	31.5 cm	34 cm	34 cm	34.1 cm
Height without pallet (lifting mechanism raised)	47.5 cm	48.5 cm	48.5 cm	39.7 cm
Operating temperature	-10 °C <> +45 °C	-10 °C <> +45 °C	-10 °C <> +45 °C	-10 °C <> +45 °C
Operating temperature during charging	0 °C <> +45 °C	0 °C <> +45 °C	0 °C <> +45 °C	0 °C <> +45 °C
Air humidity - non-condensing, max.	95%	95%	95%	95%
Battery type	LiFePo4	LiFePo4	LiFePo4	LiFePo4
Battery capacity	48 V, 40 Ah	48 V, 40 Ah	48 V, 40 Ah	48 V, 40 Ah
Operating time on 100% charge[1]	8-14 hours	6-14 hours	6-14 hours	6-14 hours
Time for full charge	~45 min	~45 min	~45 min	~45 min
Load capacity (incl. pallet) max.	425 kg	1025 kg	1230 kg	1230 kg
Centre of gravity (height above pallet) max[1].	120 cm	120 cm	120 cm	120 cm
Load height (height above pallet) max.[1]	240 cm	240 cm	240 cm	240 cm
Driving speed, max.	2.4 m/s ~9 km/h	2.4 m/s ~9 km/h	2.2 m/s ~8 km/h	2.2 m/s ~8 km/h
Floor inclination, max.	2.0 %	2.0 %	2.0 %	2.0 %
Max. height of edge that GoPal can safely cross	4 mm	4 mm	3 mm	3 mm
Weight on floor, total max.	600 kg	1215 kg	1450 kg	1475 kg
Wheel hardness, max.	80 Shore A	92 Shore A	92 Shore A	92 Shore A
Surface friction coefficient requirement (floor against GoPal with 75-92 Shore A rubber wheels)	>0.60	>0.60	>0.60	>0.60
LIDAR detection height above floor level	14 cm	14 cm	14 cm	14 cm
Wi-Fi specification	802.11ac WLAN	802.11ac WLAN	802.11ac WLAN	802.11ac WLAN

Table 1 General technical data of the GoPal models

[1] Depending on load conditions, see Appendix A for details

4.4 Function and use

ⓘ Important

Prior to using GoPal for the first time, it is recommended to read the entire manual and to ensure that the contents have been fully understood. In particular information relevant to safety.

Only use GoPal for the purposes described in this manual and avoid manipulating any part of the GoPal system to achieve performance deviating from normal operating performance.

4.4.1 Stopping GoPal in safety mode

GoPal can be safely stopped by pressing one of the four red emergency stops located at each corner of the robot. Activating an emergency stop will safely stop the robot and it will not be operational again before the emergency stop has been twisted so that the button releases and the restart button is subsequently activated.

4.4.2 Emergency stop

GoPal has four emergency stops – one at each corner of the robot (Figure 4). The emergency stop is activated by a firm push on the top of the button. The emergency stop will remain in the lower position until twisted slightly, whereupon it will return to its normal position.

If GoPal is driving when an emergency stop is activated, the robot will perform a controlled braking to avoid loss of control and to prevent it from losing its load.

The restart button must be activated after an emergency stop to restart the robot.

4.4.3 Mechanical bumper

The mechanical bumper (Figure 4) covers GoPal on all sides. If GoPal touches an object with the bumper, it will perform a controlled braking.

To restart the robot after activation of the bumper, the object and the robot must be separated, and the restart button must be activated for GoPal to be active again.

4.4.4 Restart button

The restart button (Figure 6) is located at the rear of GoPal. The button must be pressed if either the mechanical bumper or one of the emergency stops has been activated.

After pressing the restart button for 2-5 seconds, GoPal will emit audible warning signals and flash the light to indicate that GoPal is active.

4.4.5 Key switch for operating GoPal

GoPal is equipped with a key switch to operate GoPal.

The key switch (Figure 6) has 4 settings of which

- Position “Off” turns off power to GoPal. All lights remain off, the robot is halted, and it cannot move. Although the GoPal robot is turned off, the batteries will slowly discharge and the GoPal robot will need to be fully charged a minimum of every month. Please note that it is not normally required to turn the robot off manually. Only in connection with extended operational breaks - such as holiday closure - is it recommended to turn GoPal off completely.
- Position “Remote” turns GoPal on and places it in normal operational state. After start-up, the restart button must be activated, after which GoPal will be ready for use and under GoControl control.
- Position “Local” turns GoPal on and places it in local manual control state. In this state, GoPal can be manually controlled by logging onto the robot’s Wi-Fi to access the GoControl interface via a browser, e.g., via a mobile telephone. This interface can be used to manually move GoPal around and move the lift up and down - without consideration of other tasks. It is important to note that

the robot's safety functions remain active when GoPal is under manual control. This means that the restart button must be activated after start-up before GoPal can move.

- Position "Emg" (Emergency) partially turns GoPal on. In this position, the robot does not move, but it is possible to release the robot's brakes so that the robot can be moved manually. The robot's brakes are released by pressing the brake release button.

4.4.6 Brake release button

The brake release button (Figure 6) is located at the rear of GoPal. The robot's brakes are released by pressing the brake release button. It is only possible to release the brakes if the key switch is in position "Emg" and the brakes will only be released for as long as the button is pressed down. This function can be used, e.g., if the robot's bumper has been pressed in.

☠ Danger - Attention

Show caution when activating the brake release system. On a surface with an incline, the robot will tend to roll when the brakes are released.

4.4.7 Charging connector

The automatic battery charging connector points are at the front of GoPal (Figure 7). The connector is used when docking in a GoPal Power Station. An emergency charge connector is installed at the rear of GoPal (Figure 6). This connector is not normally used, but can be used if, due to an error, GoPal is not able to drive to automatic charging in a GoPal Power Station.

4.4.8 GoPal light and sound indications

GoPal is equipped with operating lights (Figure 6) which work as the lights on a car. GoPal has white lights at the front, red braking lights at the rear, and orange lights on the corners which work as indicators when turning.

Additionally, the lights and sound have the following meaning:

Green pulsing	Robot idle and ready.
Green blinking	Robot charging and cannot take orders.
Blue/yellow blinking	Robot controlled by the user either in local or emergency mode, or Robot in remote mode but not in service, or Robot configured not to take orders, or Robot operation suspended by the GoControl dispatcher.
Blue blinking + buzzer	Robot needs help: • safety stop, or • task failure, or • alarm, or • robot blocked while docking, or • while driving towards its goal.
Red blinking + buzzer	Robot warning signal to its surroundings due to increased risk either by laser safety zones being inactive due to slow driving or squeezing risk while docking or lift moving.
Yellow blinking	Communication with the GoControl computer timed out

Table 2 GoPal light and sound indications

In addition, GoPal has a strong green light installed at the front (Figure 7) which illuminates the floor a couple of metres in front of the robot. The purpose of the light is to show other traffic that a GoPal is approaching.

GoPal is equipped with a warning horn (buzzer) which is activated when the robot performs operations where extra caution is important to safety.

4.5 Standard maintenance and service inspection

ⓘ Important

Before commencing maintenance works, it must be ensured that GoPal is stopped in the safety mode (see 4.4.1 *Stopping GoPal in safety mode)*.

4.5.1 On-going safety inspections

It is the responsibility of the GoPal operator to ensure that the safety functions of the GoPal robot works correctly:

- Warning lights and warning buzzer function as intended. This can be tested, e.g., by observing the GoPal entering a pallet station or by provoking an emergency stop situation.
- The forward green light works as intended and casts a clear, green light onto the floor.
- Warning labels are intact and easily legible.
- The four manual emergency stops must be activated individually, and it must be checked that this makes the robot enter safety mode.
- The bumper function must be tested by activating the bumper, both sideways and longitudinally, and it must be confirmed that this makes the robot enter safety mode.
- Automatic emergency stop must be tested by suddenly introducing an object (e.g., a broom) in front of the robot while it is moving at speed. This must make the robot execute emergency braking - and remain halted for a couple of seconds, after which it will restart and try to navigate around the obstacle. The test must be performed from both sides of the GoPal robot. If the GoPal robot does not respond by braking for the sudden obstacle, it must be immediately removed from operation and the local dealer or Robotize Service Center must be contacted.

4.5.2 Battery maintenance

During normal operation, the system will automatically ensure that the battery power it kept on a healthy level.

ⓘ Important

If a system error prevents the robot from charging it will automatically turn itself off when the remaining power reaches a lower limit. The robot will keep vital functions running and therefore it is important not to leave the robot in this condition more than a few days. Leaving the robot uncharged longer might damage the batteries and require a battery replacement.

ⓘ Important

If the robot shall be power off for a longer period, it is important that the batteries are fully charged before the power is turned off by using the key switch (section 4.4.5). Even when the robot is turned off the batteries will continue to drain a little power. Therefore, it is important that at least every second month the robot is turned on and fully charged again. If this is omitted the batteries will eventually reach a critical power level where they will be damaged and require a replacement. This will not be covered by warranty.

4.5.3 Cleaning the GoPal

Stop GoPal in safety mode. Clean all exterior surfaces of GoPal with a cloth moistened (not wet) with lukewarm water or a mild, neutral soap.

ⓘ Important

Do not use solvents or similar materials to avoid damaging painted surfaces and plastic components.

Never wash the internal parts of GoPal and never use any kind of running water to avoid damaging the electrical and electronic components.

In dusty environments, the safety lasers must be checked regularly for dirt. The laser can be wiped over with a clean, soft cloth. Avoid scratching the laser. Lasers should be cleaned thoroughly all the way round considering the 270-degree view of the lasers.

ⓘ Important

Check the GoPal robot underside (the area around the wheels) and remove any built-up materials which could prevent the efficient functioning of the GoPal.

Clean the charging contact surfaces and remove any foreign bodies. Any oxidisation is removed with a dry cloth.

5 GoPal Power Stations

GoPal Power Station is a station for automatic charging of the batteries of the GoPal robots.

5.1 GoPal Power Station models

Two different models of GoPal Power Stations are available.

5.1.1 GoPal Power Station (E)

The GoPal Power Station (E) can be used in combination with the GoPal 400 and GoPal E24 robots.

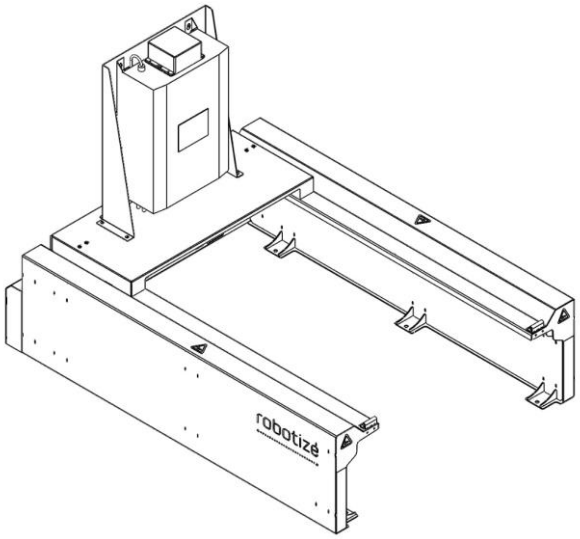


Figure 9 GoPal Power Station

5.1.2 GoPal Power Station (W)

The GoPal Power Station (W) can be used to charge GoPal 400, GoPal E24, GoPal E24W and GoPal U24W robots.

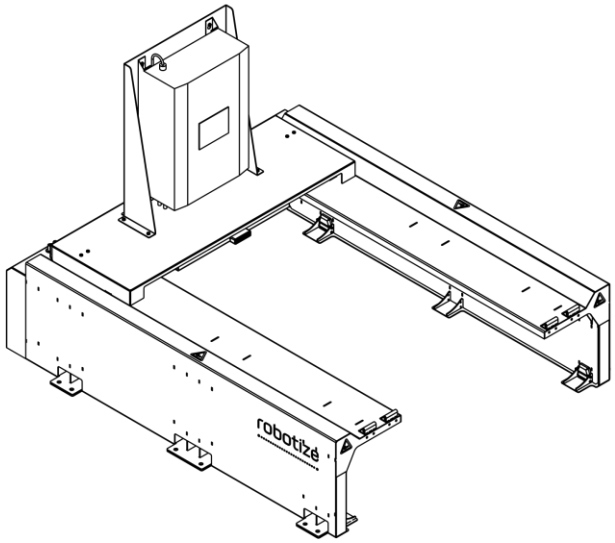


Figure 10 GoPal Power Station (W)

5.2 GoPal Power Station identification

The identification label on the side of GoPal Power Station contains information regarding serial number, model, production date, and approval.

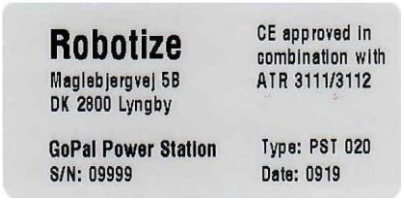


Figure 11 Identification label GoPal Power Station

5.3 Technical information

	GoPal Power Station (E)	GoPal Power Station (W)
Required power supply	230 V / 13 A	230 V / 13 A
Max. charging current/voltage (not concurrent)	50 A / 58.4 V	50 A / 58.4 V
Station weight	88 kg	113 kg
Station dimensions (LxWxH)	146 x 105 x 100 cm	147 x 130 x 100 cm

Table 3 GoPal Power Station technical information

5.4 Function and use

When a GoPal robot is sent for charging by GoControl, it will automatically enter a GoPal Power Station where it will remain until it is either fully charged or instructed by GoControl to leave. It can be despatched on an assignment even if its batteries are not fully charged.

ⓘ Important

GoPal robots must not be manually removed from the GoPal Power Station.

5.5 Button LED status light

The GoPal Power station is equipped with a GoPal Charger Box on top of the charger. The GoPal Charger Box is equipped with a LED light. The light will change depending on the status:

Button light	**Status**
Steady blue	Ready
Blinking blue/red	Wi-Fi Connection failure

Table 4 GoPal Charger Box lights

Figure 12 Charger interface box.

5.6 On-going safety inspections

It is the responsibility of the GoPal operator that the GoPal Power Station warning labels are intact and legible.

5.7 Standard maintenance

ⓘ Important

Never wash the internal parts of the GoPal Power Station and never use any kind of running water to avoid damaging the electrical and electronic components.

Clean all exterior surfaces of the GoPal Power Station with a cloth moistened (not wet) with lukewarm water or a mild, neutral soap.

ⓘ Important

Carefully clean the GoPal Power Station charging contact surfaces and remove foreign bodies. It is particularly important that there are no metal objects or wires that can short circuit the charging terminals.

6 GoPal Pallet Station

GoPal Pallet Station is a rack for pallets to be transported by GoPal robots.

6.1 Function and use

The GoPal Pallet Station configuration allow GoPal robots lift the pallet off the rack onto the robot - or vice versa.

The pallets position on the GoPal Pallet Station is ensured by the physical shape of the GoPal Pallet Station such that GoPal robots always collects the pallet from the same place.

A pallet station can be installed as a solitary station or in combination with others to form a group. Each station can be installed with or without the back piece. Typically, the back piece is omitted if a forklift is used to deliver or collect pallets from the back side of the station.

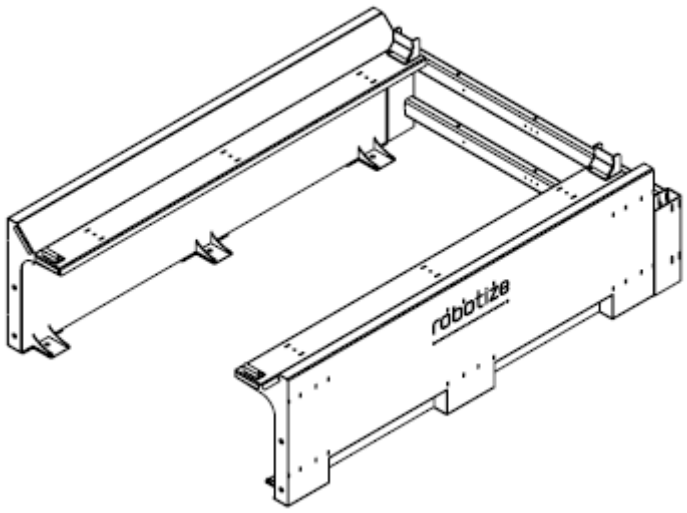


Figure 13 Standalone Pallet Station

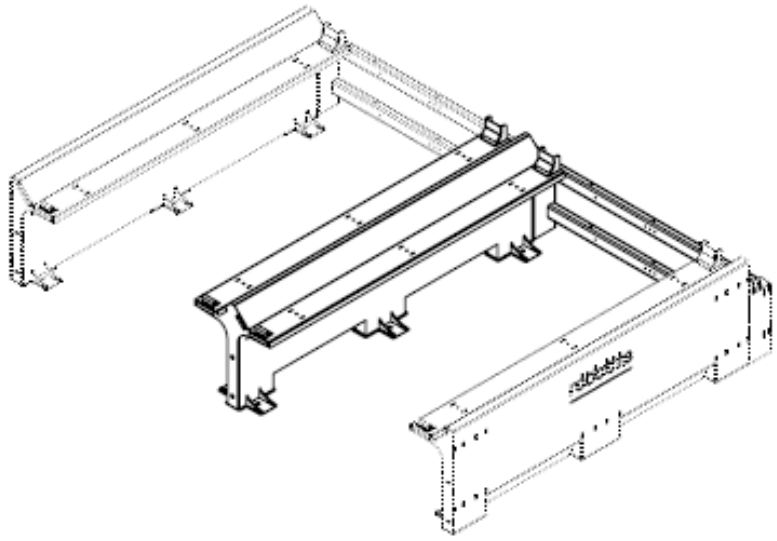


Figure 14 Pallet Station with expansion module

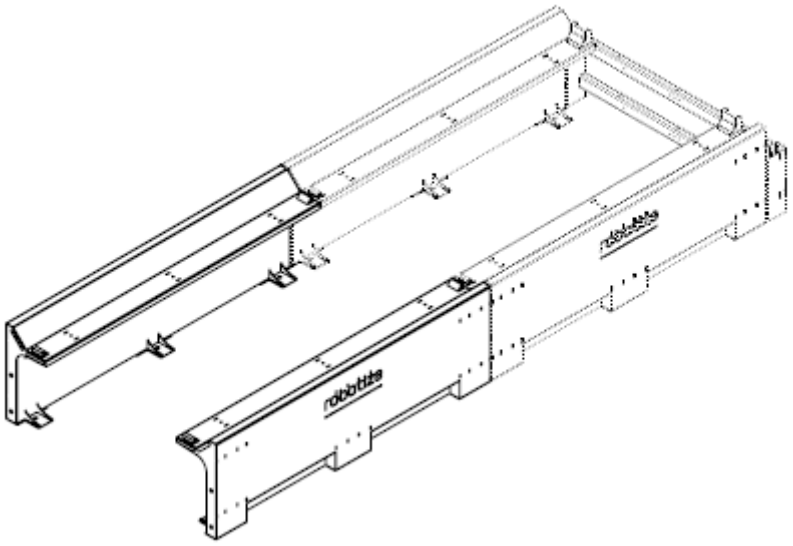


Figure 15 Pallet stations combined in depth

It is crucial to system safety that the pallet is placed correctly in the pallet station when placed manually.

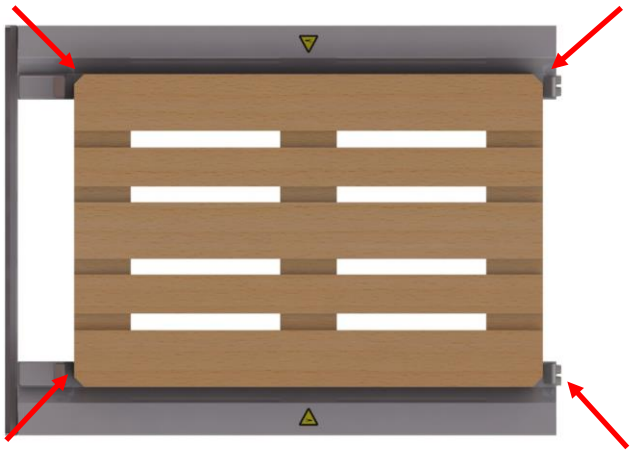


Figure 16 Placing pallet in pallet station.

Be particularly aware of pallet location at the four corners where the pallet must be level in the recess (see Figure 16).

6.2 GoPal Pallet Station models

The GoPal Pallet station is available in different models, designed for the specific pallets intended to be stored there.

6.2.1 GoPal Pallet Station (E)

The GoPal Pallet Station (E) is designed to carry normal EUR pallets and can be used with the GoPal 400 and GoPal E24 robots.

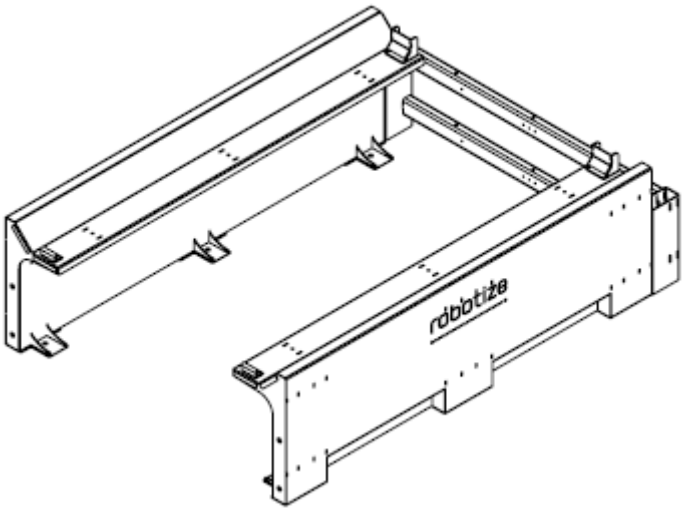


Figure 17 GoPal Pallet Station (E)

6.2.2 GoPal Pallet Station (EW)

The GoPal Pallet Station (EW) is designed to carry normal EUR and Industrial EUR pallets and can be used with the GoPal E24W robot.

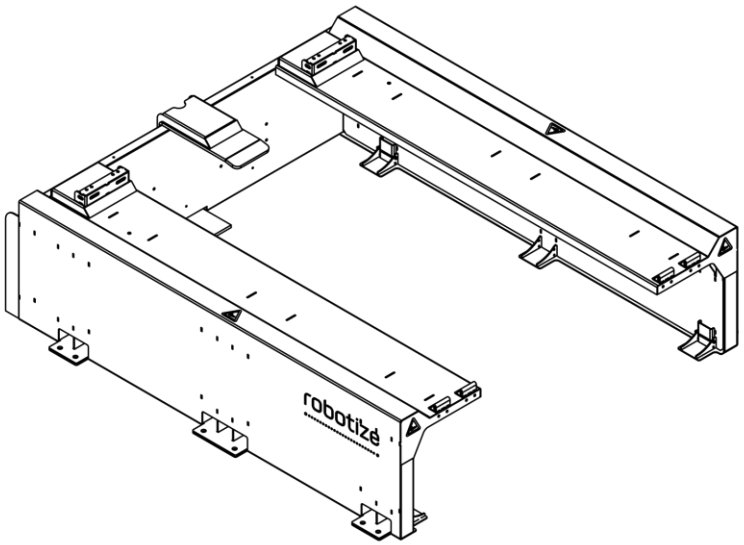


Figure 18 GoPal Pallet Station (EW)

In case the GoPal Pallet Station (EW) shall be used to carry standard EUR pallets it is important that the steering brackets for EUR pallet are mounted on the station. The steering brackets will ensure that a pallet lies at the correct position for the robot to pick it up and equally ensure that the pallet is steered into the correct position when delivered by the robot. In this configuration industrial pallets cannot be handled.

The brackets are easy to install or remove by an operator to enable use of both types of pallets.

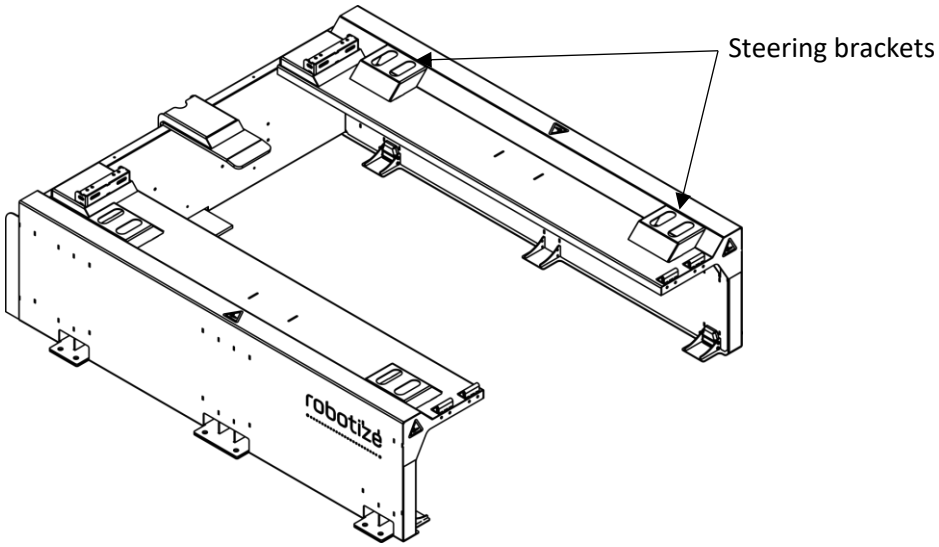


Figure 19 GoPal Pallet Station (EW) with steering brackets mounted.

☠ Danger – Attention

If the pallet station is used with standard EUR pallet and the steering brackets are not mounted, a pallet can potentially be misplaced so much that GoPal during pickup causes the pallet to tilt.

☝ Caution – Warning

Avoid situations where the GoPal deliver an industrial EUR pallet to a station where the steering brackets are mounted. This will prevent correct alignment of the pallet and prevent the pallet to fit properly into the pallet station.

6.2.3 GoPal Pallet Station (U)

The GoPal Pallet Station (U) is designed to carry UK/US pallet and can be used with the GoPal U24W robot.

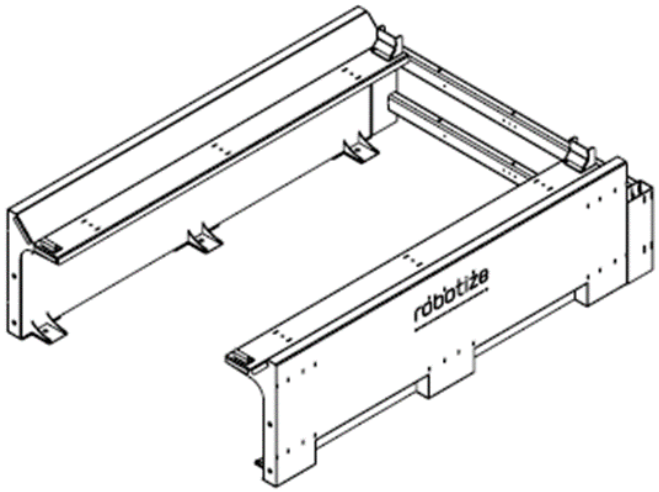


Figure 20 GoPal Pallet Station (U)

☝ Caution – Warning

Heavy load on a pallet can make it bend. To ensure sufficient clearance for the GoPal to enter the pallet station it is important to ensure that the maximum bend of the pallet is below 10 mm.

6.3 GoPal Pallet Station identification

The identification label on the side of GoPal Pallet Station contains information regarding serial number, model, production date, and approval.

Figure 21 Identification label GoPal Pallet Stations

6.4 Technical information

	Pallet Station (E)	Pallet Station (EW)	Pallet Station (U)
Weight	61 kg	77 kg	74 kg
Dimensions (LxWxH)	140 x 100 x 39 cm	140 x 120 x 39 cm	140 x 121 x 41 cm
Max. load on pallet supports	1000 kg	1200 kg	1200 kg
Pallet offset from floor	33 cm	33 cm	35.5 cm

Table 5 Technical information GoPal Pallet Stations

The load limit of the pallet stations is predicated on the GoPal Pallet Stations being correctly bolted to the floor and that the pallet can support the weight.

6.5 On-going safety inspections

It is the responsibility of the GoPal operator that the GoPal Pallet Station warning labels are intact and legible and that the GoPal Pallet Stations is in in good condition and securely bolted to the floor.

6.6 Standard maintenance

Clean all exterior surfaces of the GoPal Pallet Station with a cloth moistened (not wet) with lukewarm water or a mild, neutral soap.

Do not use solvents or similar materials to avoid damaging painted surfaces.

7 GoPal Conveyor Pallet Station

The GoPal Conveyor Pallet Station is a rack for pallets and is equipped with a conveyor system, so that the station can deliver or pick up pallets to and from an adjoining conveyor system. The Conveyor Pallet Station offers an interface to enable the adjoining conveyor system to control the timing of pallets entering or leaving the GoPal Conveyor Pallet Station. Emergency stop sensors on the GoPal Conveyor Pallet Station can also be connected to the emergency stop function on the adjoining conveyor system.

7.1 GoPal Conveyor Pallet Station models

The GoPal Conveyor station exists in a standard model for normal EUR pallets and a wide model that is capable of handling both normal EUR pallet and industrial EUR pallets.

7.1.1 GoPal Conveyor Pallet Station

The GoPal Conveyor Pallet Station can be used with the GoPal 400 and the GoPal E24 robot.

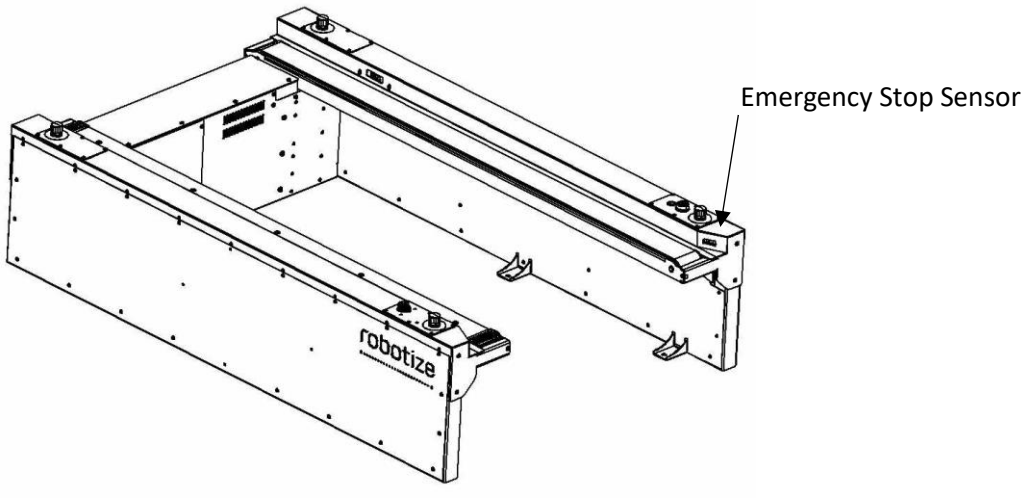


Figure 22 GoPal Conveyor Pallet Station

☝ Caution – Warning

If the GoPal Conveyor Station is used with a GoPal E24 precautions must be made to ensure that a GoPal E24 robot does not deliver pallets to the station that exceeds the load limits (please see Table 6). Failure to do so may cause a breakdown of the Conveyor Pallet Station.

7.1.2 GoPal Conveyor Pallet Station (EW)

GoPal Conveyor Pallet Station (EW) is a rack for Industrial EUR and standard EUR pallets equipped with a rolling conveyor system, so that the station can deliver or pick up pallets to and from an adjoining conveyor system.

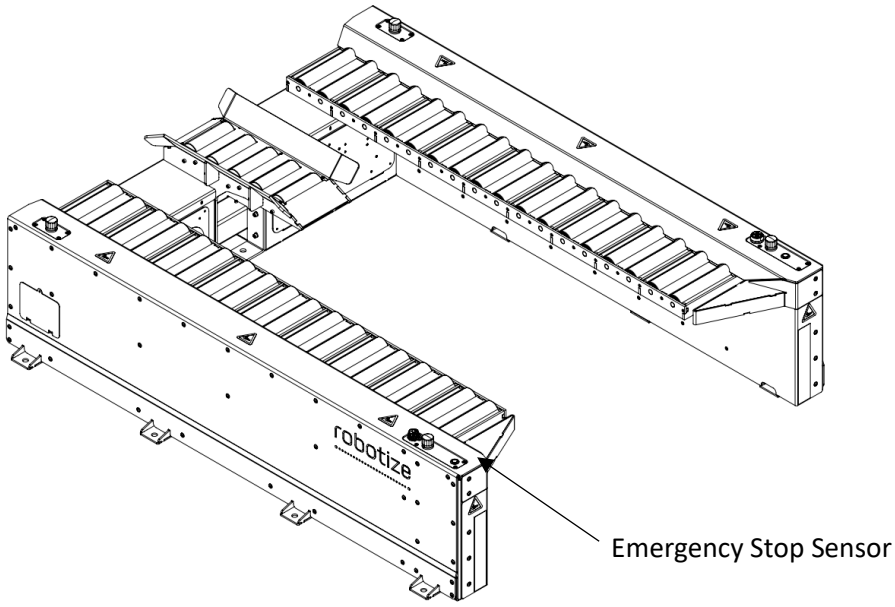


Figure 23 GoPal Conveyor Pallet Station (EW)

The conveyor is designed to work with the GoPal E24W but can also be delivered in a version adapted to work with the GoPal 400 and GoPal E24 models.

☠ Danger – Attention

In case the GoPal Conveyor Pallet Station (EW) is used to supply pallets to GoPal robots, precautions must be made to ensure that GoPal load specifications are fulfilled. Failing to do so may cause the load to fall of the GoPal or the GoPal to fail due to overload.

7.1.3 GoPal Conveyor Pallet Station (UW)

GoPal Conveyor Pallet Station (UW) is a rack for US/UK pallets, equipped with a rolling conveyor system so that the station can deliver or pick up pallets to and from an adjoining conveyor system.

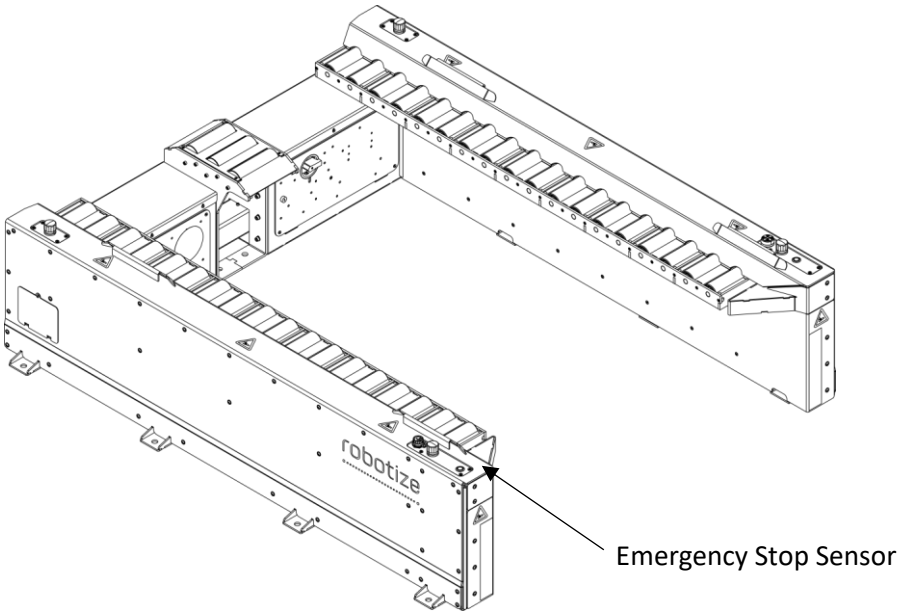


Figure 24 GoPal Conveyor Pallet Station (UW)

☠ Danger – Attention

In case the GoPal Conveyor Pallet Station UW is used to supply pallets to GoPal robots, precautions must be made to ensure that GoPal load specifications are fulfilled. Failing to do so may cause the load to fall of the GoPal or the GoPal to fail due to overload.

7.2 GoPal Conveyor Pallet Station identification

The identification label on the side of GoPal Conveyor Pallet Station contains information regarding serial number, model, production date, and approval.

Figure 25 GoPal Conveyor Pallet Station identification labels

7.3 Technical information

	GoPal Conveyor PS	GoPal Conveyor PS (EW/UW)
Weight	120 kg	365 kg
Dimensions (LxWxH)	162 x 105 x 40 cm	162.5 x 140 x 42 cm
Max. weight on pallet supports	750 kg	1500 kg
Pallet elevation above floor level when placed in rack	35.5 cm	35.5 cm

Table 6 Technical information GoPal Conveyor Pallet Stations

ⓘ Important

The weight limit of the pallet stations is predicated on the GoPal Conveyor Pallet Station is correctly bolted to the floor and that the pallet can support the weight.

7.4 Emergency stop

GoPal Conveyor Pallet Station is equipped with four emergency stops – located at each corner. An emergency stop is activated by a firm push on the top of the button. The emergency stop will remain in the lower position until twisted slightly, whereupon it will return to its normal position.

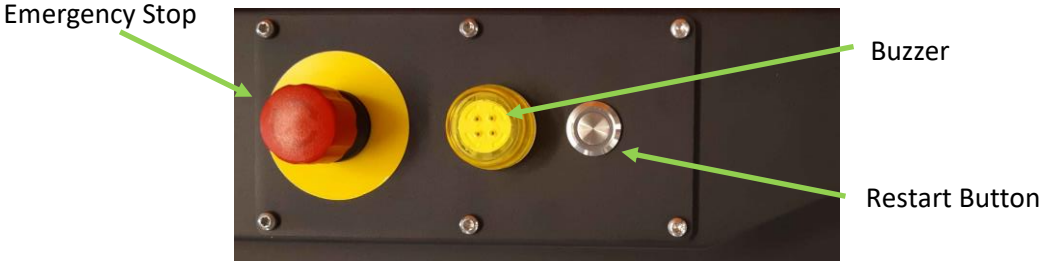


Figure 26 User interface for GoPal Conveyor Pallet Station

If the GoPal Conveyor Pallet Station is operational when the emergency stop is activated, the conveyor belts/rollers are stopped. To restart conveyor belts after an emergency stop, the restart button must be activated.

Please note that pressing the GoPal Pallet Station emergency stop will stop the GoPal station conveyors but does not affect the GoPal operation. To stop GoPal operation, the emergency stop on the robot must be activated (see section 4.4.2).

7.5 Emergency stop sensor

The GoPal Conveyor Pallet Station is equipped with a sensor that detects if a pallet by mistake is pushed too far out of the pallet station.

If the sensor is activated, remove the pallet blocking the sensor and press the restart button.

7.6 Restart button

The restart button (see Figure 26) is located at the top right corner of the control panel for the GoPal Conveyor Pallet Station. If the emergency stop has been used, the button must be activated to make the station operational again.

7.7 Button LED status light

The GoPal Conveyor Station is equipped with a LED light. The light will change depending on the status of the GoPal Conveyor Station:

Button light	**Status**
Steady blue	Ready
Steady green	Order received
Blinking green	Order started
Blinking red	Order failed
Blinking blue/green	Order cancelled
Blinking blue/red	Wi-Fi Connection failure

Table 7 GoPal Conveyor Pallet Station lights

7.8 On-going safety inspections

It is the responsibility of the GoPal operator to ensure the correct safety function of the GoPal Conveyor Pallet Station:

- Warning labels are intact and easily legible.
- The manual emergency stops must be activated, and it must be confirmed that this makes the station enter safety mode.
- The belt/rollers are intact and in a suitable state for operation.

7.9 Standard maintenance

Prior to cleaning of - or around - the GoPal Conveyor Station, the emergency stop must be activated. This will put the station in safety mode.

Clean all exterior surfaces of the GoPal Conveyor Pallet Station with a damp (not wet) cloth. Use lukewarm water or a mild, neutral soap.

Do not use solvents or similar materials to avoid damaging painted surfaces.

8 GoPal Elevation Pallet Station (E)

GoPal Elevation Pallet Station is a rack, for EUR pallets, with a lifting mechanism allowing the station to vary the pallet position between floor level and a max. elevation of 76 cm (depending on model).

The station features a control panel used to activate the lifting mechanism and to summon a robot. The control panel features an emergency stop.

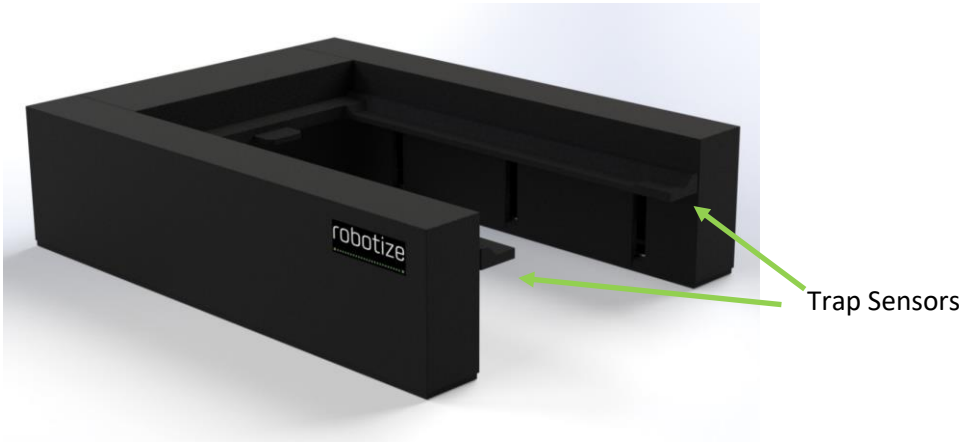


Figure 27 GoPal Elevation Pallet Station

Figure 28 GoPal Elevation Pallet Station control panel

8.1 GoPal Elevation Pallet Station models

The GoPal Elevation Station is available in 2 versions.

- GoPal Elevation Station
- GoPal Elevation Station with automatic lifting

The difference between the 2 GoPal Elevation Pallet Station is that the Automatic GoPal Elevation Pallet Station will automatically shift between floor height and GoPal collection height (33 cm) and that it cannot lift higher than to GoPal collection height.

Otherwise, the 2 models of the GoPal Elevation Stations are identical.

8.2 GoPal Elevation Pallet Station identification

The identification label on the rear of the GoPal Elevation Pallet Station contains information regarding serial number, model, production date, and approval.

Figure 29 GoPal Elevation Pallet Station identification label

8.3 Technical information

	Standard	Automatic
Weight	289 kg	289 kg
Dimensions (LxWxH)	180 x 135 x 47-90 cm	180 x 135 x 47 cm
Max. weight on pallet supports	425 kg	425 kg
Pallet elevation above floor level	7-76 cm	7-33 cm
Hydraulic oil content	3 l	3 l

Table 8 Technical information GoPal Elevation Pallet Station (E)

8.4 Function and use

The GoPal Elevation Pallet Station allow GoPal robots to park below the pallet and from there lift the pallet off the rack onto the robot - or vice versa.

The pallets are moved into position by the physical shape of the GoPal Elevation Pallet Station such that a GoPal robot always collects the pallet from the same place.

It is crucial to system safety that the pallet is placed correctly in the pallet station.

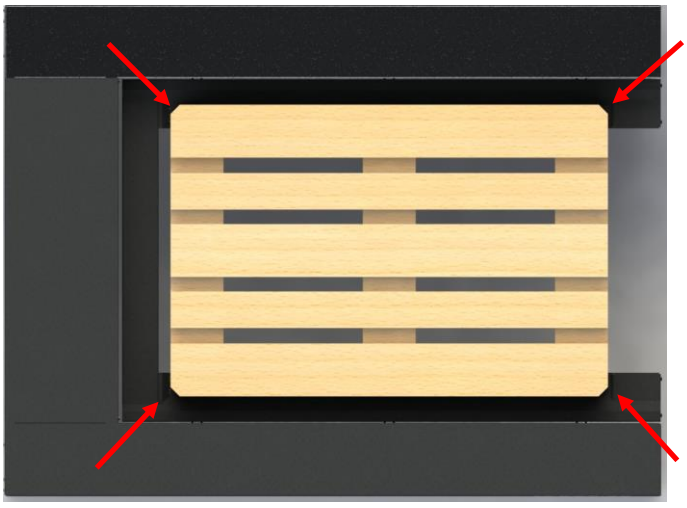


Figure 30 Placing a pallet in the pallet station

Be particularly aware of pallet location at the four steering corners where the pallet must be level in the recess. See Figure 30.

GoPal Elevation Pallet Station features a control panel (Figure 28) which is connected via a cable to the Elevation Pallet Station and wirelessly connected to GoControl.

☠ Danger - Attention

The GoPal Elevation Pallet Station is designed to carry a maximum load of 425 kg matching the capabilities of the GoPal 400 robot. If the station is used in an environment with GoPal E24 robots, it is important to

ensure that only pallets carrying a maximum load of 425 kg are delivered to the GoPal Elevation Pallet Station.

ⓘ Important

When the Standard GoPal Elevation Pallet Station is installed the Control Panel must be installed a minimum of 60 cm from the pallet station. This is to prevent accidental trapping of e.g., fingers in the mechanism of the GoPal Elevation Pallet Station. The operator must also monitor the operation to prevent anyone else from being trapped.

8.4.1 Emergency stop

GoPal Elevation Pallet Station is equipped with one emergency stop (Figure 28) located on the control panel. The emergency stop is activated by a firm push on the top of the button. The emergency stop will remain in the lower position until twisted slightly, whereupon it will return to its normal position.

If GoPal Elevation Pallet Station is operational when the emergency stop is activated, the lifting/lowering function is stopped.

To restart the lifting/lowering function after an emergency stop, the “Up” button must first be activated.

8.4.2 Trapping sensor

At the entry to the GoPal Elevation Pallet Station, the underside of the lifting bar is equipped with a trapping sensor to prevent the trapping of feet (see Figure 27).

If the trapping sensor is activated, the station immediately stops and can only be restarted by pressing the “Up” button.

8.4.3 Up

The GoPal Elevation Pallet Station features an “Up” button (Figure 28) to elevate the pallet – located on the control panel.

When power is connected to the GoPal Elevation Pallet Station, the Up button will be illuminated, and safety precautions prescribe that the Up button must be pressed before the lifting/lowering function is activated.

The button must be activated if the emergency stop has been activated.

When the Up button is activated, the lift is raised and automatically pauses for up to 5 seconds if parsing the GoPal robot collection height. The “Up” button illumination is extinguished during the pausing and the Call button is now illuminated and can be activated. If the Up button is kept pressed down, the button will illuminate again after the pause and the lift keeps moving upwards.

8.4.4 Down

The GoPal Elevation Pallet Station features a “Down” button (Figure 28) to lower the pallet – located on the control panel. When the button is illuminated, it can be activated, and the lift is lowered.

When the “Down button” is activated, the lift is lowered and automatically pauses for up to 5 seconds if parsing the GoPal robot collection height. The “Down button” illumination is extinguished during the pause and the Call button is now illuminated and can be activated. If the Down button is kept pressed down, the button will illuminate again after the pause and the lift keeps moving downwards.

8.4.5 Call

GoPal Elevation Pallet Station control panel is equipped with a call button (Figure 28) – located on the control panel. When the lift is at the collection elevation, the button is illuminated and can be activated.

The button function is configured via GoControl. When the button is activated, GoControl summons a GoPal to collect the pallet at the station.

8.5 Button LED status light

The GoPal Elevation Pallet Station control box is equipped with a push button with LED light. The light of the button will change depending on the status:

Button light	Status
Steady blue	Ready
Steady green	Order received
Blinking green	Order started
Blinking red	Order failed
Blinking blue/green	Order cancelled
Solid red	Error
Blinking blue/red	Wi-Fi Connection failure

Table 9 GoPal Elevation Pallet Station Control panel button lights

8.6 On-going safety inspections

It is the responsibility of the GoPal operator that the GoPal Elevation Pallet Station warning labels are intact and legible.

The GoPal operator must check for leaks from the hydraulic system weekly. In case of oil leaks, please contact the local dealer or Robotize Service Center.

8.7 Standard maintenance

☝ Caution – Warning

Prior to cleaning of - or around - the GoPal Elevation Station, it must be taken all the way to the bottom level and the emergency stop must be activated. This will put the station in safety mode.

Clean all exterior surfaces of the GoPal Elevation Pallet Station with a damp (not wet) cloth. Use lukewarm water or a mild, neutral soap.

Do not use solvents or similar materials to avoid damaging painted surfaces.

Every 12 months the hydraulic oil must be replaced.

9 GoPal Elevation Pallet Station (EUW)

GoPal Elevation Pallet Station (EUW) is a station for EUR, Industrial EUR, or US/UK pallets. Equipped with a lifting mechanism, this station can regulate the pallet position between floor level and a maximum elevation of 70 cm.

The station features a control panel used to activate the lifting mechanism and to summon a robot. The control panel features an emergency stop.

☠ Danger - Attention

Do not enter the pallet station unless the station is turned off or in safety mode. The inner side of the U-structure is not protected by trap sensors and can therefore cause crushing when lowered.

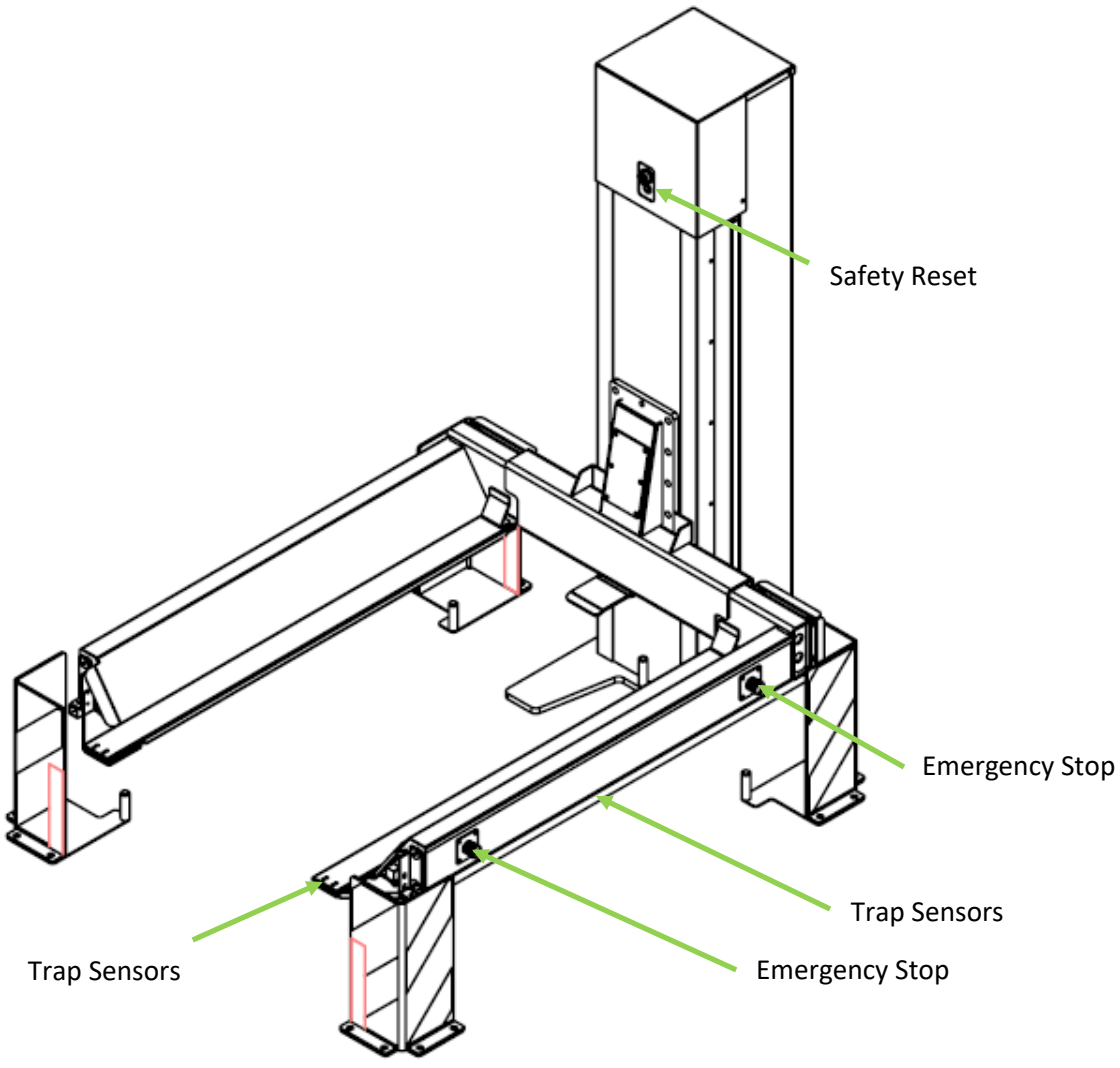


Figure 31 GoPal Elevation Pallet Station (EUW)

Figure 32 GoPal Elevation Pallet Station (EUW) power switch

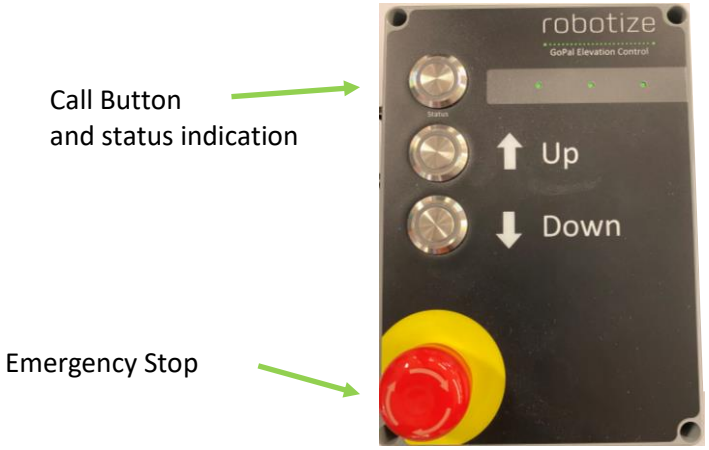


Figure 33 GoPal Elevation Pallet Station (EUW) control panel

9.1 GoPal Elevation Pallet Station (EUW) identification

The identification label on the rear of the GoPal Elevation Pallet Station (EUW) contains information regarding serial number, model, production date, and approval.

Figure 34 GoPal Elevation Pallet Station (EUW) identification label

9.2 Technical information

Weight	350 kg
Dimensions (LxWxH)	177 x 130-150 x 162 cm
Max. weight on pallet supports	800 kg
Pallet elevation above floor level	7-70 cm

Table 10 Technical information GoPal Elevation Pallet Station (EUW)

9.3 Function and use

The GoPal Elevation Pallet Station (EUW) allow GoPal robots to park below the pallet and from there lift the pallet off the rack onto the robot - or vice versa.

The pallets are moved into position by the physical shape of the GoPal Elevation Pallet Station such that a GoPal robot always collects the pallet from the same place.

It is crucial to system safety that the pallet is placed correctly in the pallet station.

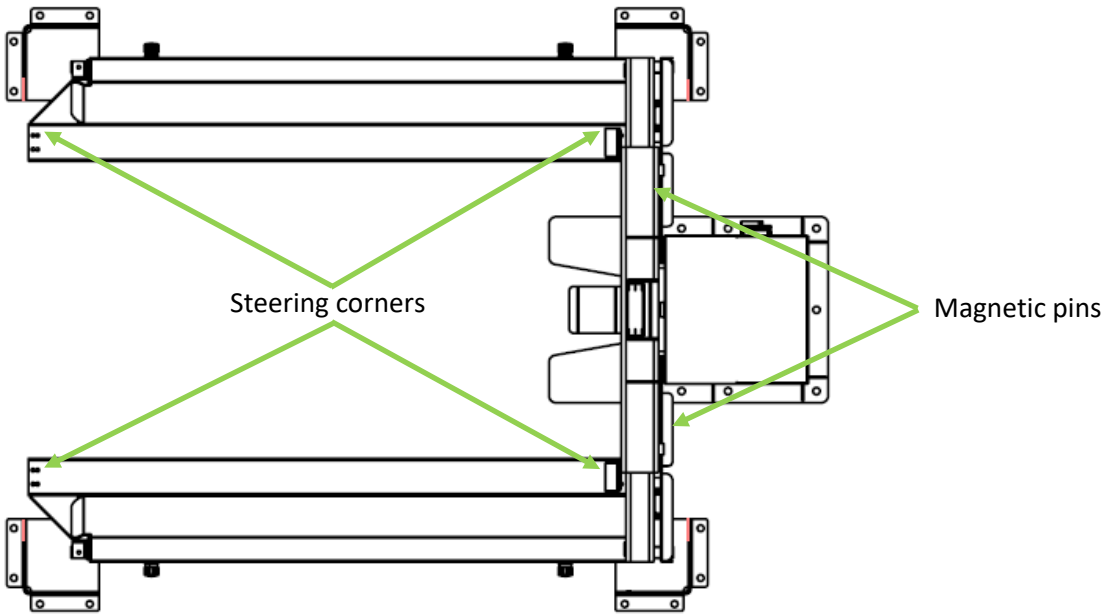


Figure 35 Placing a pallet in the pallet station (EUW)

Be particularly aware of pallet location at the four steering corners where the pallet must be level in the recess. See Figure 35.

GoPal Elevation Pallet Station (EUW) features a control panel (Figure 33) which is connected via a cable to the Elevation Pallet Station and wirelessly connected to GoControl.

☠ Danger - Attention

The GoPal Elevation Pallet Station (EUW) is designed to carry the maximum load listed in Table 10. If the station is used in an environment with robots that can carry a higher load, it is important to ensure that only pallets with a load smaller than or equal to the specified maximum load are delivered to the GoPal Elevation Pallet Station (EUW).

9.3.1 Adjusting pallet support width to pallet type

The pallet support can be adjusted to different sizes of pallet by retracting the magnetic pin on the backside of the lifting arms (Figure 35). With the pins removed the outer part of the pallet support can be moved to fit the desired pallet. After adjusting the support arms the magnetic pins must be re-mounted and it must be ensured that the pins are fully inserted in the holes.

☠ Danger - Attention

Be very careful when retraction the outer part of the pallet support not to extract it too much. It can be fully detached from the backside and is very heavy. The operation should be a two-person job.

☠ Danger - Attention

Users must be aware which types of pallets the GoPal system can transport, and make sure that only legal types of pallets can be collected from the Elevation Pallet Station. Collecting an illegal pallet size can cause the pallet to fall from a robot, causing severe risk of personal injuries.

☝ Caution – Warning

The width of the pallet support arms shall never be set such that the arms does not fit within the truck protection corners. Making the arm wider will cause damages to the construction when the lift is lowered.

9.3.2 Power switch

GoPal Elevation Pallet Station (EUW) is equipped with a main power switch (Figure 32) located on the side of the lift tower. The main switch can be turned to the right to the ON position and by turning it to the left to the OFF position. In ON position, the power connection to the GoPal Elevation pallet station (EUW) is established and in the OFF position it is cut off.

9.3.3 Emergency stop

GoPal Elevation Pallet Station (EUW) is equipped with four emergency stops placed in each corner of the lifting bar (Figure 31) and one additional emergency stop located on the control panel (Figure 33). Emergency stops are activated by a firm push on the top of a button. The emergency stop will remain in the lower position until twisted slightly, whereupon it will return to its normal position.

If GoPal Elevation Pallet Station (EUW) is operational when the emergency stop is activated, the lifting/lowering function is stopped.

To restart the lifting/lowering function after an emergency stop, the “Safety Reset” button (Figure 31) must be activated. This is not necessary when the emergency stop on the control panel has been activated (Figure 33).

9.3.4 Trapping sensor

The outside edge of the lifting bar is equipped with trapping sensors to prevent the trapping of feet’s (Figure 31).

If the trapping sensor is activated, the station immediately stops and can only be restarted by removing the object that activated the trapping sensor and afterwards pressing the "Safety Reset” button (Figure 31).

9.3.5 Safety reset

The GoPal Elevation Pallet Station (EUW) features a “Safety reset” button to reactivate the station after an emergency stop (Figure 31).

When power is connected to the GoPal Elevation Pallet Station (EUW), the “Safety reset” button will be illuminated, and safety precautions prescribe that the button must be pressed before the lifting/lowering function is activated.

9.3.6 Up

The GoPal Elevation Pallet Station (EUW) features an “Up” button to elevate the pallet. The button is located on the control panel (Figure 33).

When the Up button is activated, the lift is raised and automatically pauses for up to 2 seconds if parsing the GoPal robot collection height. The “Up” button illumination is extinguished during the pausing and the Call button is now illuminated and can be activated. If the Up button is kept pressed down, the button will illuminate again after the pause and the lift keeps moving upwards.

Pressing the “up” and “down” button at the same time will automatically move the pallet station to GoPal collection height.

9.3.7 Down

The GoPal Elevation Pallet Station features a “Down” button (Figure 33) to lower the pallet. The button is located on the control panel. When the button is illuminated, it can be activated, and the lift is lowered.

When the “Down button” is activated, the lift is lowered and automatically pauses for up to 2 seconds if parsing the GoPal robot collection height. The “Down button” illumination is extinguished during the pause and the Call button is now illuminated and can be activated. If the Down button is kept pressed down, the button will illuminate again after the pause and the lift keeps moving downwards.

Pressing the “up” and “down” button at the same time will automatically move the pallet station to GoPal collection height.

9.3.8 Call

GoPal Elevation Pallet Station (EUW) control panel is equipped with a call button (Figure 33) – located on the control panel. When the lift is at the collection elevation, the button is illuminated and can be activated.

The button function is configured via GoControl. When the button is activated, GoControl summons a GoPal to collect the pallet at the station.

9.4 LED status light

The call button on the GoPal Elevation Pallet Station (EUW) control box is equipped with a LED light. The light of the button will change depending on the status:

Button light	**Status**
Steady blue	Ready
Steady green	Order received
Blinking green	Order started
Blinking red	Order failed
Blinking blue/green	Order cancelled
Solid red	Error
Blinking blue/red	Wi-Fi Connection failure

Table 11 GoPal Elevation Pallet Station (EUW) Control panel button lights

9.5 On-going safety inspections

It is the responsibility of the GoPal operator to ensure that the safety functions of the GoPal Elevation Station (EUW) work correctly:

- The five manual emergency stops must be activated individually, and it must be checked that this makes the pallet station enter safety mode.
- The trap sensors must move freely and be able to set the pallet station in safety mode.
- Warning lights and warning buzzer functions as intended.
- Warning labels are intact and easily legible.
- The four truck protect corners must be intact and have no visible damages or structural changes.
- Visually inspect that the bolts mounting the pedestal to the floor are intact and fully inserted.

9.6 Standard maintenance

Ensure that the reflective tape attached to the four truck protection corners is intact and visible for the GoPal. They are used as parking guidance for the GoPal robots.

☝ Caution – Warning

Prior to cleaning of - or around - the GoPal Elevation Station (EUW), it must be taken all the way to the bottom level and the power switch (Figure 32) must be turned off. This will put the station in safe mode.

Clean all exterior surfaces of the GoPal Elevation Pallet Station (EUW) with a damp (not wet) cloth. Use lukewarm water or a mild, neutral soap.

Do not use solvents or similar materials to avoid damaging painted surfaces.

10 GoPal Call Button

The GoPal Call Button is a push button connected wirelessly with GoControl. The button(s) function is configured via GoControl. When the button is activated, GoControl summons a GoPal robot to perform the predefined order associated with the button.

10.1 GoPal Call Button models

The GoPal Call Button is available in 2 versions.

- 1 Button
- 5 Buttons

The difference between the two is the number of buttons. Apart from this they are identical.

Figure 36 GoPal Call Button with 5 buttons (Top view)

10.2 GoPal Call button identification

The identification label on the side of the GoPal Call Button contains information regarding serial number, model, production date, and approval.

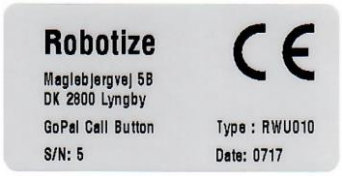


Figure 37 GoPal Call Button identification label

10.3 Technical information

	Single Button	5 Button
Weight	1.1 kg	1.1 kg
Dimensions	17 x 12 x 8 cm	17 x 12 x 8 cm
Required power supply	110-230 Nom VAC	110-230 Nom VAC

Table 12 Technical information GoPal Call Buttons

10.4 Button LED status light

The GoPal Call Button is equipped with a push button(s) with LED light. The light of the button will change depending on the status:

Button light	**Status**
Steady blue	Ready
Steady green	Order received
Blinking green	Order started
Blinking red	Order failed
Blinking blue/green	Order cancelled
Blinking blue/red	Wi-Fi Connection failure

Table 13 Call Button lights

11 GoPal AUX Interface

The GoPal AUX Interface is a box connected wirelessly with GoControl. The GoPal AUX Interface function is to allow interfacing to various external sensors and equipment. The box in equipped with 6 IO ports that can be configured during system installation.

Figure 38 GoPal AUX Box (Top view)

11.1 GoPal AUX Interface identification

The identification label on the side of the GoPal AUX Interface contains information regarding serial number, model, production date, and approval.

11.2 Technical information

Weight	Approx. 1.1 kg
Dimensions	17 x 12 x 8 cm
Required power supply	110-230 Nom VAC

Table 14 Technical information GoPal AUX Interface

11.3 Button LED status light

The GoPal AUX Interface is equipped with an LED light. The light will change depending on the status:

Button light	**Status**
Steady blue	Ready
Blinking blue/red	Wi-Fi Connection failure

Table 15 GoPal AUX Interface button lights

12 GoPal Pallet Sensor

The GoPal Pallet Sensor is an optical sensor and bracket that can be mounted on a GoPal Pallet Station. The sensor kit shall be connected to an I/O port of a GoPal AUX Interface. When connected the sensor will add loaded/unloaded status information about the GoPal Pallet Station to the GoControl.

Depending on configuration this can either enable an automated pickup on a pallet station or prevent that a GoPal uses time to investigate the current load status of a Pallet Station.

13 GoControl

GoControl is a control box located in the company which guides and monitors the GoPal robots and the other parts of the GoPal system in the company. GoControl determines which jobs are performed and how the various jobs and GoPal robots are prioritised. GoControl also sends GoPal robots to GoPal Power Stations when the batteries require charging.

14 GoPal system service inspections

To maintain the high safety level of the GoPal system, Robotize requires service inspections every six months and main service inspections once per year. The service must be performed by a service technician authorised by Robotize.

It is the responsibility of the GoPal operator to ensure that the ongoing system maintenance and inspection requirements are complied with.

14.1 Semi-annual GoPal inspection

At the semi-annual service inspection, the general condition of the GoPal system is inspected and an enhanced inspection is performed of the components indicated in Table 16.

Component	Service inspection type
LIDAR	Enhanced safety function inspection
Emergency brake	Inspection of function and brake lining
Warning labels	Legibility and presence

Table 16 Semi-annual GoPal inspection

14.2 Annual GoPal main inspection

In addition to the semi-annual inspection requirement, an annual main service inspection is required. At the inspection, both a semi-annual and an annual service inspection are performed. The main service inspection requirements are indicated in Table 17.

Component	Service inspection type
Lifting mechanism	Function and safety system are inspected
Rubber areas	Rubber elements on GoPal robot is checked for wear
Bumper	Bumper function is tested
Wheels	Wheels are checked for wear
Emergency stop	The functionality of the four emergency stops is verified
Protecting shield	The protecting shield is checked for damage
Warning lights	Warning lights are checked for functionality
Horn	Horn functionality is verified
GoPal Pallet Station(s)	Is inspected for damage
GoPal Power Station(s)	Is inspected for damage

Table 17 Annual GoPal inspection

14.3 Annual service inspection of GoPal Conveyor Pallet Stations

At the annual service inspection of the GoPal Conveyor Pallet Station, the station's general condition is inspected, and an enhanced inspection is performed of the components indicated in Table 18.

Component	Service inspection type
Emergency stop	The functionality of the four emergency stops is verified
Emergency sensor	The functionality of the emergency stop sensor is verified
Belts	Belts (if available) are checked for wear
Warning system	Warning lights and warning buzzer functions as intended
Mechanicals	Is inspected for mechanical damage

Table 18 Annual service inspection of GoPal Conveyor Pallet Stations

14.4 Annual service inspection of GoPal Elevation Pallet Station

At the annual service inspection of the GoPal Elevation Pallet Station, the station's general condition is inspected, and an enhanced inspection is performed of the components indicated in Table 19.

Component	Service inspection type
Emergency stop	The function of the emergency stop is verified
Hydraulics	The hydraulic system is inspected for functionality and wear. The hydraulic oil is replaced.
Trapping sensor	The trapping sensor is inspected for functionality and wear
Mechanicals	Is inspected for mechanical damage

Table 19 Annual service inspection of GoPal Elevation Pallet Station

14.5 Annual service inspection of GoPal Elevation Pallet Station (EUW)

At the annual service inspection of the GoPal Elevation Pallet Station (EUW), the station's general condition is inspected, and an enhanced inspection is performed of the components indicated in Table 20.

Component	Service inspection type
Emergency stop	The function of the emergency stops is verified
Trapping sensor	The trapping sensors are inspected for functionality and wear
Warning system	Warning lights and warning buzzer functions as intended
Mechanicals	Is inspected for mechanical damage
Mounting	The mounting bolts are inspected and replaced if necessary
Load capability	The load capability and structural stability is verified with a test load of maximum load + 10%

Table 20 Annual service inspection of GoPal Elevation Pallet Station (EUW)

14.6 GoPal system errors - cause and solution

The following information serves to assist in the identification and rectification of error situations which may occur during use. Most errors can be rectified by the GoPal operator while others require specific technical skills or special experience. In such cases local dealer or Robotize Service Center must be contacted. Most error types will trigger a GoControl alert which clearly describes the error experienced by the system. GoControl will also show how to rectify the error. In Table 21 there is a list of some of the errors that may occur:

Error	Cause	Solutions
GoPal robot does not enter the GoPal Power Station	There is a foreign body in the GoPal Power Station	Remove the object
	The Wi-Fi connection is poor and GoPal robot cannot communicate with GoControl	Check GoControl and Wi-Fi connection
GoPal robot does not enter the GoPal Pallet Station	There is a foreign body in the GoPal Pallet Station	Remove the object
	The Wi-Fi connection is poor and GoPal cannot communicate with GoControl	Check GoControl and Wi-Fi connection
GoPal robot has struck an object with its bumper and is stationery	The GoPal robot will remain in safety mode for as long as the bumper is impacted, and the reactivation button is not activated	Remove the object impacting the bumper and activate the robot with the reactivation button
GoPal robots stop performing tasks - GoPal Call Buttons stop working	The Wi-Fi connection is down	Re-establish the Wi-Fi connection
	GoControl is down	Check GoControl status and restart if necessary
The GoPal lifting mechanism does not lift the pallet off the GoPal Pallet Station	The pallet is overloaded, or the weight distribution does not comply with requirements	Reload the pallets to comply with requirements
	The lifting mechanism is defective	Call for service
The lifting mechanism does not lower the pallet	There is an object caught in the lifting mechanism preventing it from working	Stop GoPal robot in safety mode Remove the pallet and its load manually, then remove the object
	The lifting mechanism is defective	Call for service

Table 21 Typical GoPal system errors

15 Disposal of the GoPal system

☠ Danger - Attention

Do not leave pollutants in the environment. Make sure that materials are disposed of in accordance with relevant legislation.

16 Appendix A

16.1 GoPal 400 Stability Diagrams

EUR pallets to be transported by GoPal 400 must be loaded in such a way that the centre of gravity is located reasonably centrally on the pallet and as low as practicable. The permitted centre of gravity area is indicated in Figure 39 to Figure 50. Distances in mm are indicated from the centre of the pallet surface.

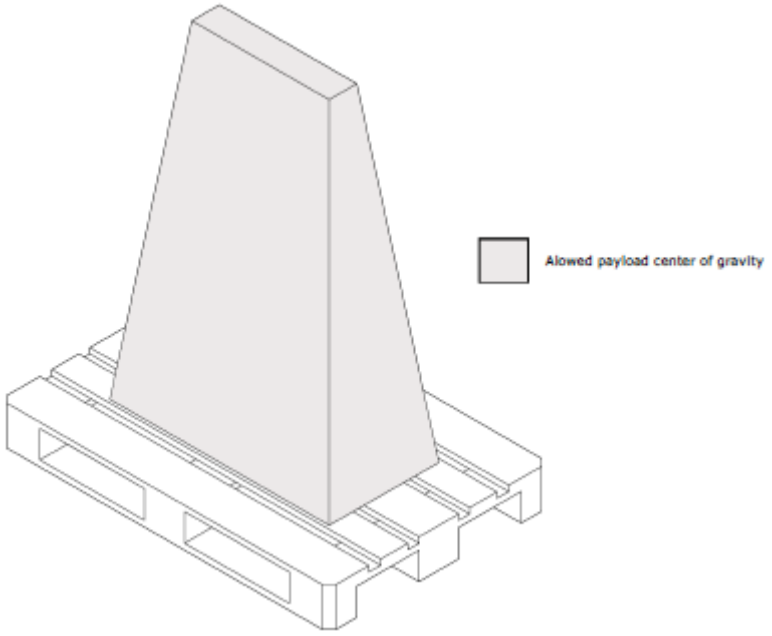


Figure 39 Permitted centre of gravity location, 3D, load max. 100 kg + 25 kg pallet

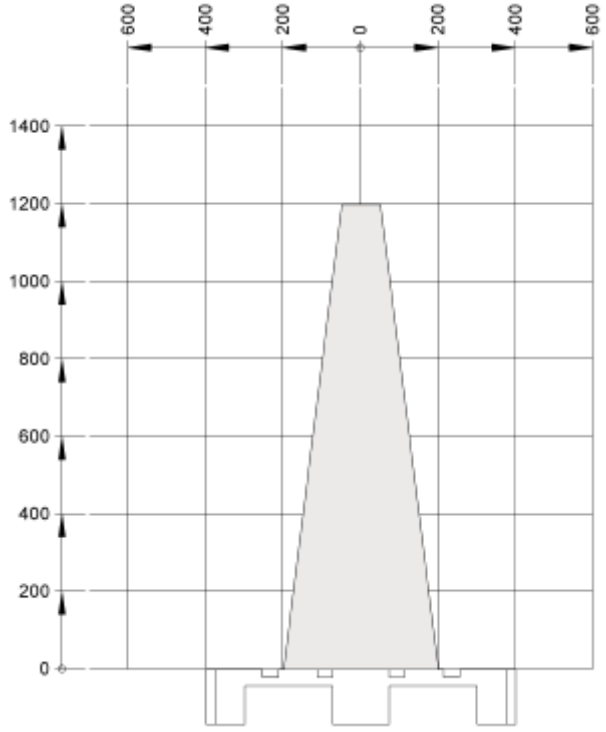


Figure 40 Permitted centre of gravity location, end, load max. 100 kg + 25 kg pallet

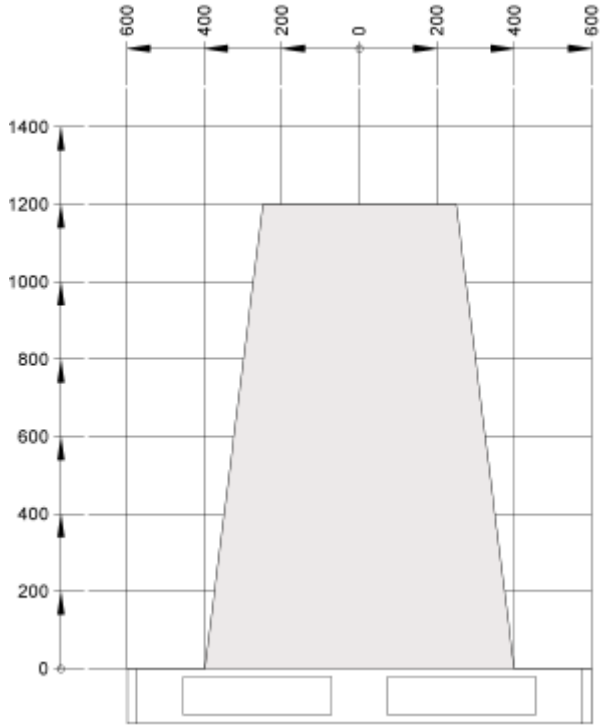


Figure 41 Permitted centre of gravity location, side, load max. 100 kg + 25 kg pallet

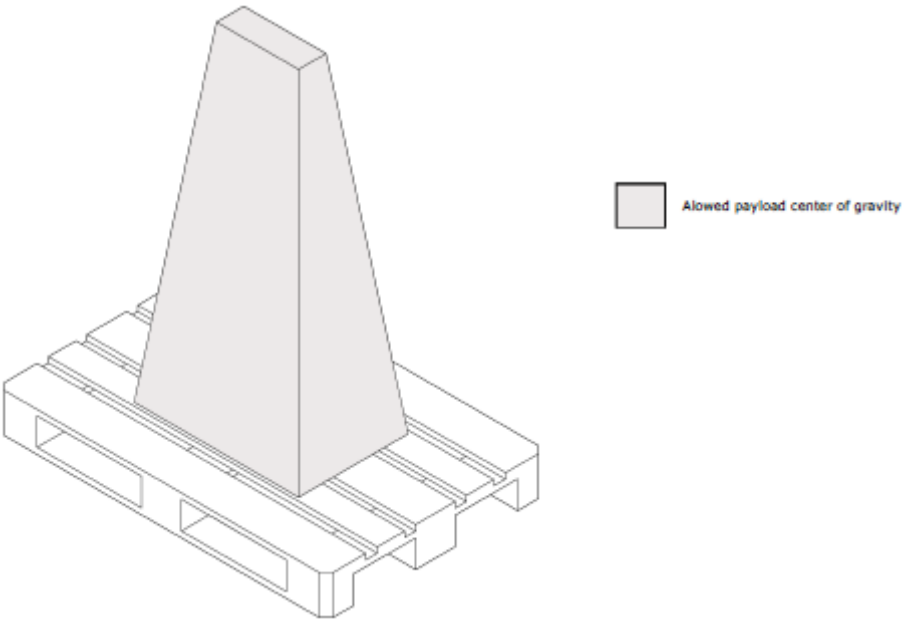


Figure 42 Permitted centre of gravity location, 3D, load 101-200 kg + 25 kg pallet

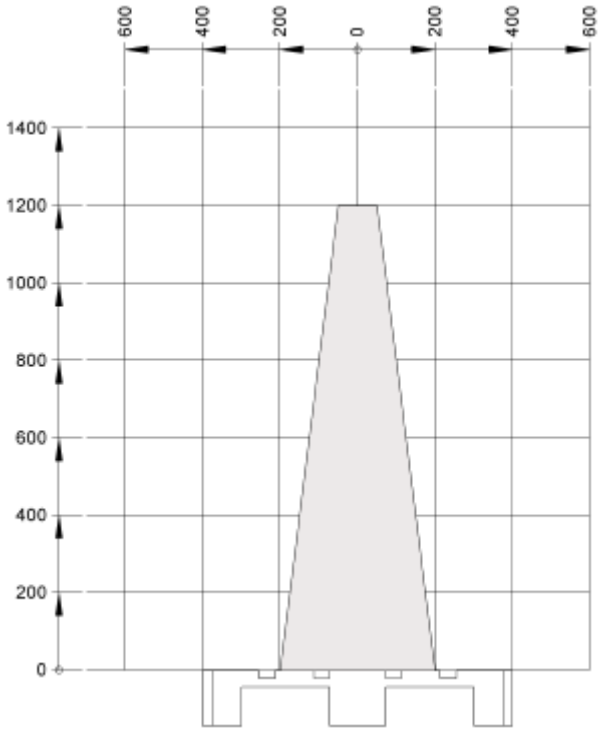


Figure 43 Permitted centre of gravity location, end, load 101-200 kg + 25 kg pallet

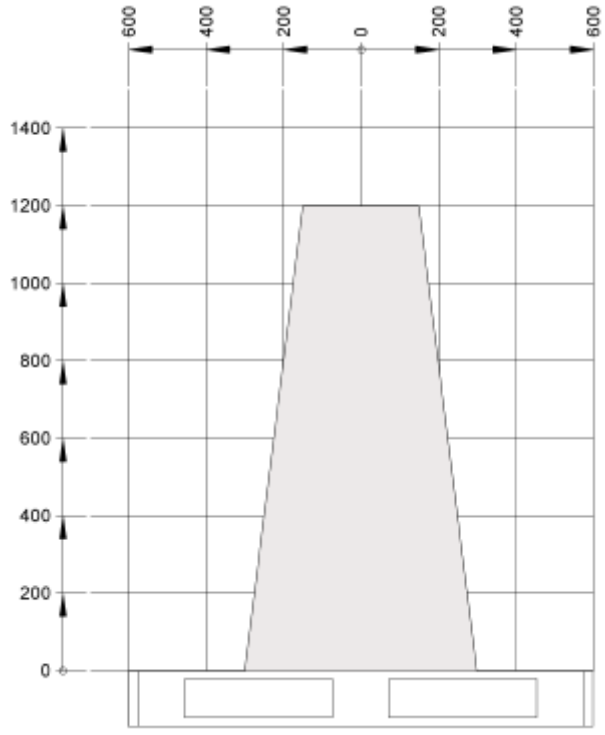


Figure 44 Permitted centre of gravity location, side, load 101-200 kg + 25 kg pallet

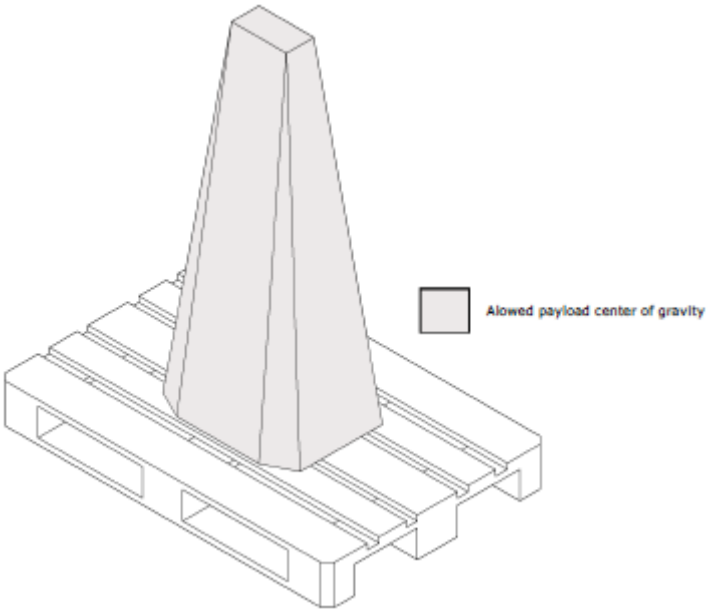


Figure 45 Permitted centre of gravity location, 3D, load 201-300 kg + 25 kg pallet

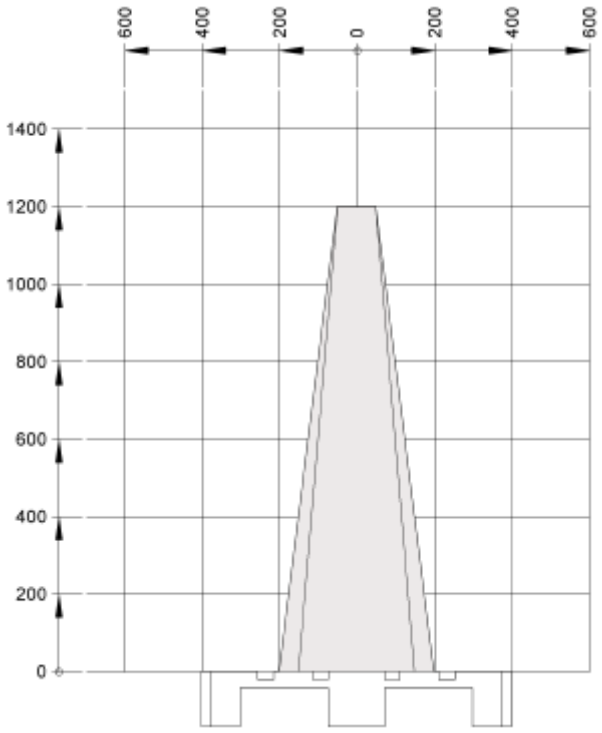


Figure 46 Permitted centre of gravity location, end, load 201-300 kg + 25 kg pallet

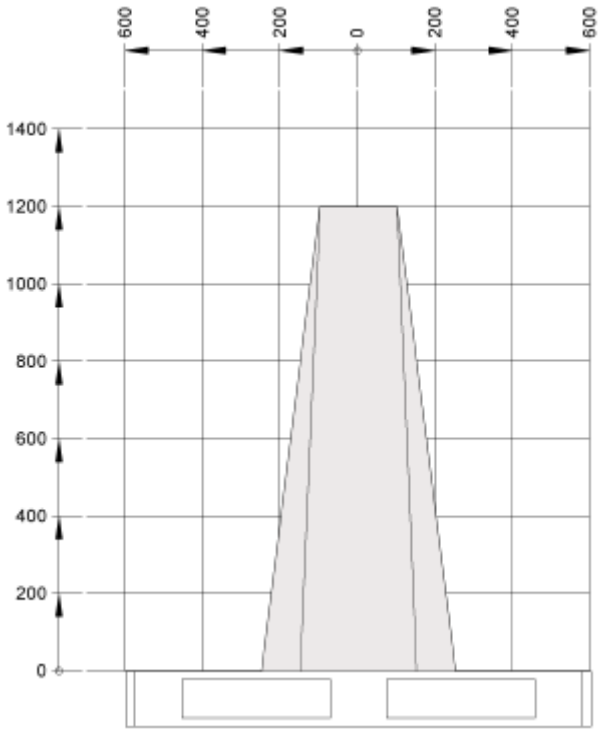


Figure 47 Permitted centre of gravity location, side, load 201-300 kg + 25 kg pallet

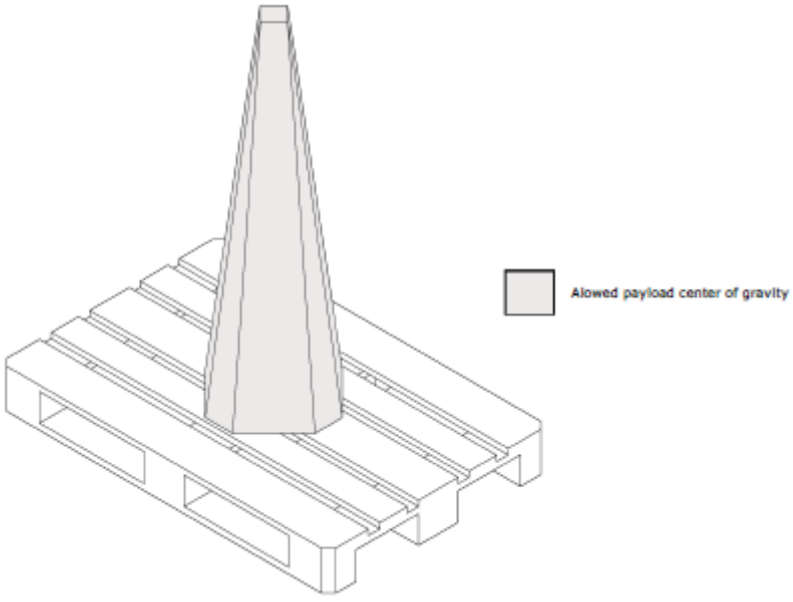


Figure 48 Permitted centre of gravity location, 3D, load 301-400 kg + 25 kg pallet

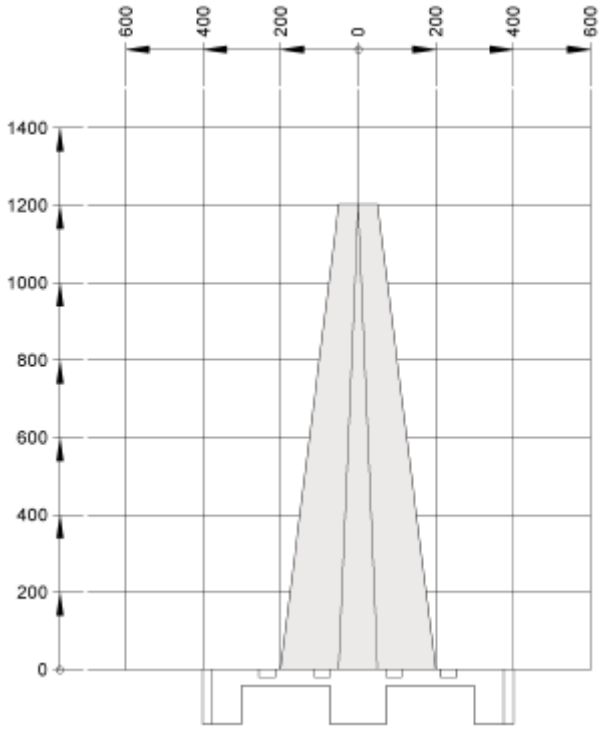


Figure 49 Permitted centre of gravity location, end, load 301-400 kg + 25 kg pallet

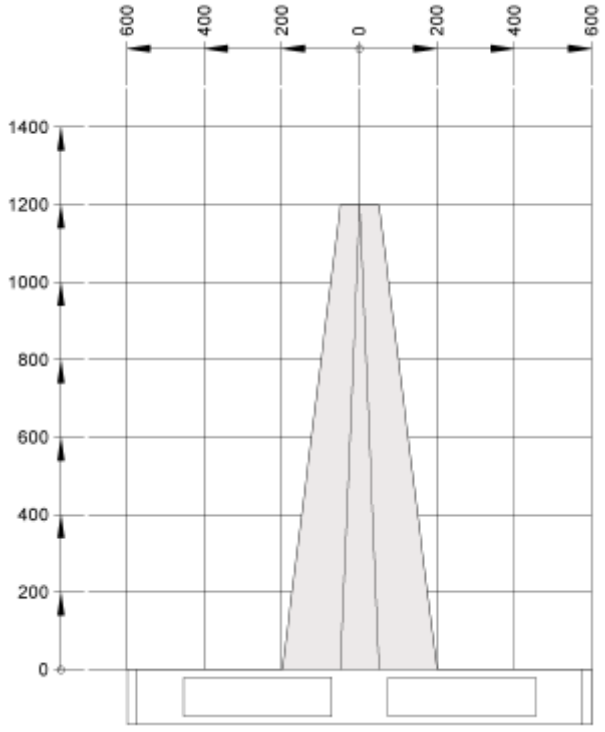
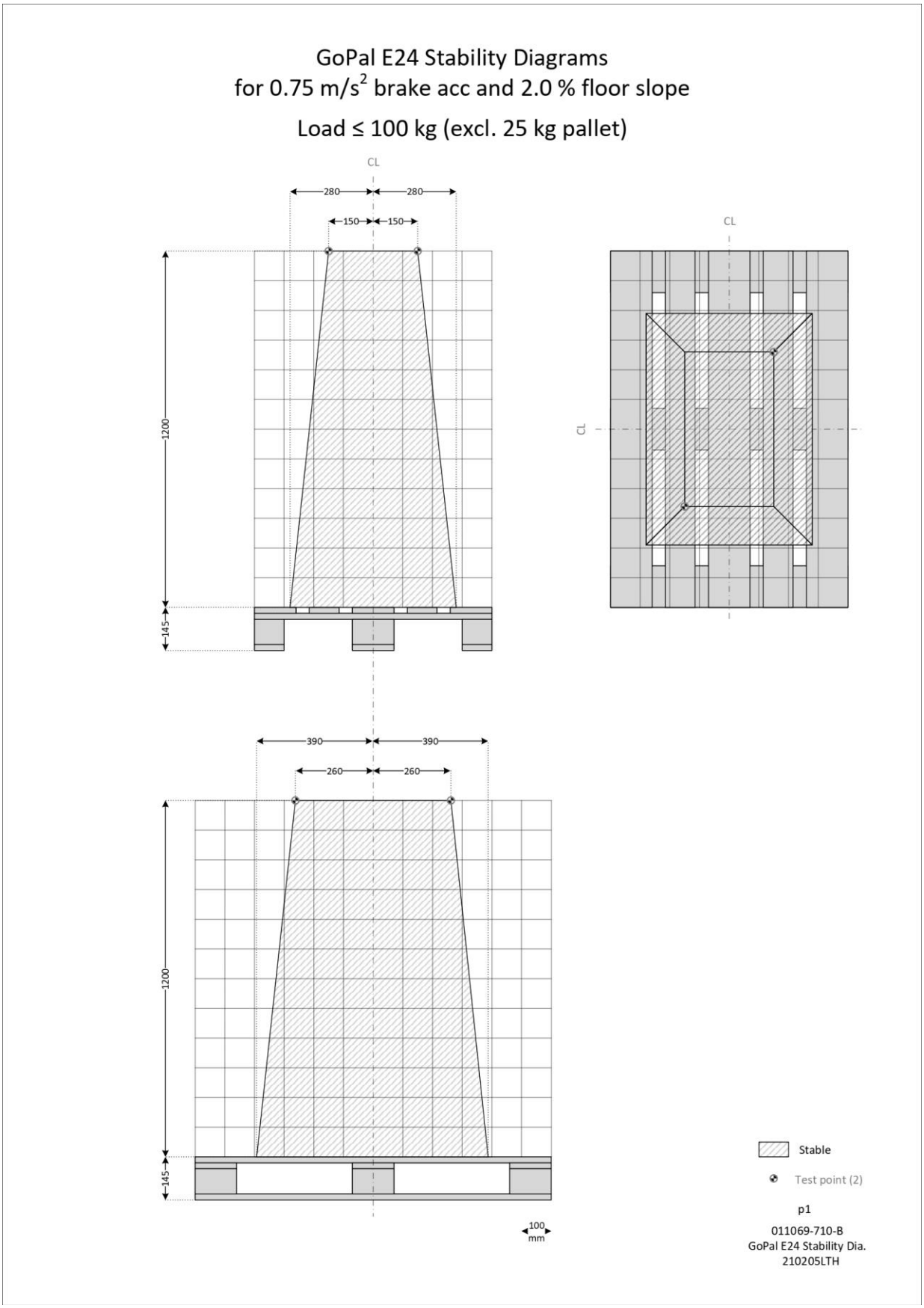


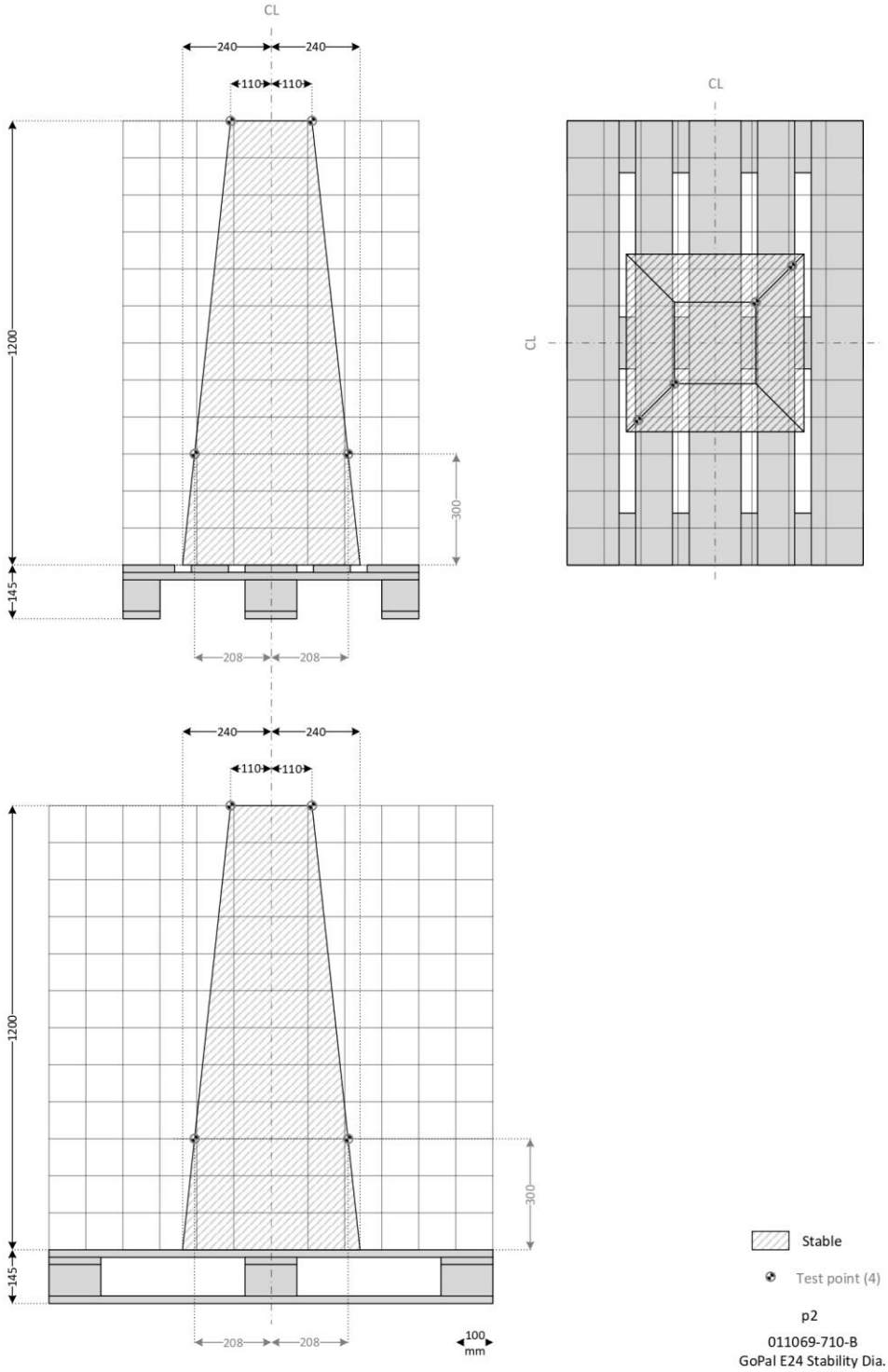
Figure 50 Permitted centre of gravity location, side, load 301-400 kg + 25 kg pallet

16.2 GoPal E24 Stability Diagrams



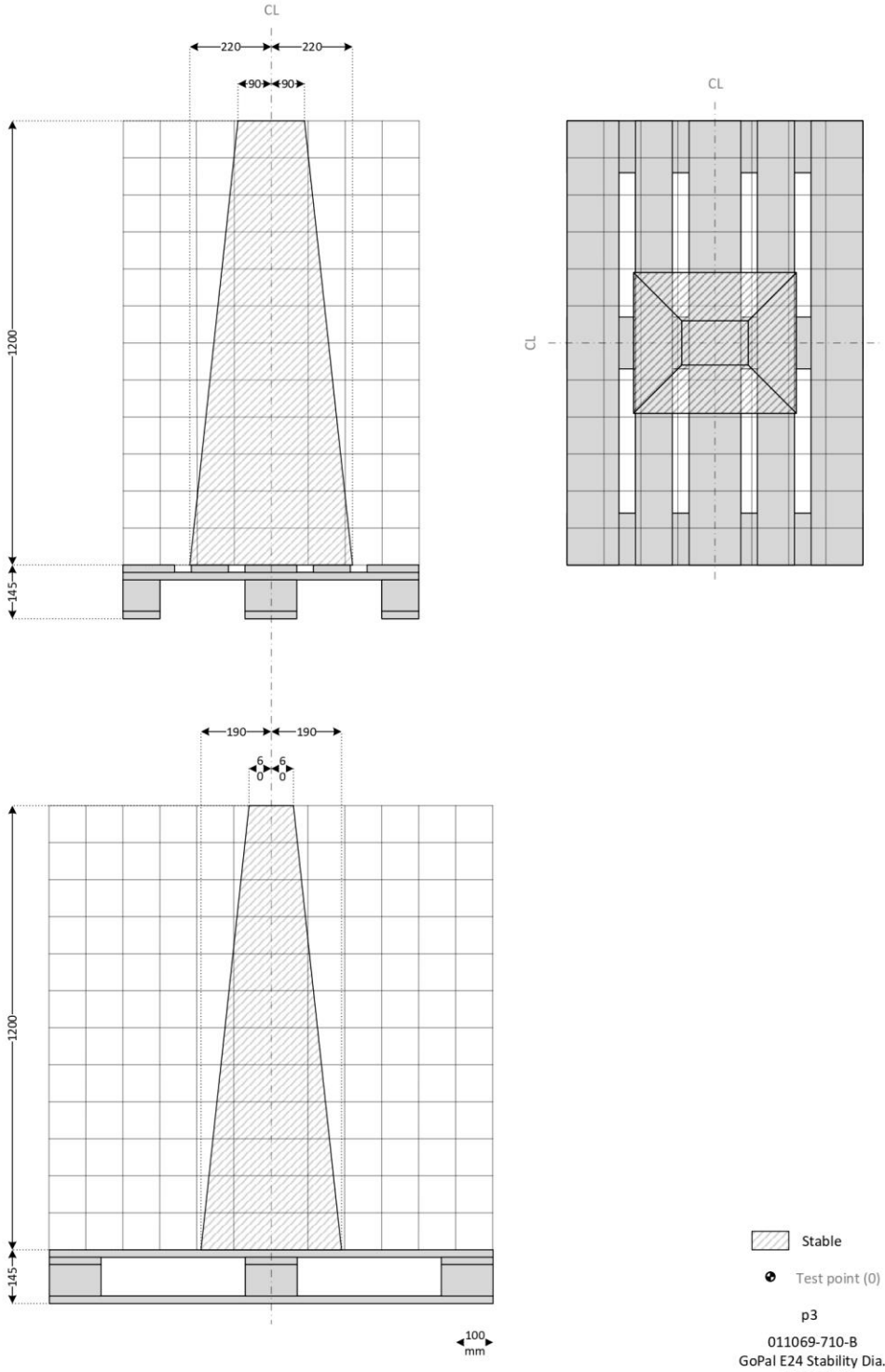
GoPal E24 Stability Diagrams
for 0.75 m/s^2 brake acc. and 2.0 % floor slope

Load ≤ 200 kg (excl. 25 kg pallet)



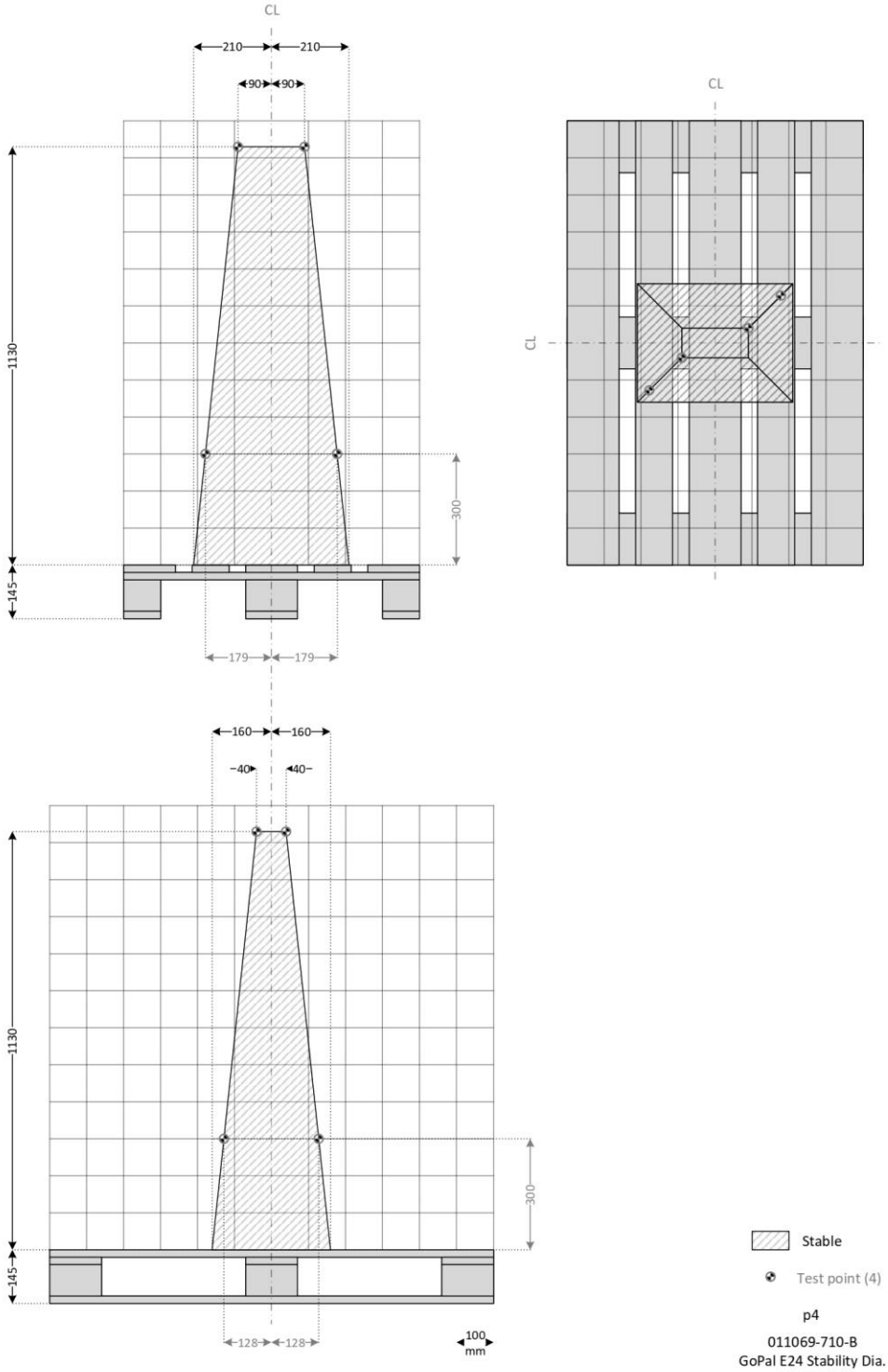
GoPal E24 Stability Diagrams
for 0.75 m/s^2 brake acc. and 2.0 % floor slope

Load ≤ 300 kg (excl. 25 kg pallet)

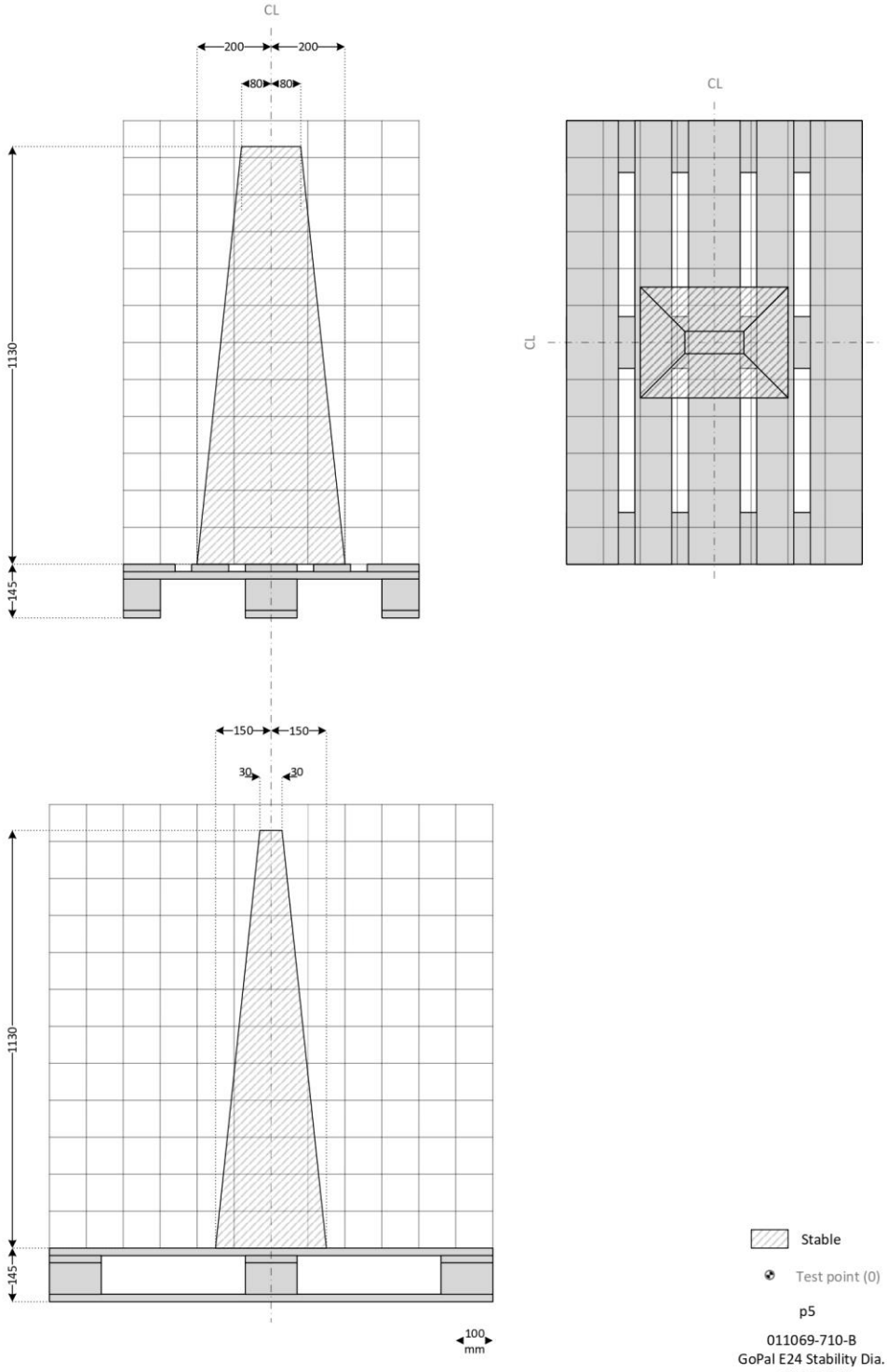


GoPal E24 Stability Diagrams
for 0.75 m/s^2 brake acc. and 2.0 % floor slope

Load ≤ 400 kg (excl. 25 kg pallet)

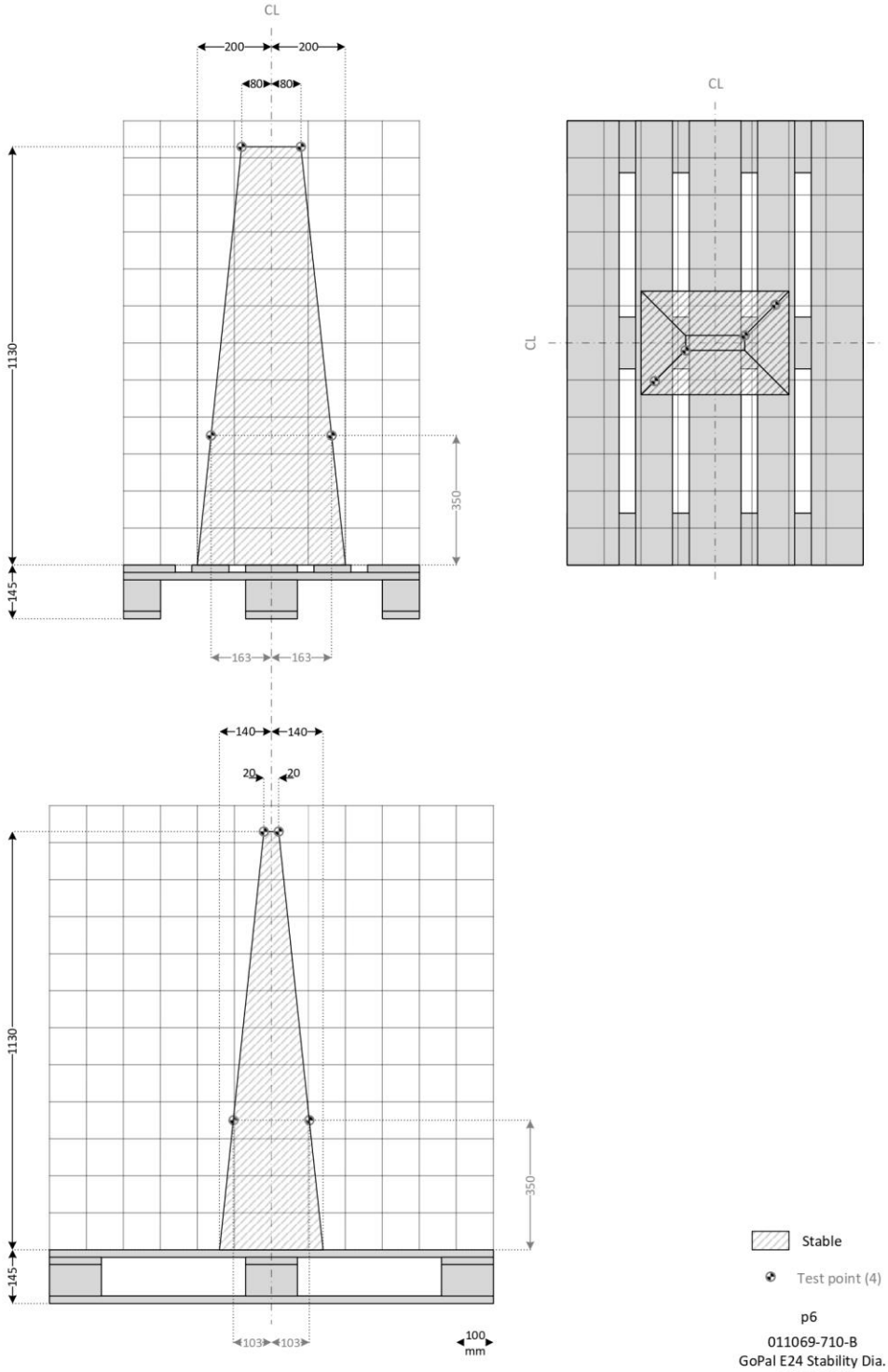


GoPal E24 Stability Diagrams
for 0.75 m/s^2 brake acc and 2.0 % floor slope
Load ≤ 500 kg (excl. 25 kg pallet)



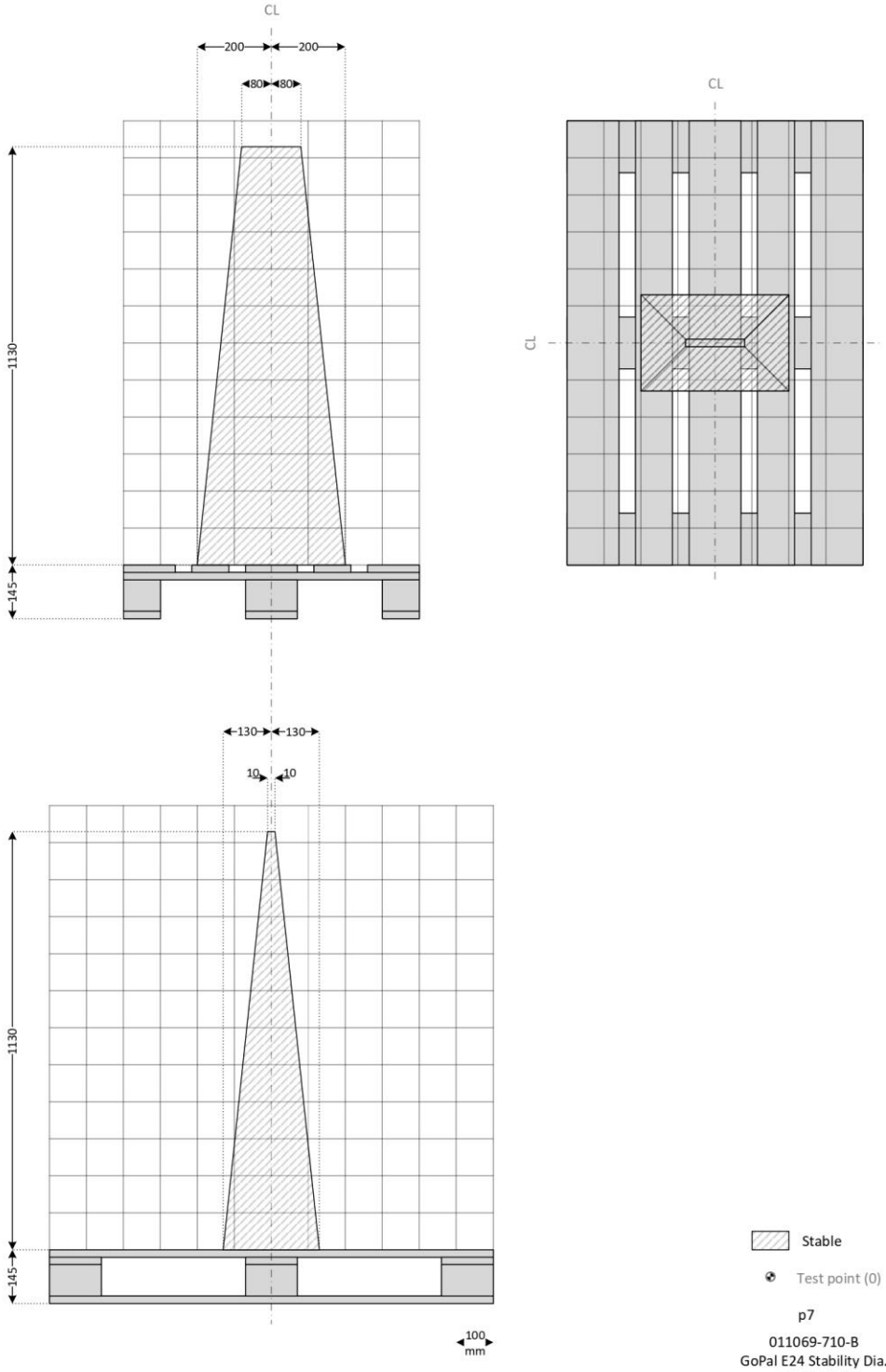
GoPal E24 Stability Diagrams
for 0.75 m/s^2 brake acc. and 2.0 % floor slope

Load ≤ 600 kg (excl. 25 kg pallet)



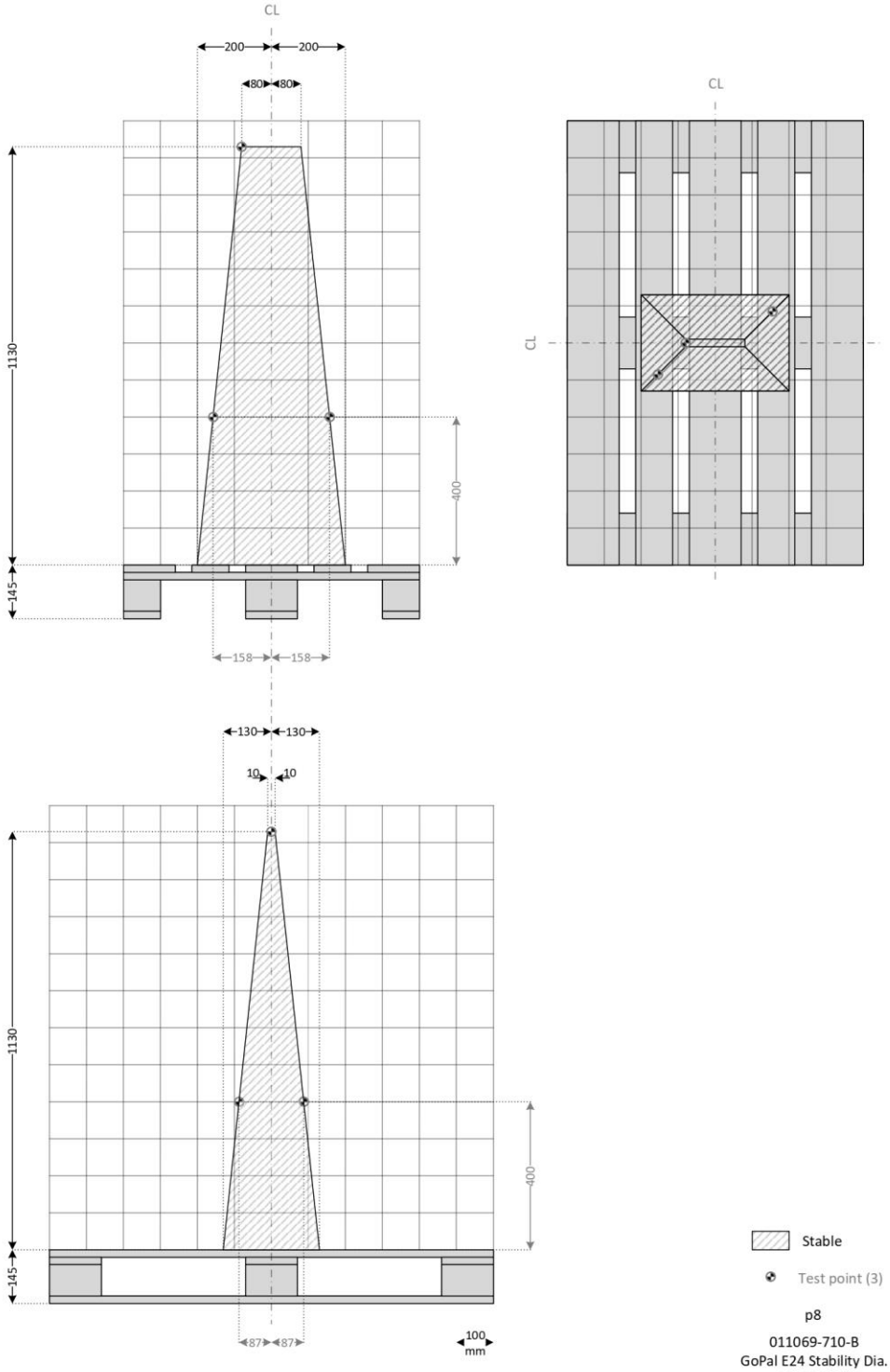
GoPal E24 Stability Diagrams
for 0.75 m/s^2 brake acc. and 2.0 % floor slope

Load ≤ 700 kg (excl. 25 kg pallet)



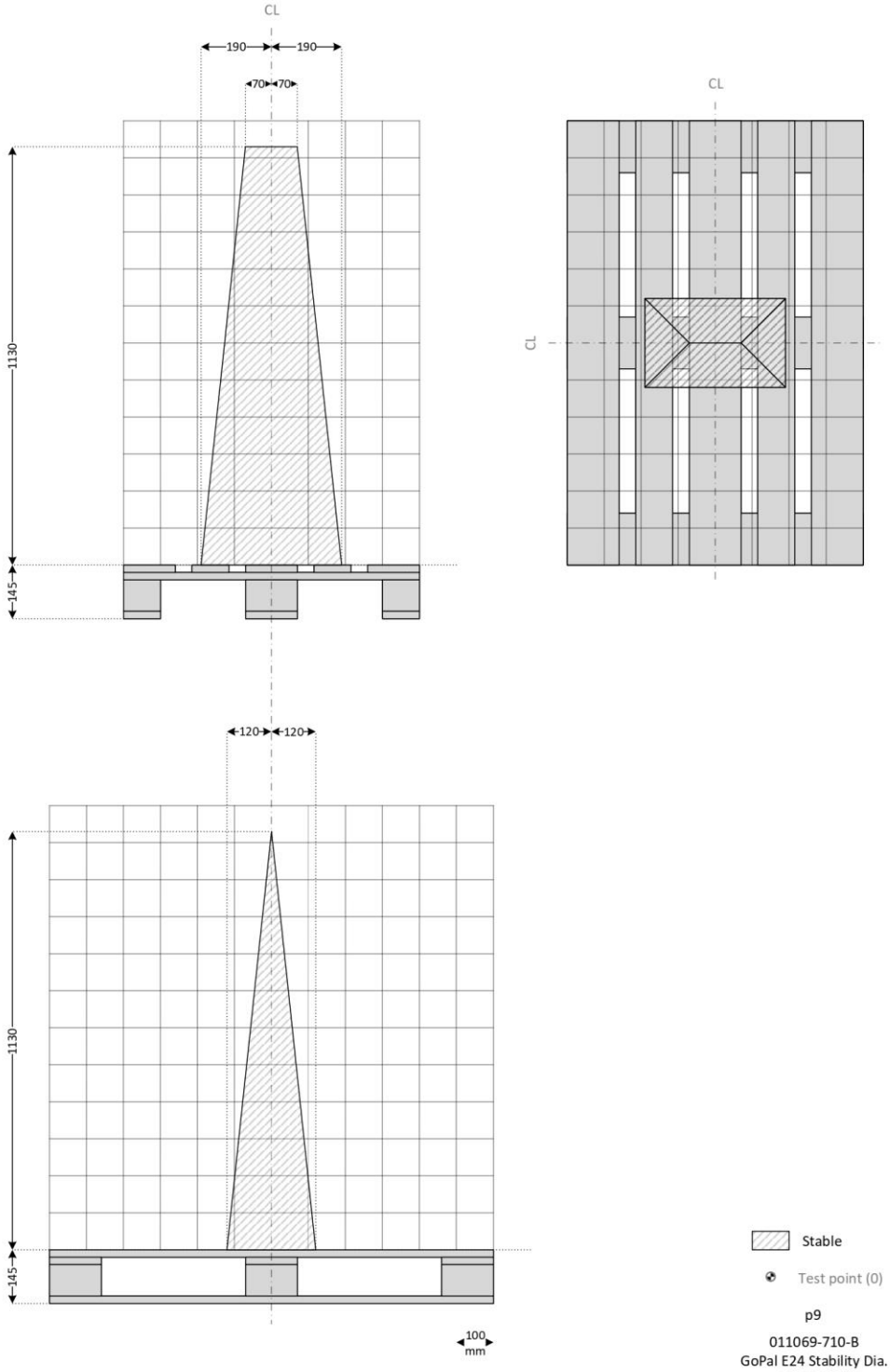
GoPal E24 Stability Diagrams
for 0.75 m/s^2 brake acc. and 2.0 % floor slope

Load ≤ 800 kg (excl. 25 kg pallet)



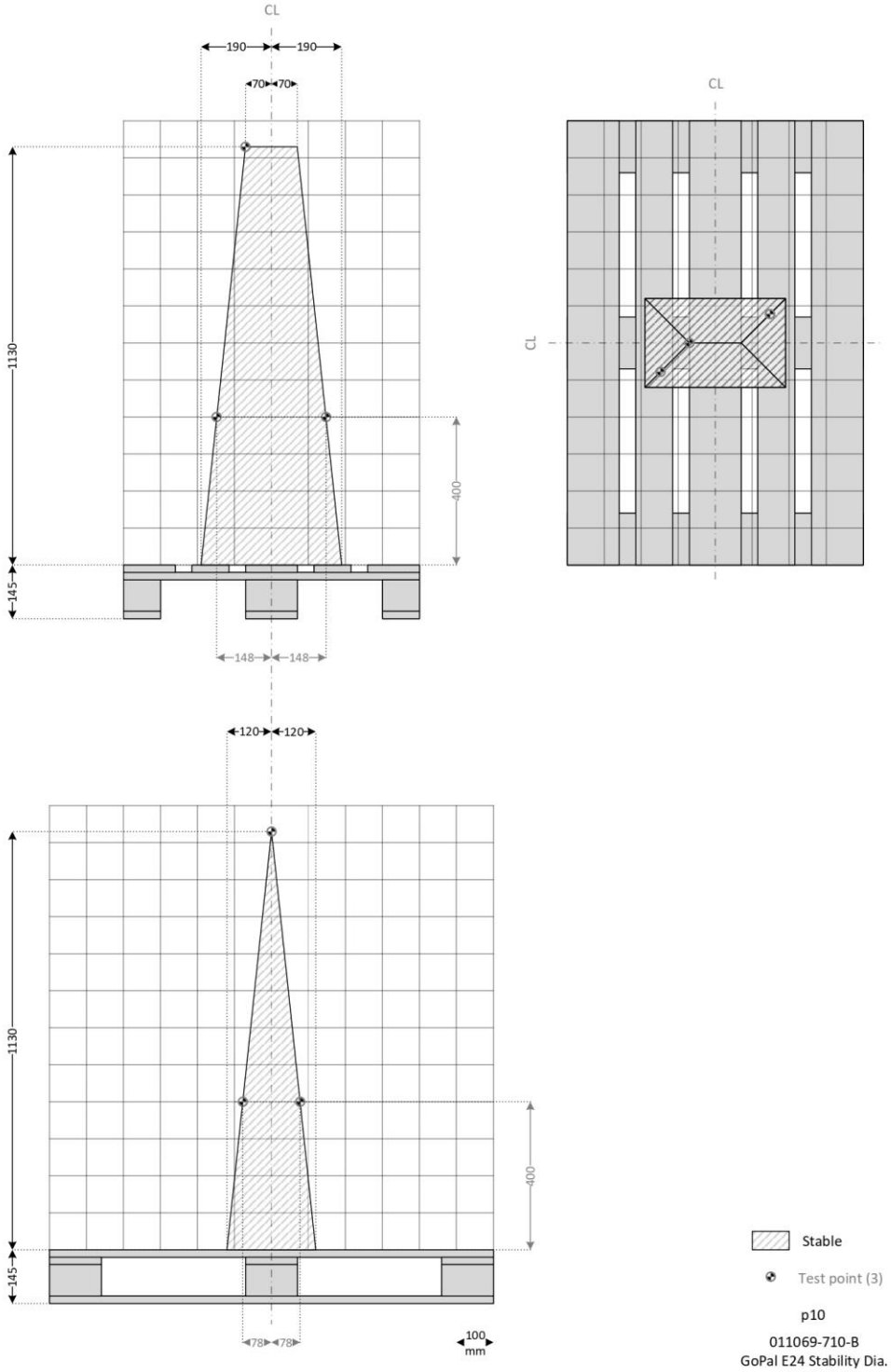
GoPal E24 Stability Diagrams
for 0.75 m/s^2 brake acc. and 2.0 % floor slope

Load ≤ 900 kg (excl. 25 kg pallet)

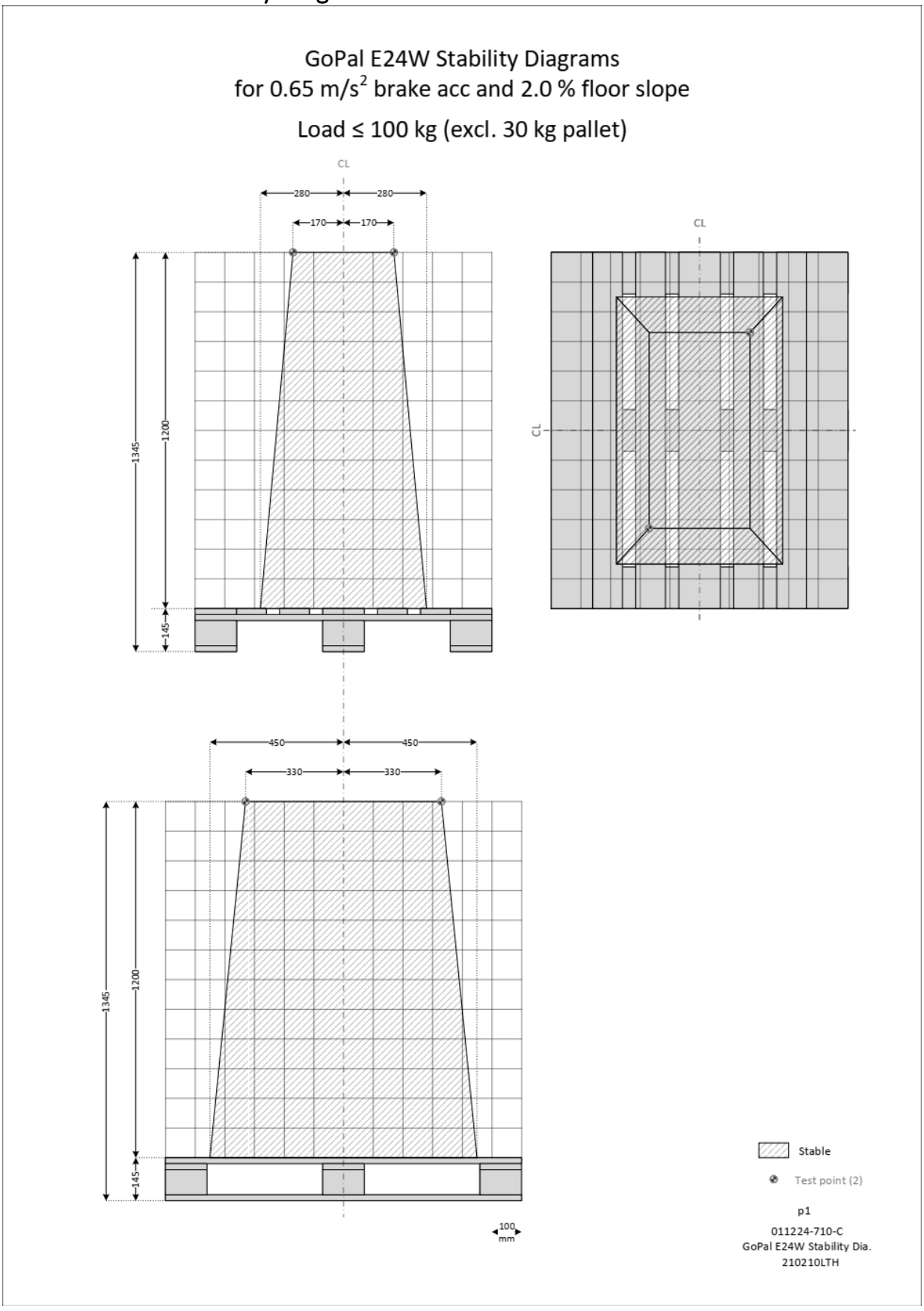


GoPal E24 Stability Diagrams
for 0.75 m/s^2 brake acc. and 2.0 % floor slope

Load ≤ 1000 kg (excl. 25 kg pallet)

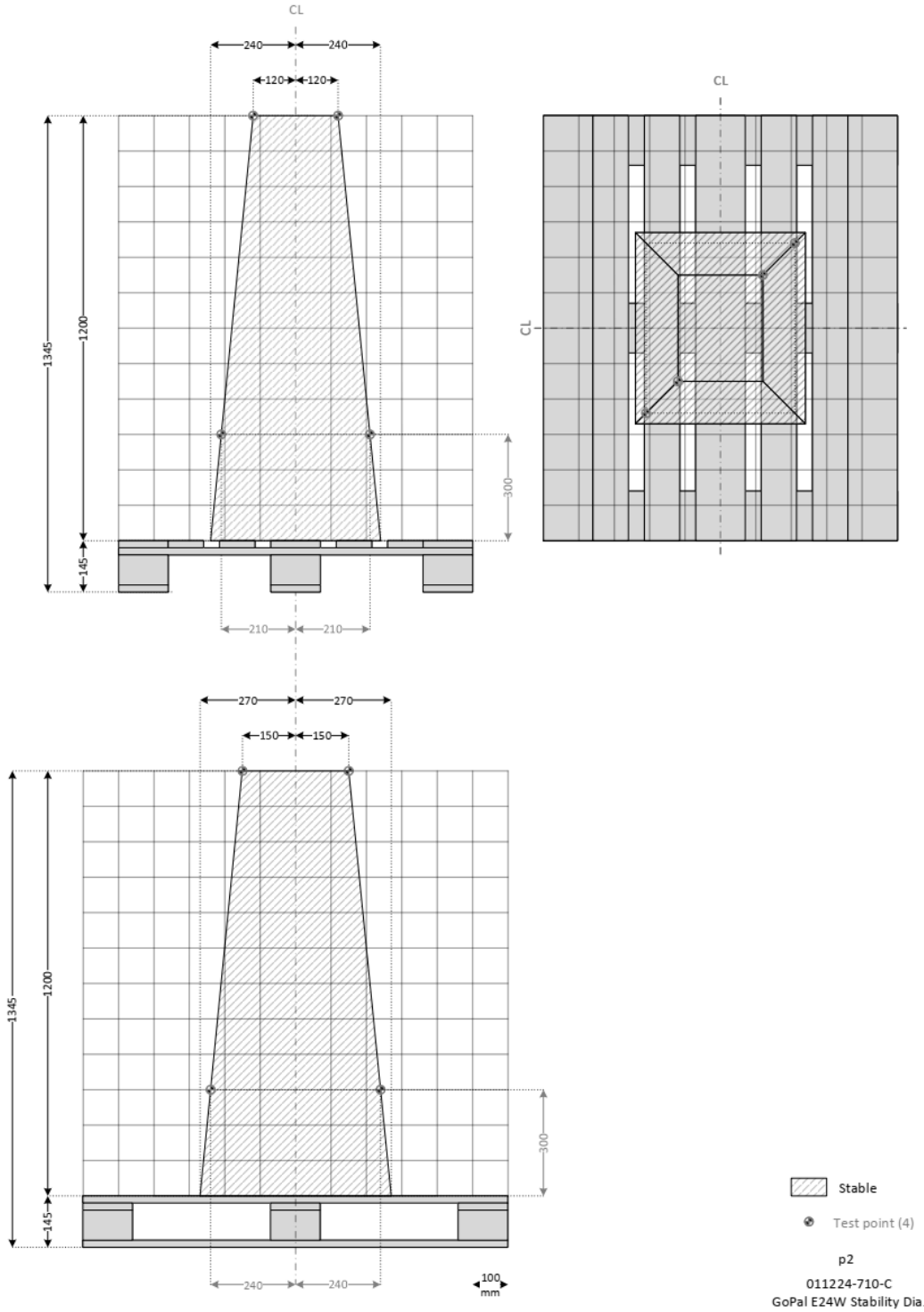


16.3 GoPal E24W Stability Diagrams



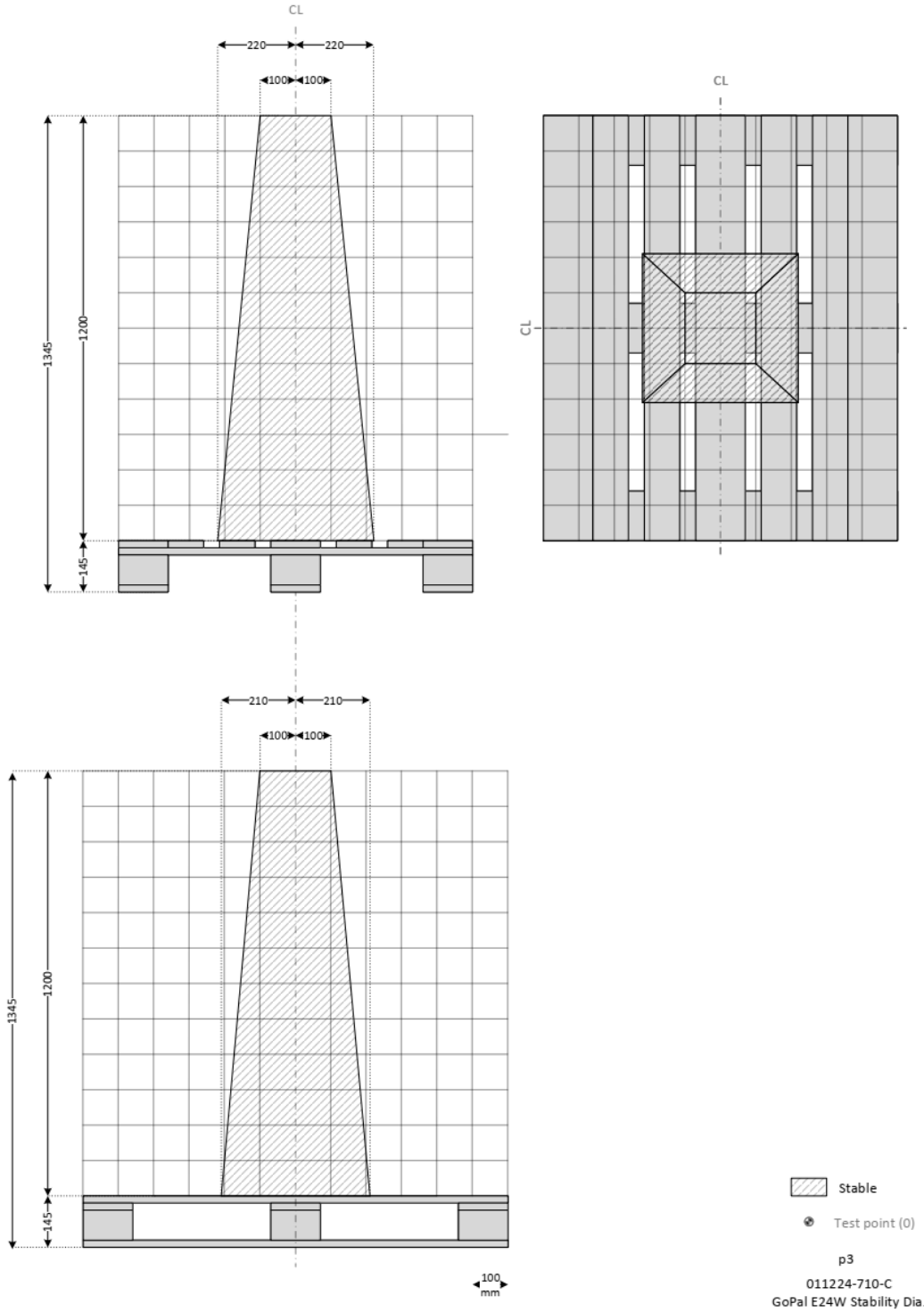
GoPal E24W Stability Diagrams
for 0.65 m/s^2 brake acc. and 2.0 % floor slope

Load ≤ 200 kg (excl. 30 kg pallet)

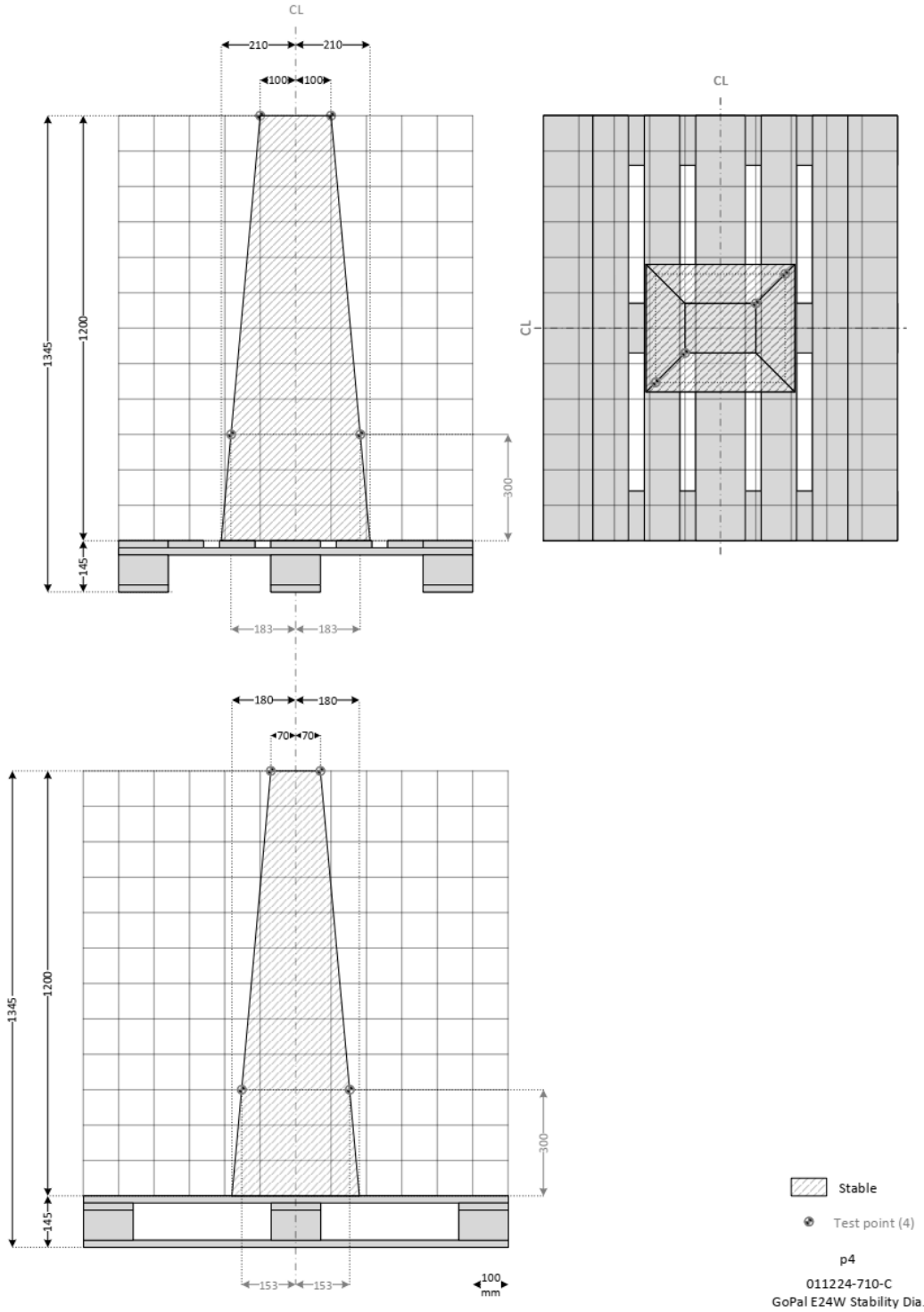


GoPal E24W Stability Diagrams
for 0.65 m/s^2 brake acc. and 2.0 % floor slope

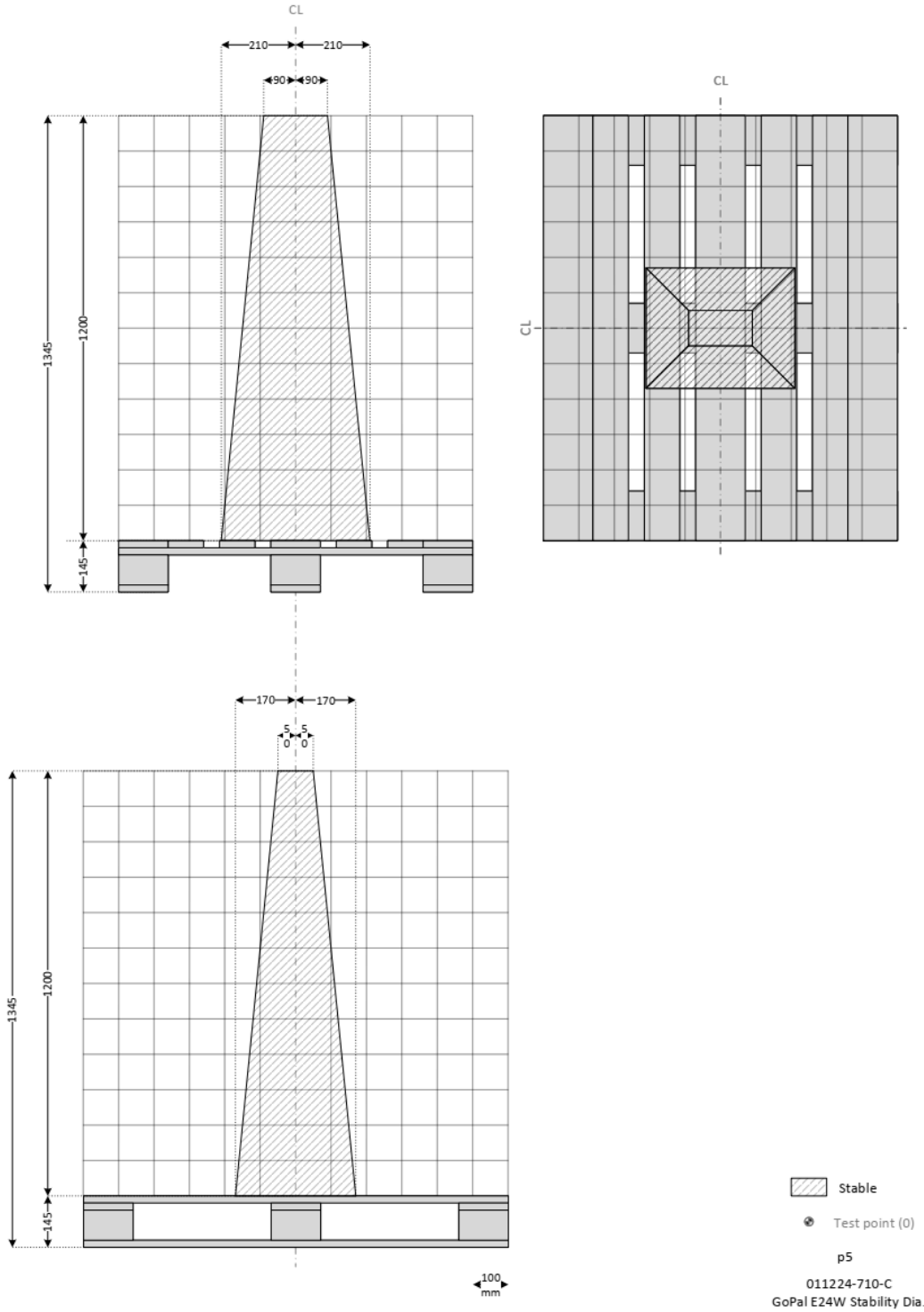
Load ≤ 300 kg (excl. 30 kg pallet)



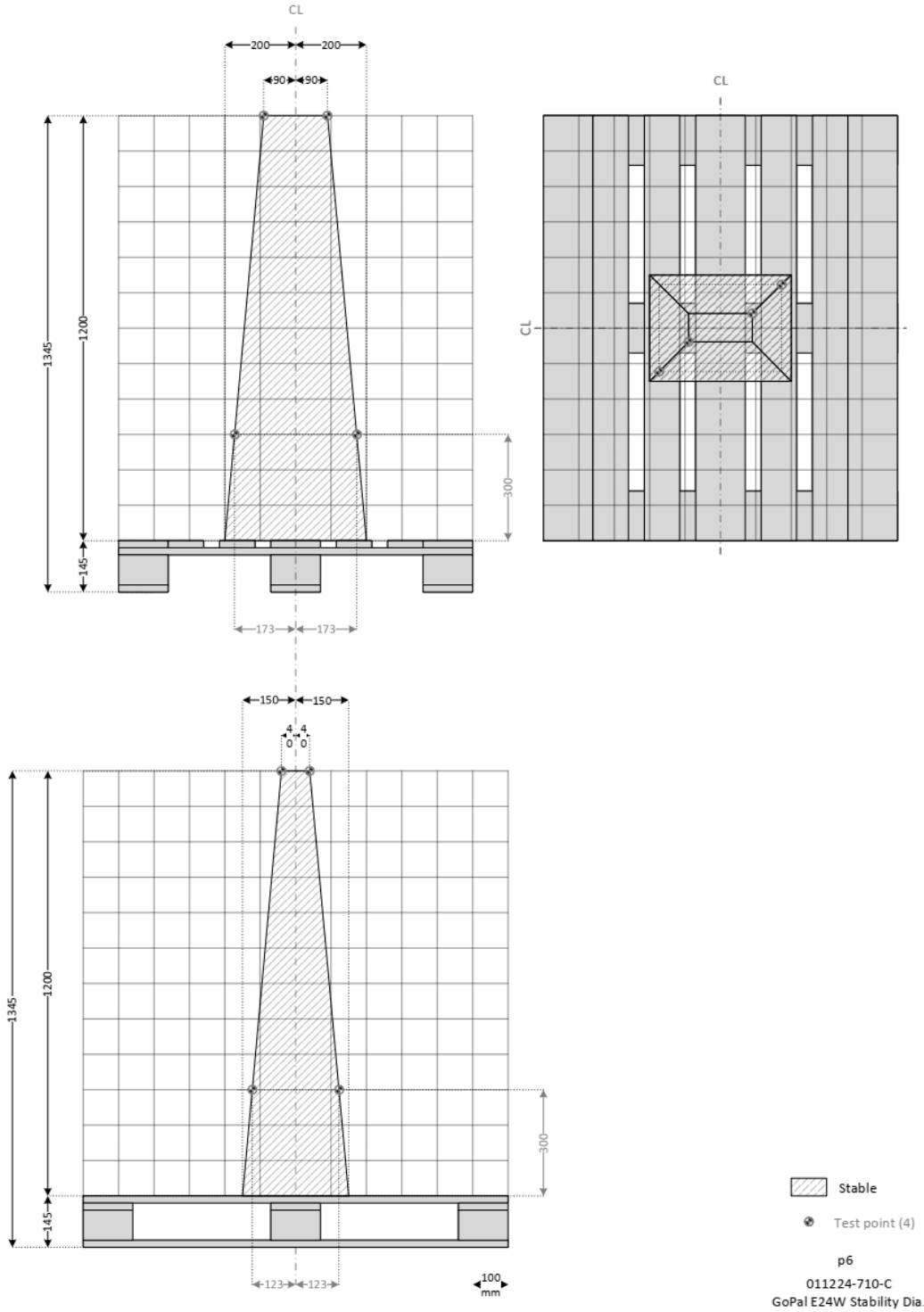
GoPal E24W Stability Diagrams
for 0.65 m/s^2 brake acc. and 2.0 % floor slope
Load ≤ 400 kg (excl. 30 kg pallet)



GoPal E24W Stability Diagrams
for 0.65 m/s^2 brake acc and 2.0 % floor slope
Load ≤ 500 kg (excl. 30 kg pallet)

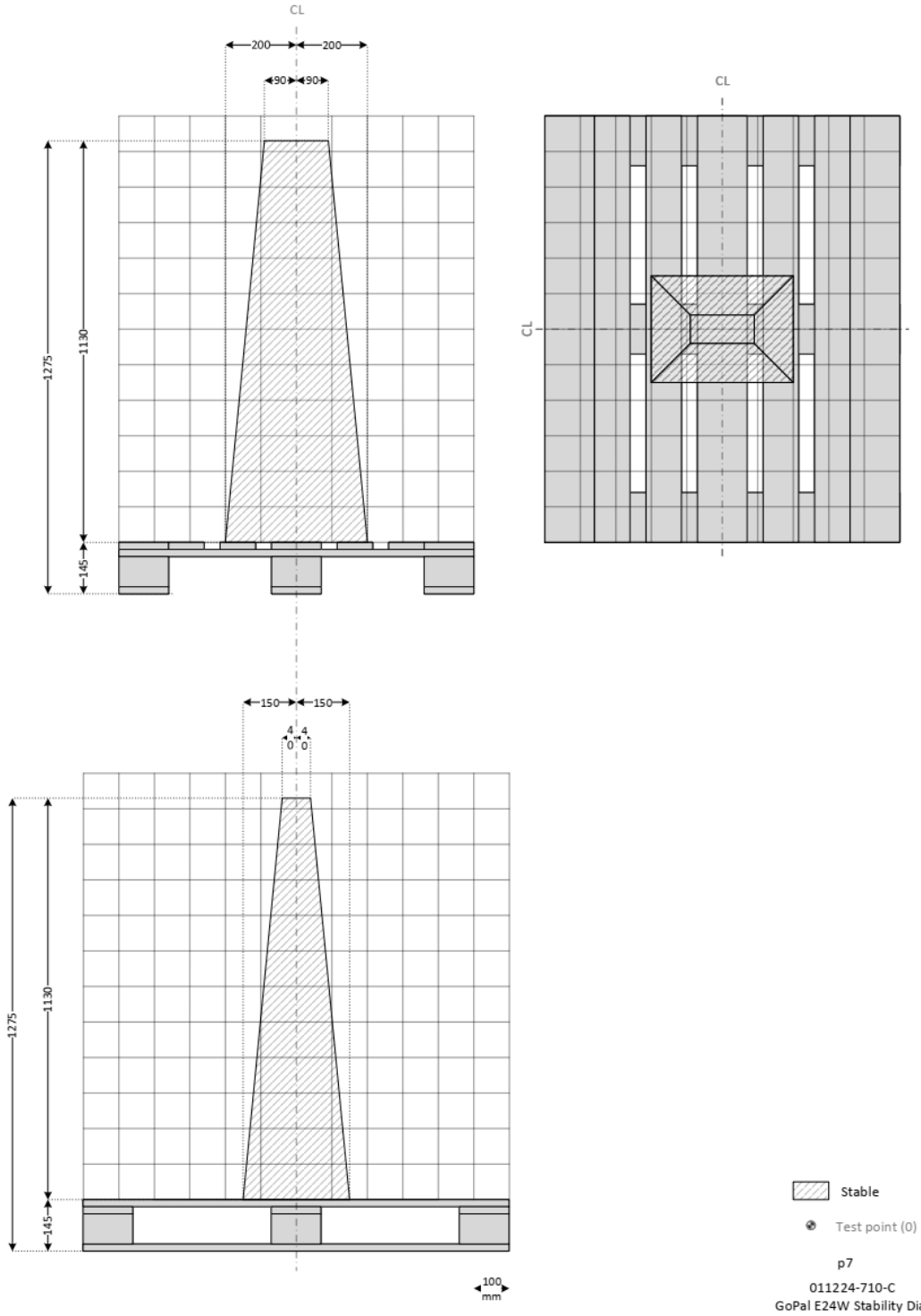


GoPal E24W Stability Diagrams
for 0.65 m/s^2 brake acc. and 2.0 % floor slope
Load ≤ 600 kg (excl. 30 kg pallet)



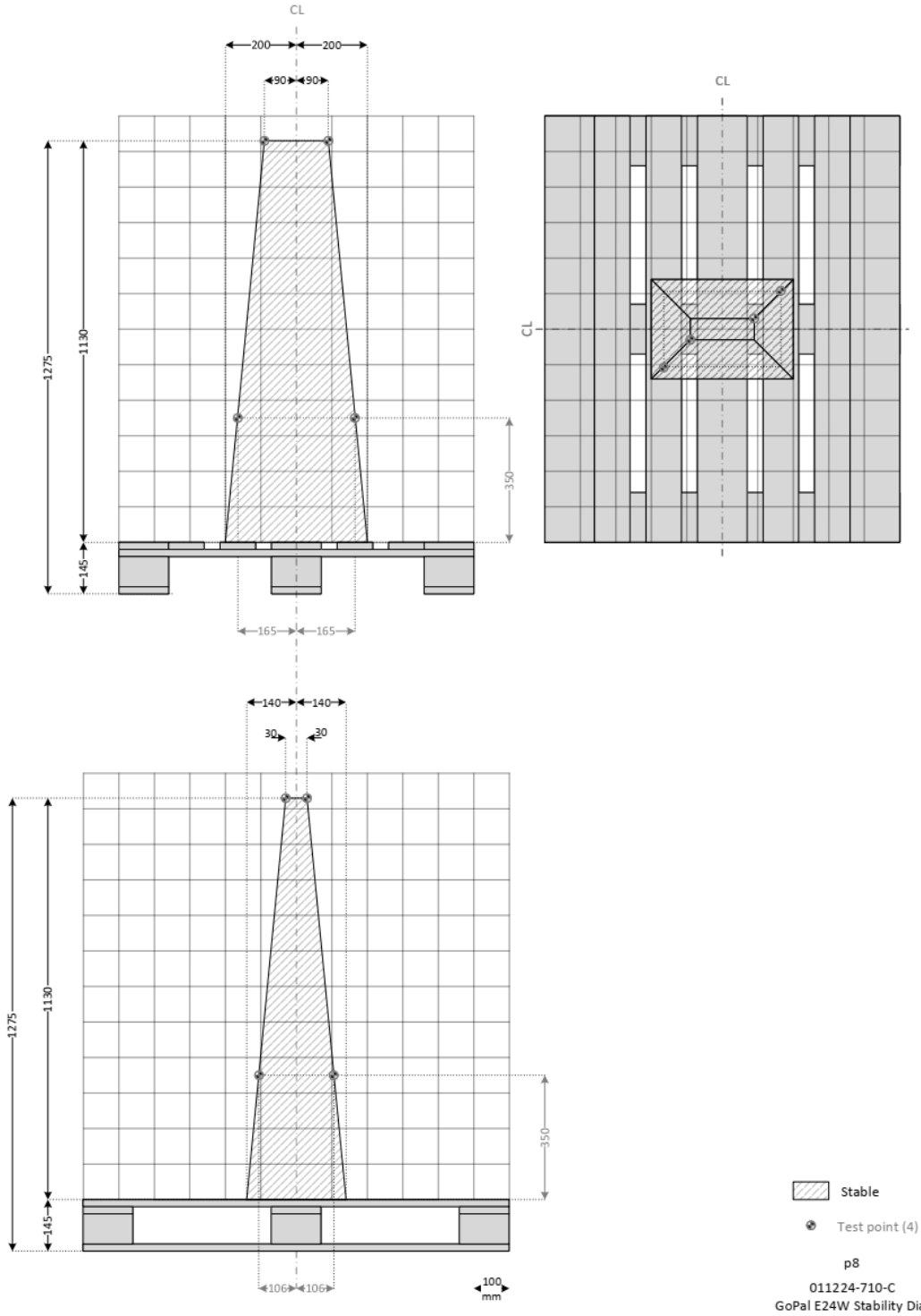
GoPal E24W Stability Diagrams
for 0.65 m/s^2 brake acc. and 2.0 % floor slope

Load ≤ 700 kg (excl. 30 kg pallet)



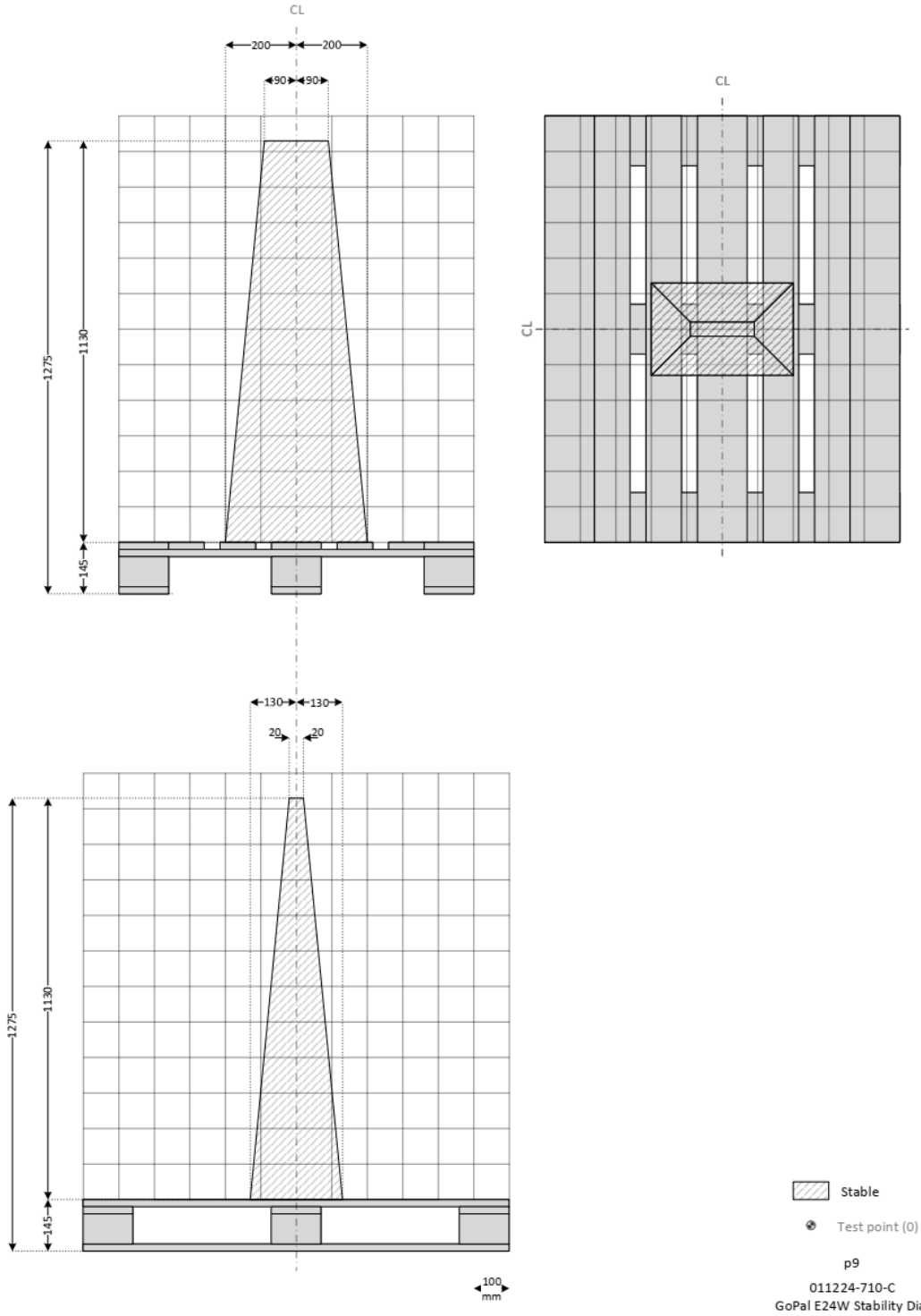
GoPal E24W Stability Diagrams
for 0.65 m/s^2 brake acc. and 2.0 % floor slope

Load ≤ 800 kg (excl. 30 kg pallet)



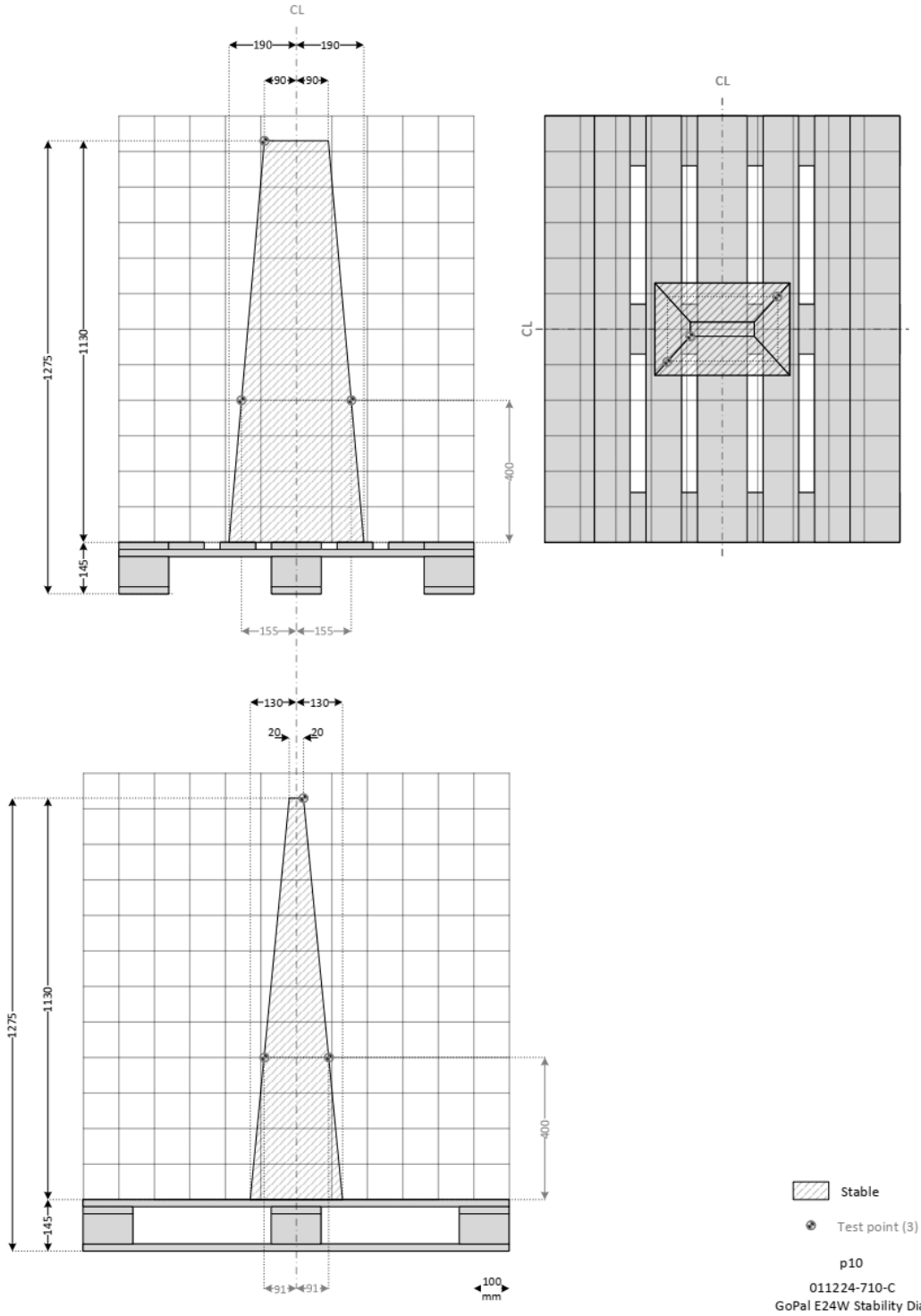
GoPal E24W Stability Diagrams
for 0.65 m/s^2 brake acc. and 2.0 % floor slope

Load ≤ 900 kg (excl. 30 kg pallet)



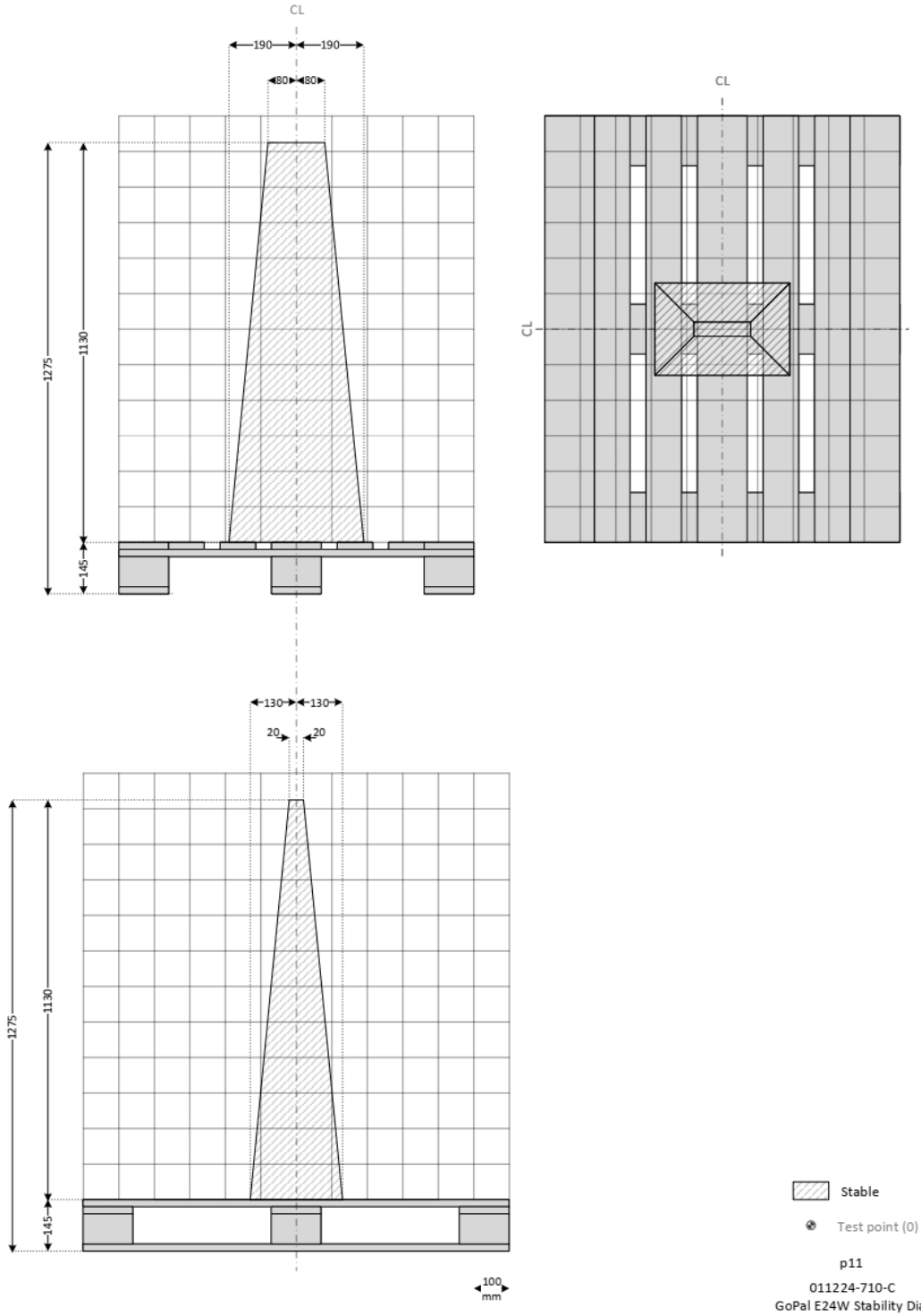
GoPal E24W Stability Diagrams
for 0.65 m/s^2 brake acc. and 2.0 % floor slope

Load ≤ 1000 kg (excl. 30 kg pallet)



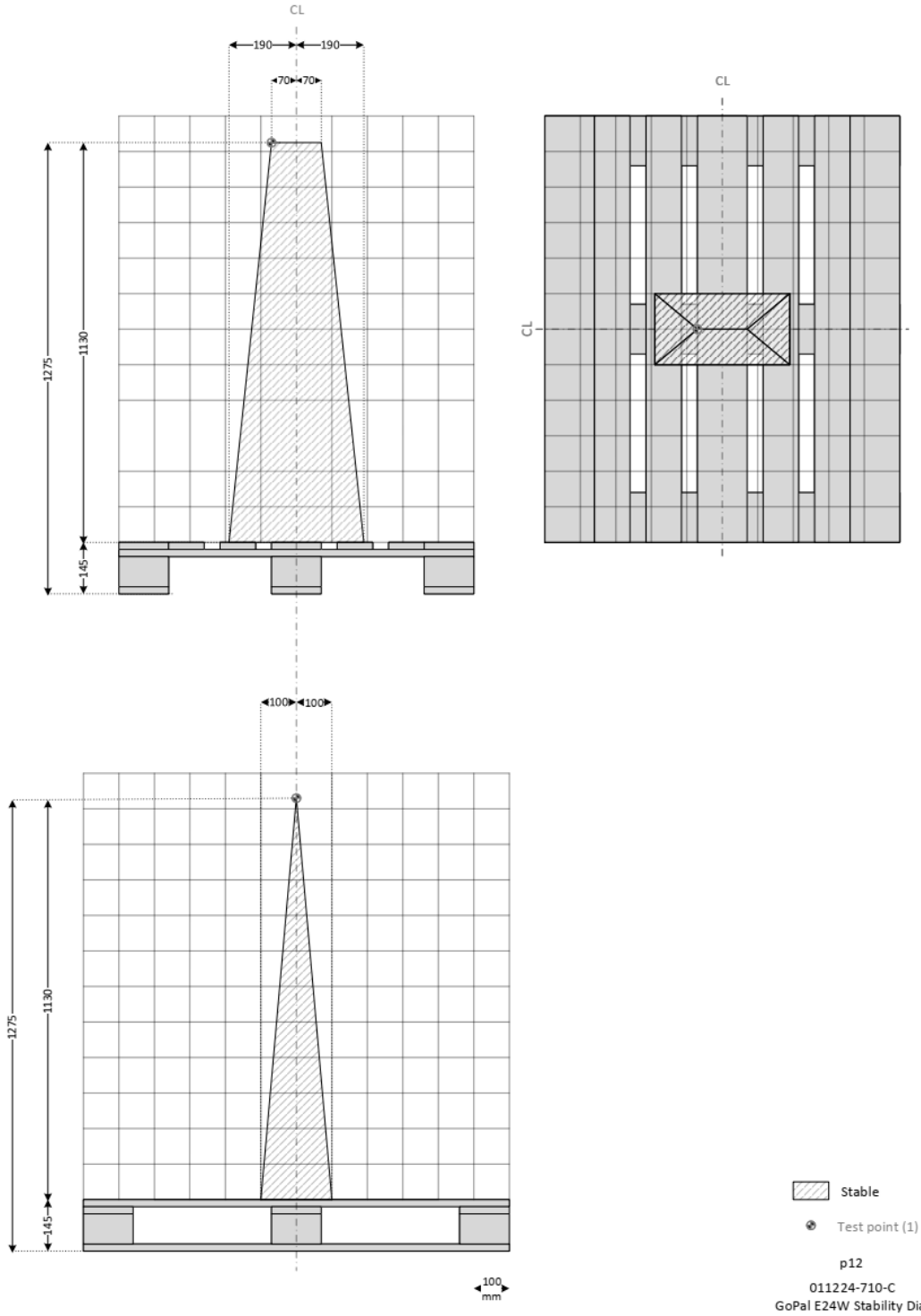
GoPal E24W Stability Diagrams
for 0.65 m/s^2 brake acc. and 2.0 % floor slope

Load ≤ 1100 kg (excl. 30 kg pallet)



GoPal E24W Stability Diagrams
for 0.65 m/s^2 brake acc. and 2.0 % floor slope

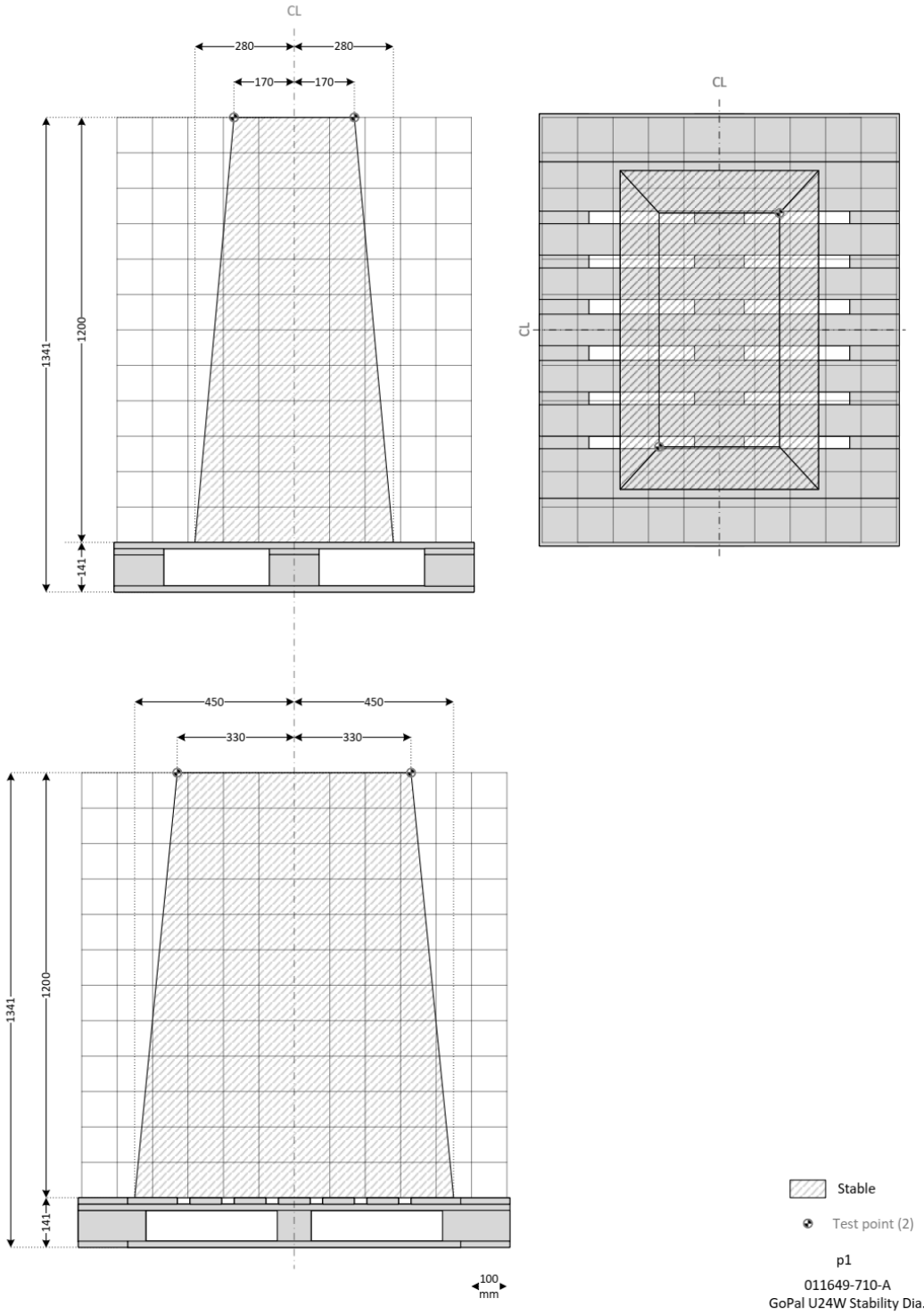
Load ≤ 1200 kg (excl. 30 kg pallet)



16.4 GoPal U24W Stability Diagrams

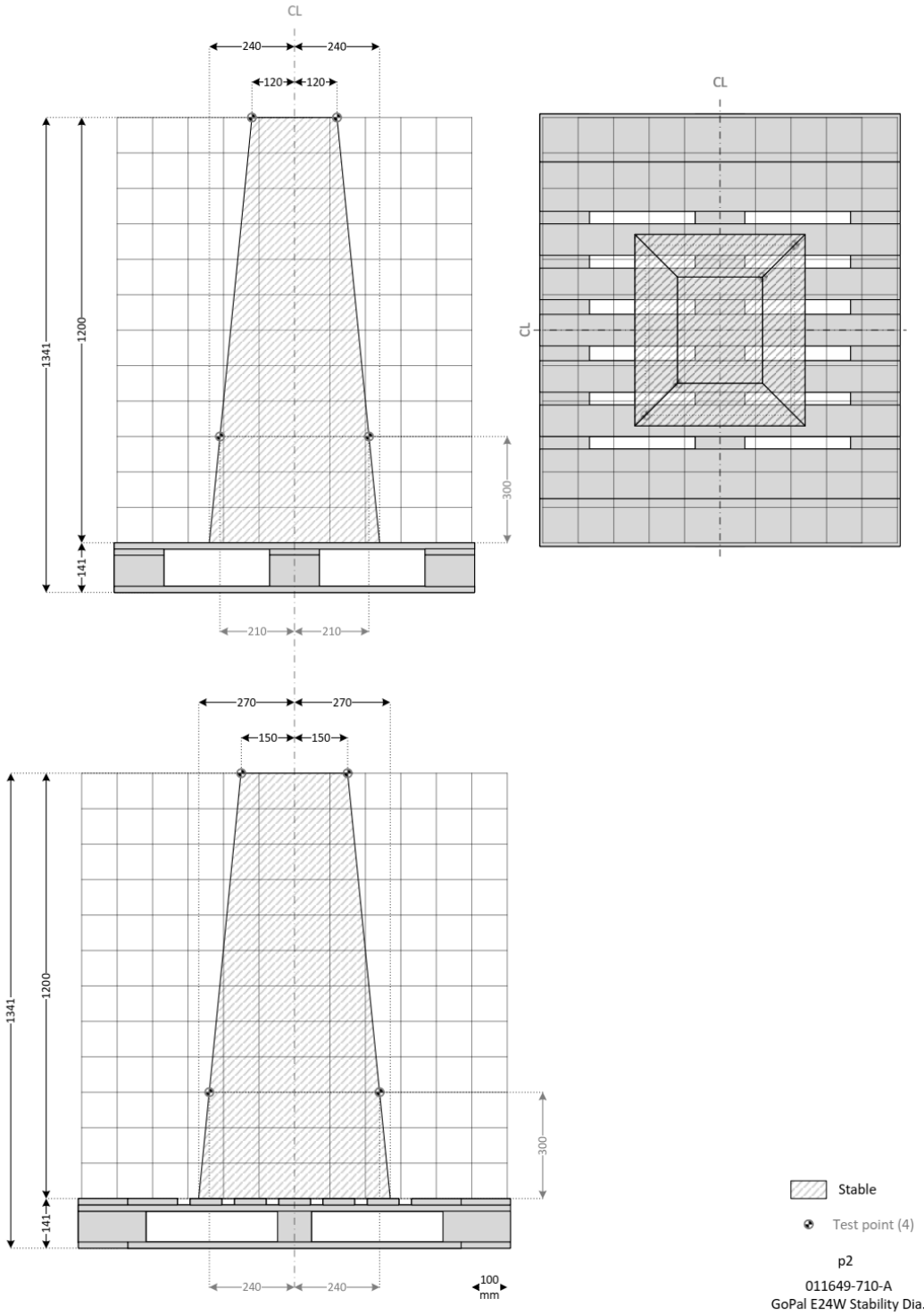
GoPal U24W Stability Diagrams
for 0.65 m/s^2 brake acc and 2.0 % floor slope

Load ≤ 100 kg (excl. 30 kg pallet)



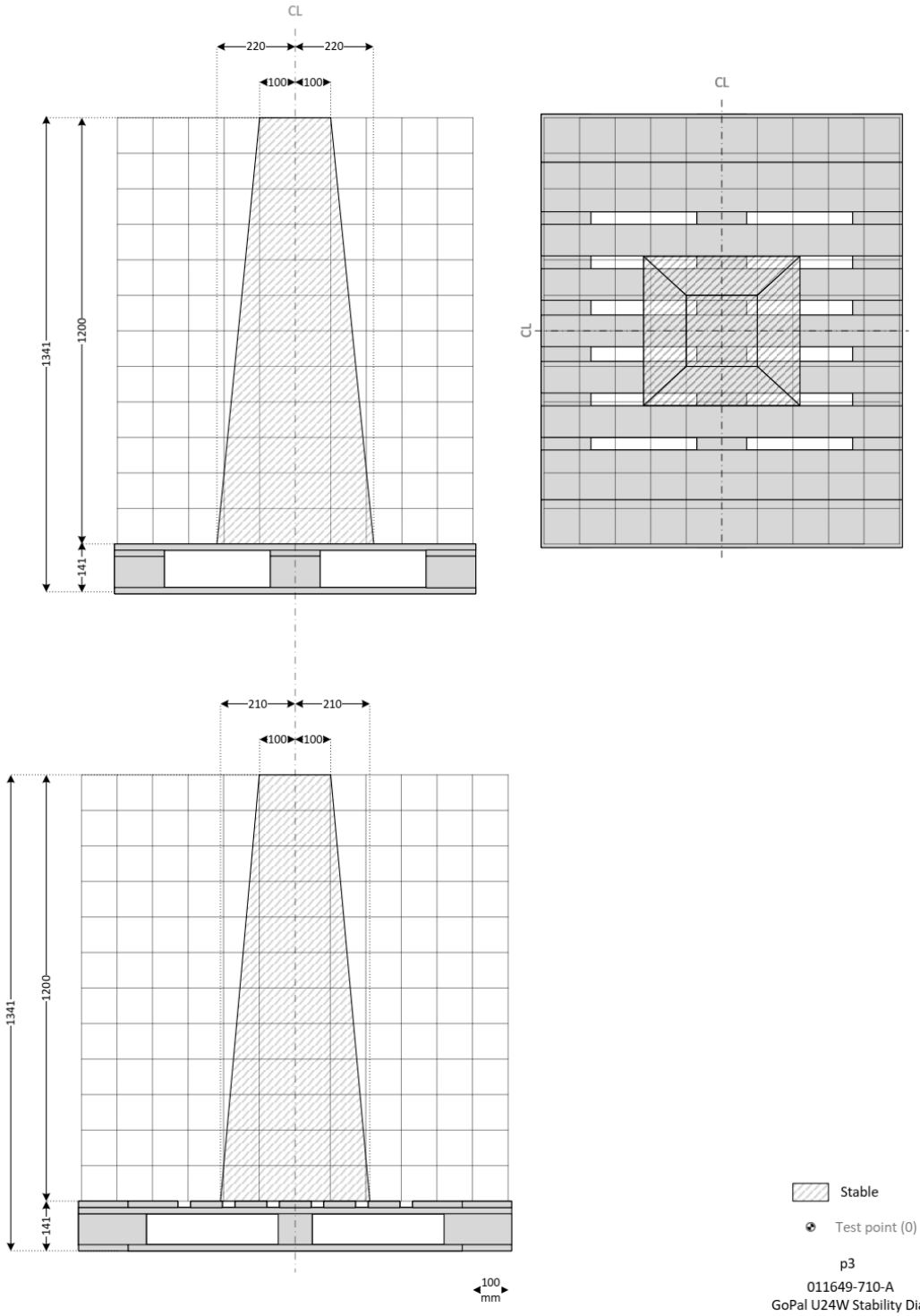
GoPal U24W Stability Diagrams
for 0.65 m/s^2 brake acc. and 2.0 % floor slope

Load ≤ 200 kg (excl. 30 kg pallet)



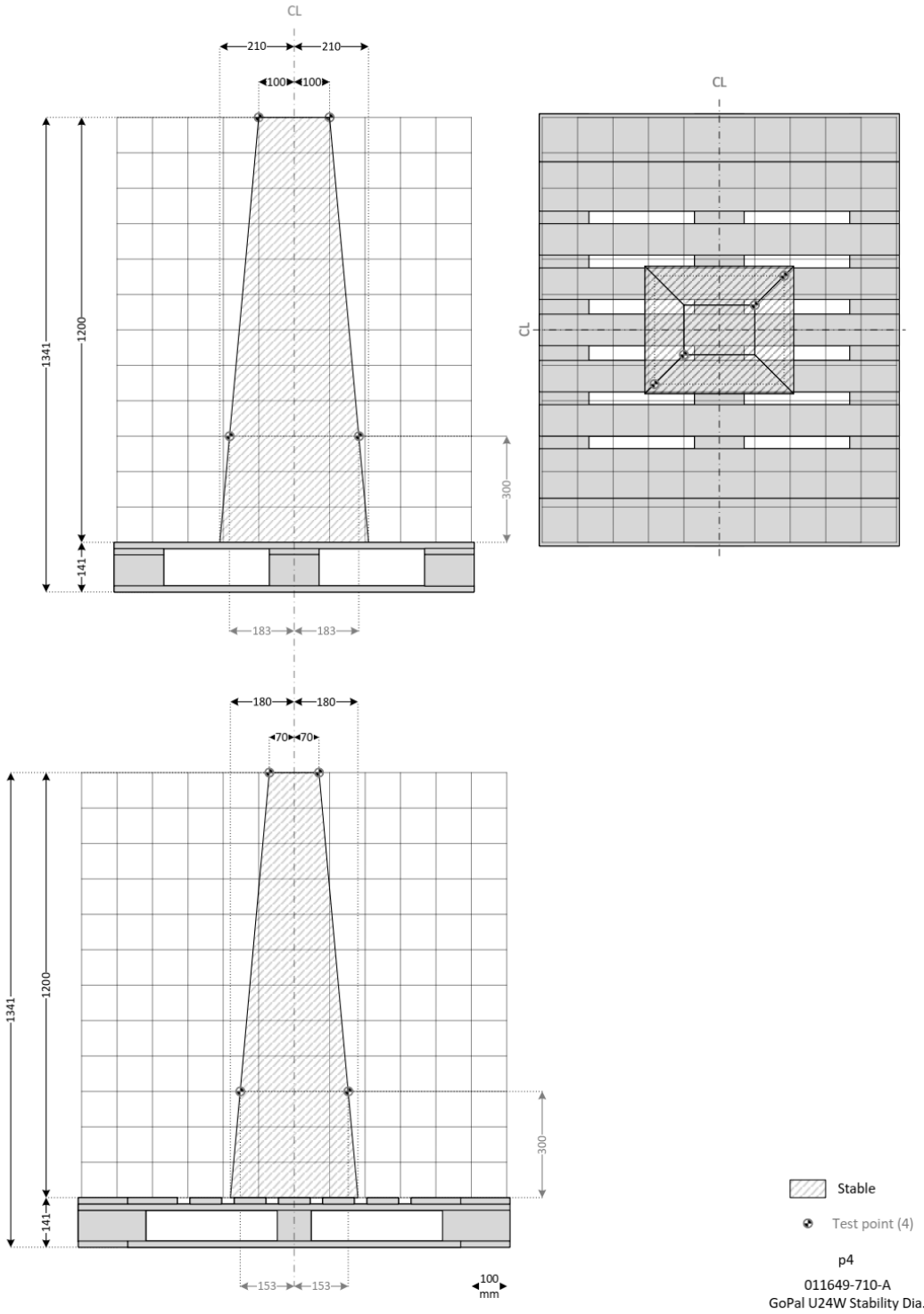
GoPal U24W Stability Diagrams
for 0.65 m/s^2 brake acc. and 2.0 % floor slope

Load ≤ 300 kg (excl. 30 kg pallet)



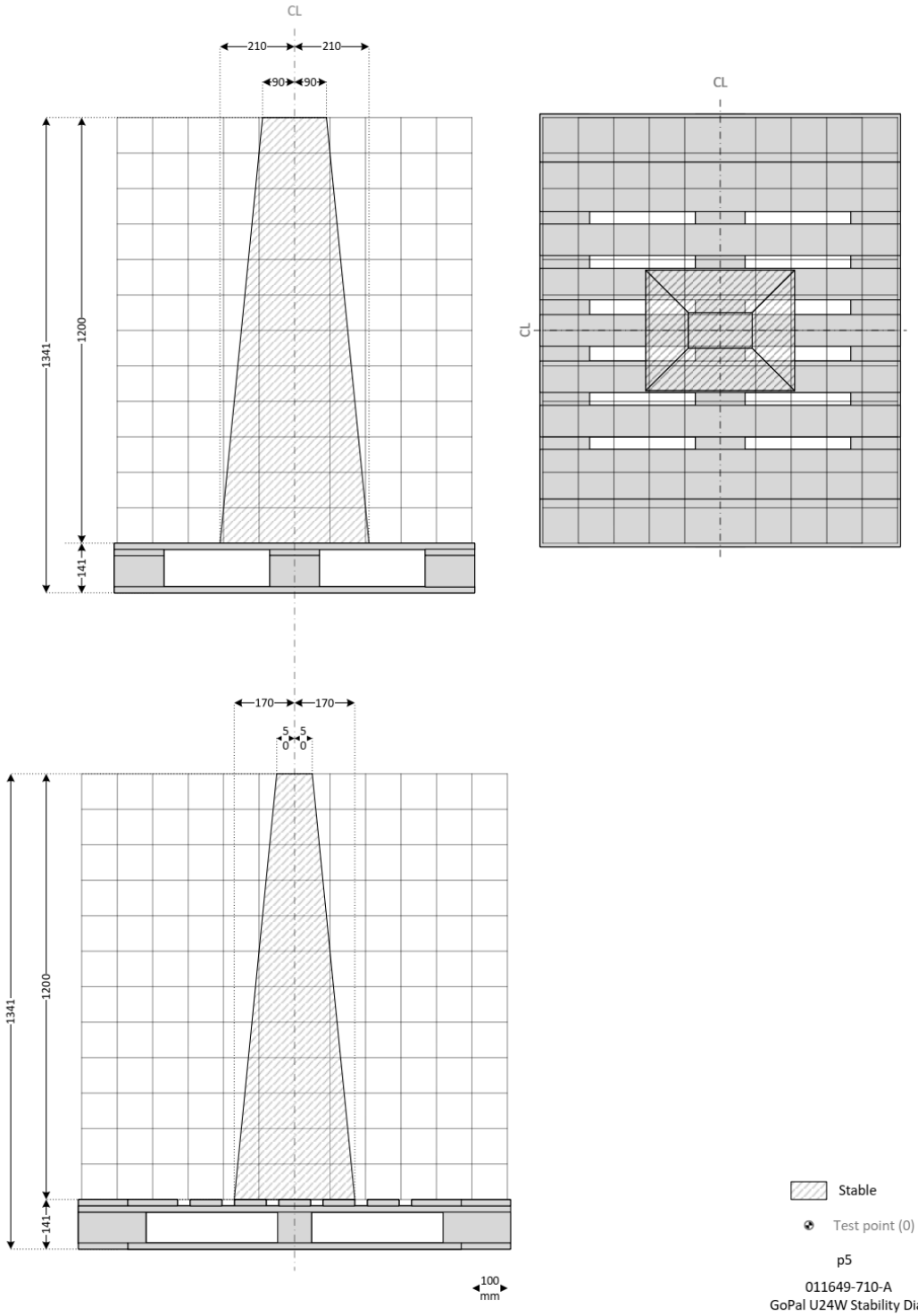
GoPal U24W Stability Diagrams
for 0.65 m/s^2 brake acc. and 2.0 % floor slope

Load ≤ 400 kg (excl. 30 kg pallet)



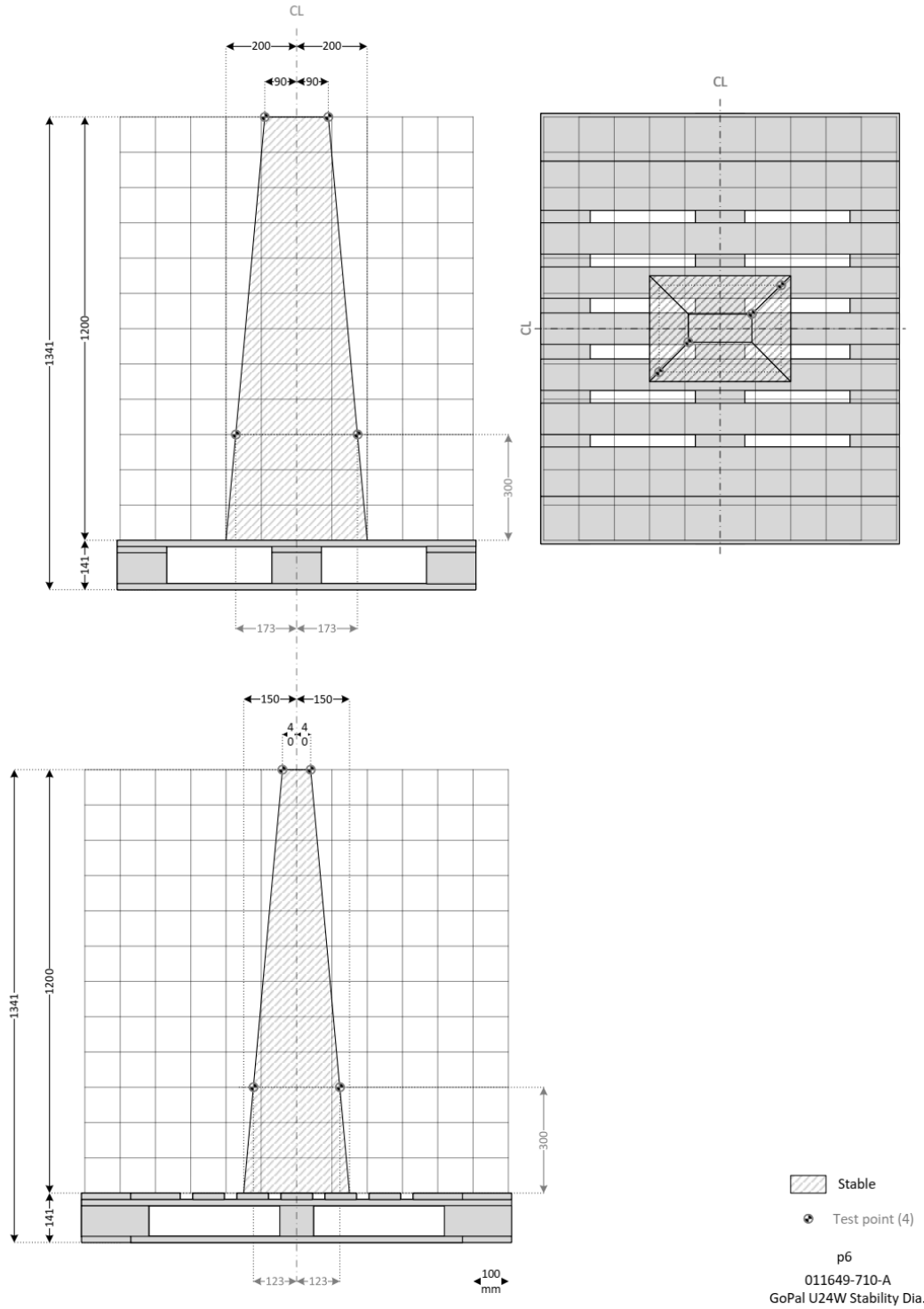
GoPal U24W Stability Diagrams
for 0.65 m/s^2 brake acc and 2.0 % floor slope

Load ≤ 500 kg (excl. 30 kg pallet)



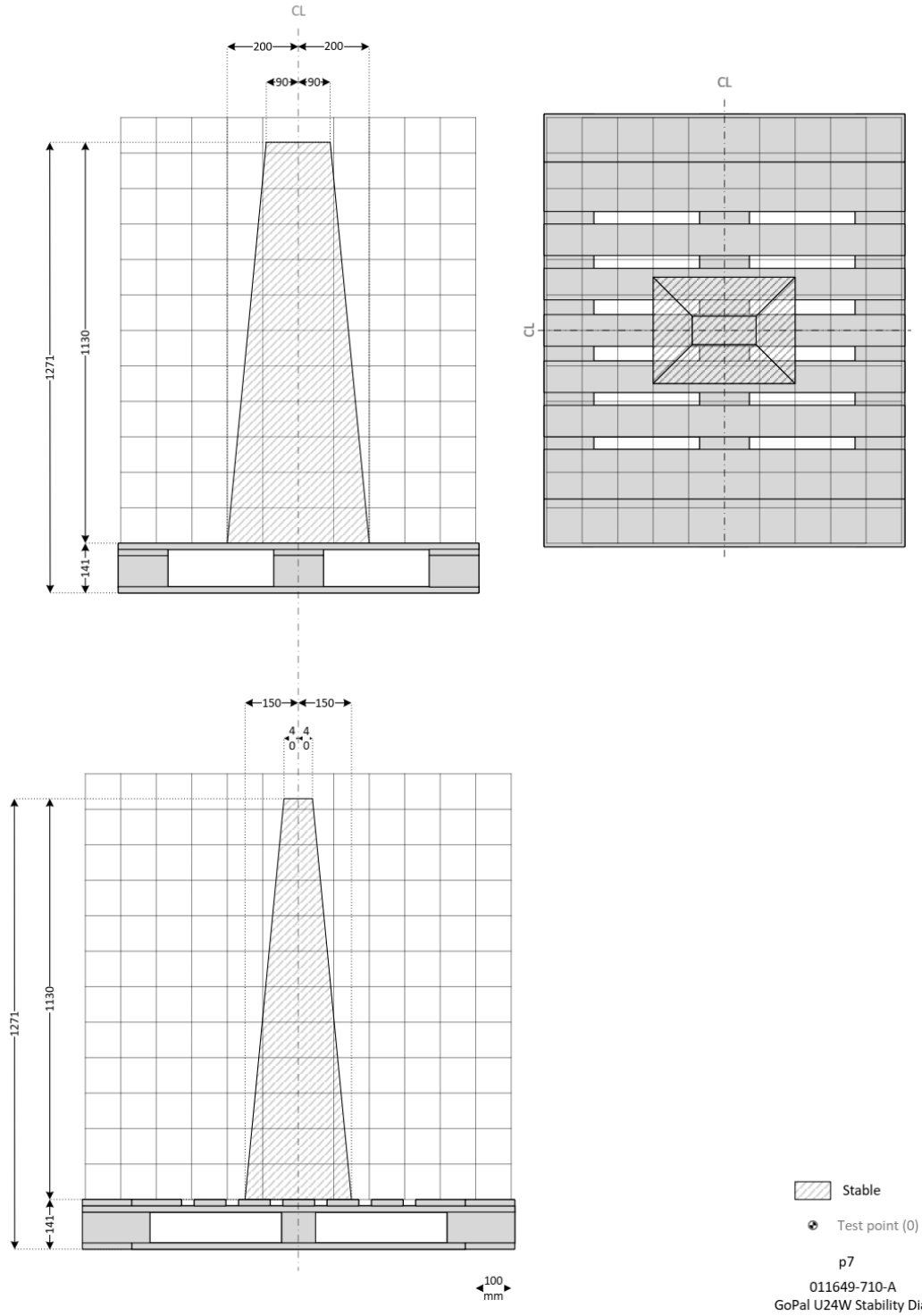
GoPal U24W Stability Diagrams
for 0.65 m/s^2 brake acc. and 2.0 % floor slope

Load ≤ 600 kg (excl. 30 kg pallet)



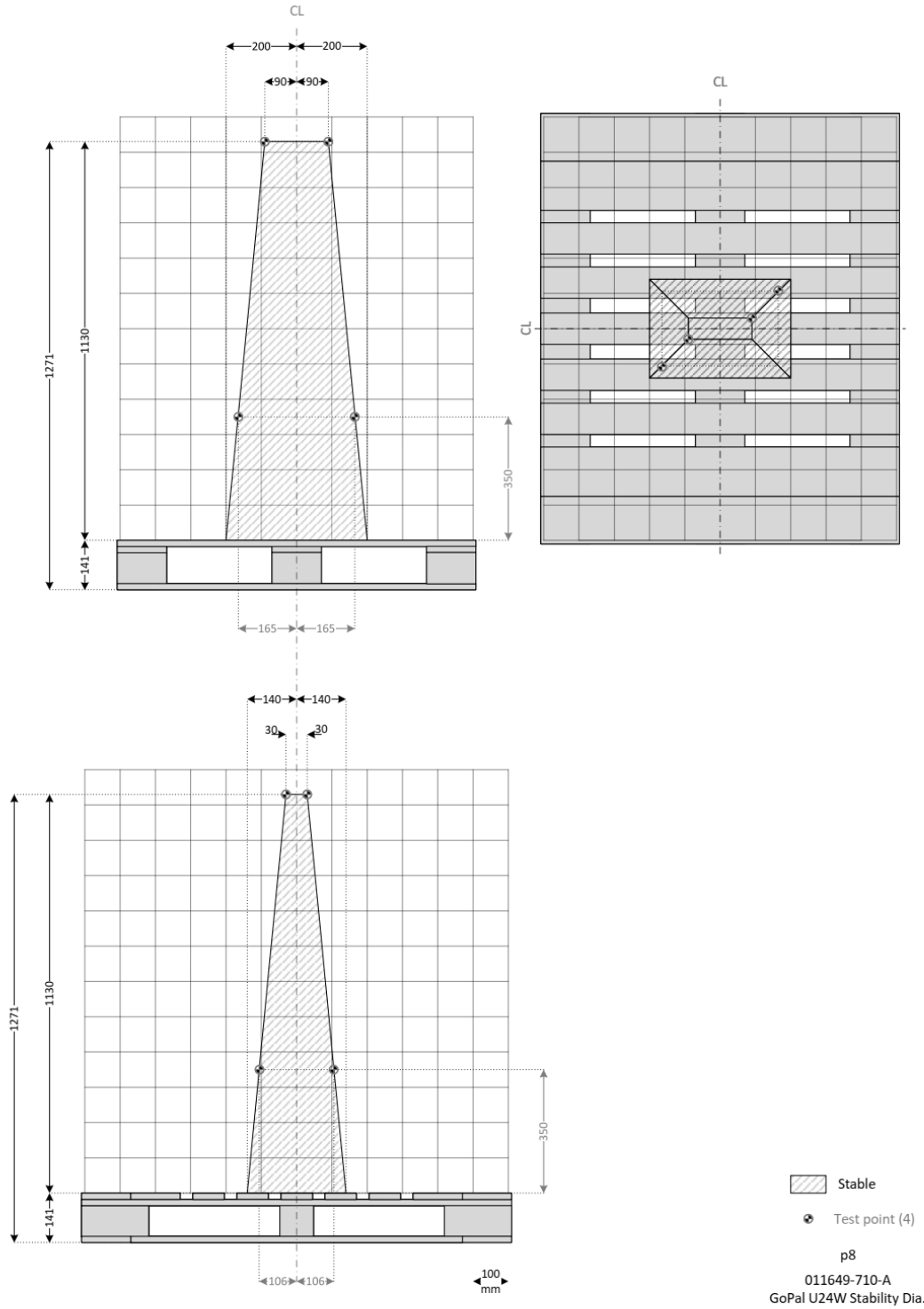
GoPal U24W Stability Diagrams
for 0.65 m/s^2 brake acc. and 2.0 % floor slope

Load ≤ 700 kg (excl. 30 kg pallet)



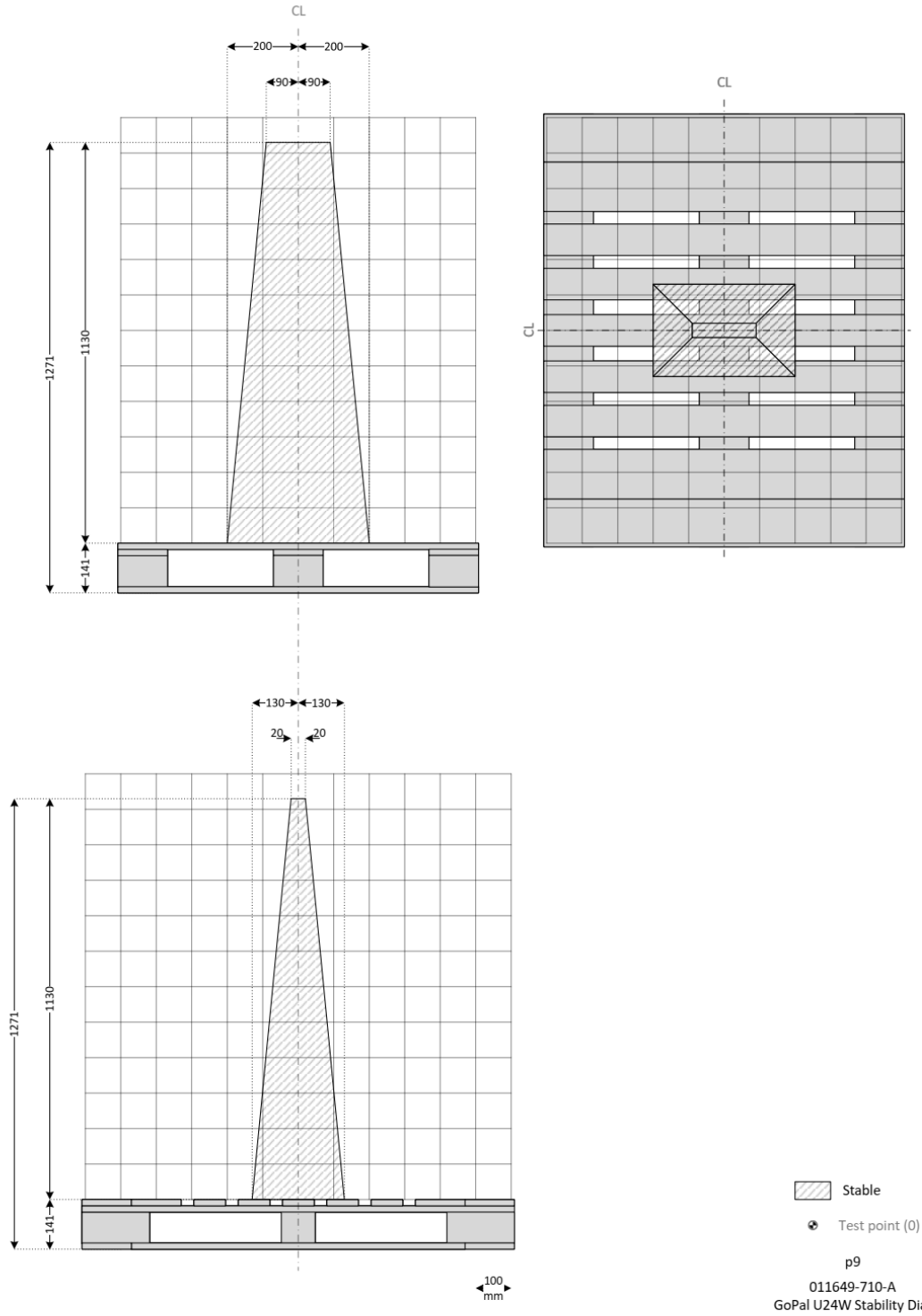
GoPal U24W Stability Diagrams
for 0.65 m/s^2 brake acc. and 2.0 % floor slope

Load ≤ 800 kg (excl. 30 kg pallet)



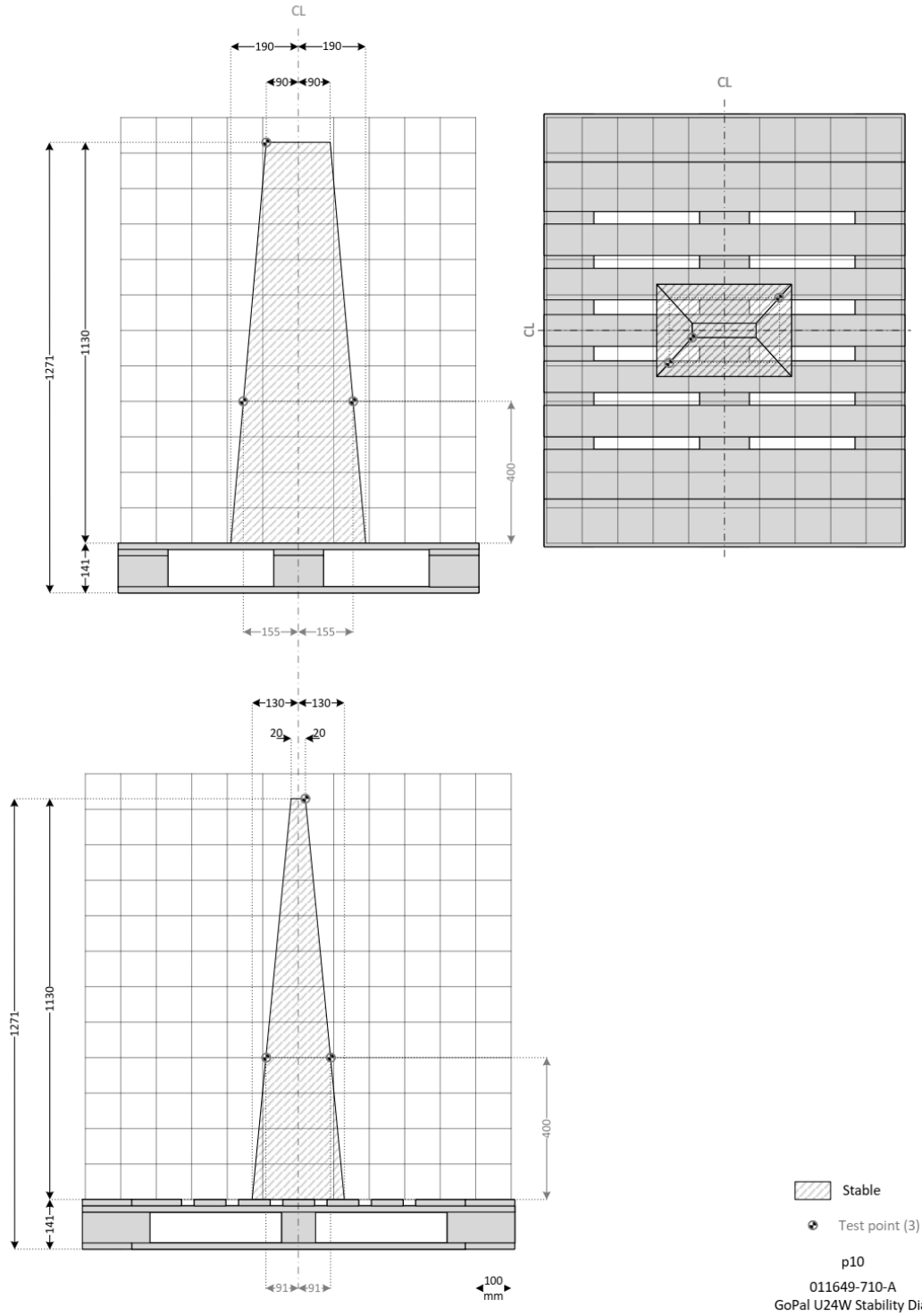
GoPal U24W Stability Diagrams
for 0.65 m/s^2 brake acc. and 2.0 % floor slope

Load ≤ 900 kg (excl. 30 kg pallet)



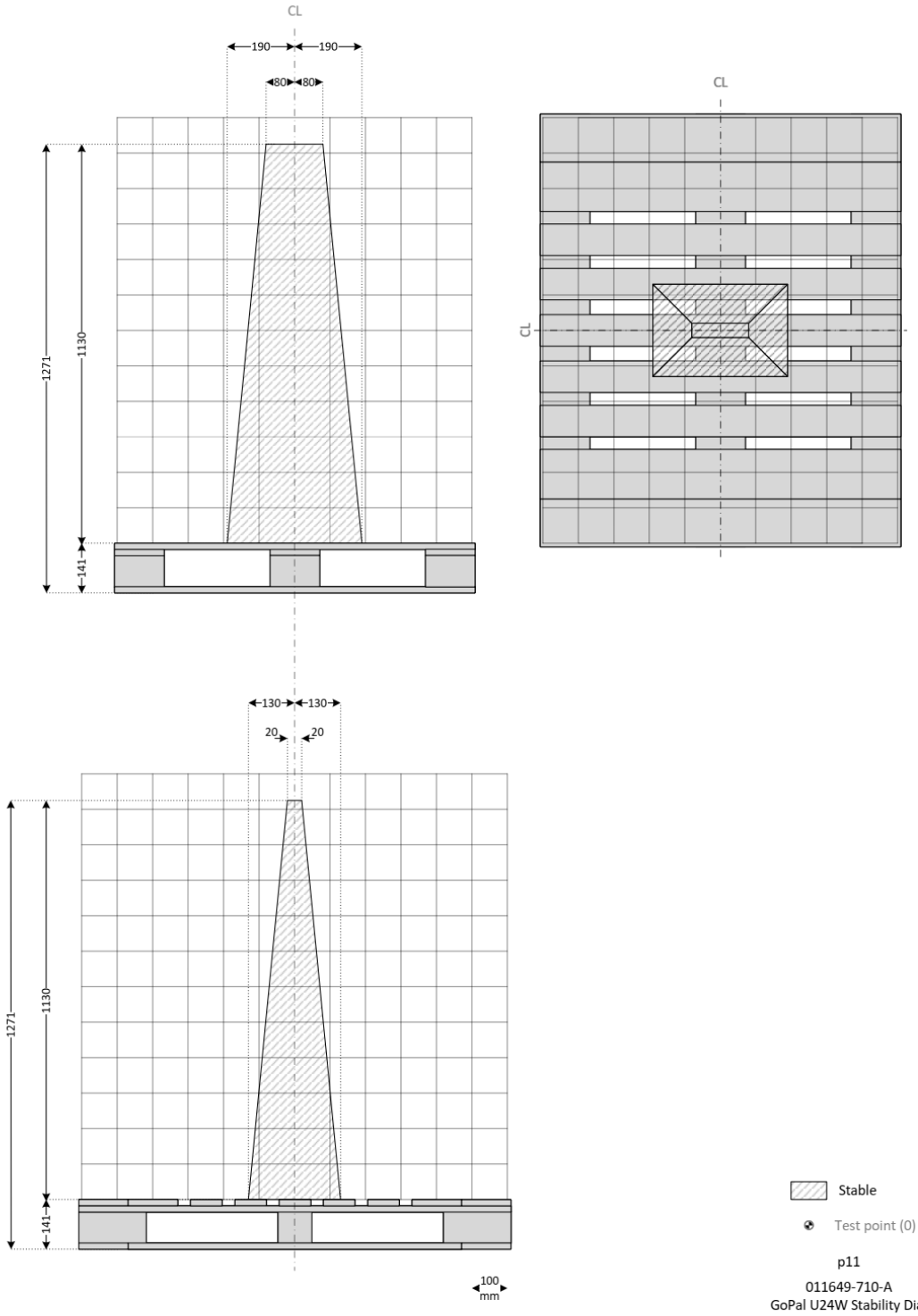
GoPal U24W Stability Diagrams
for 0.65 m/s^2 brake acc. and 2.0 % floor slope

Load ≤ 1000 kg (excl. 30 kg pallet)



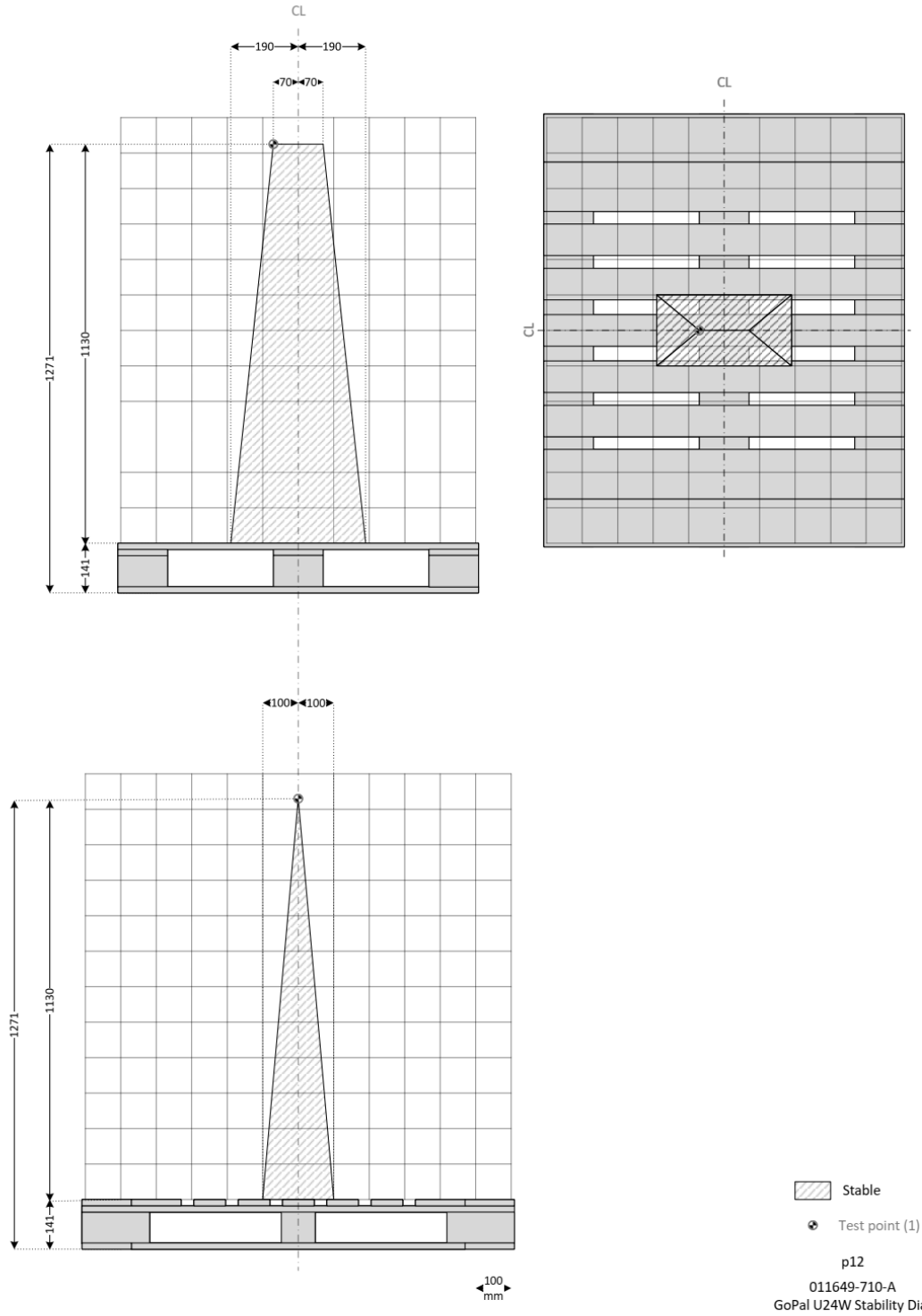
GoPal U24W Stability Diagrams
for 0.65 m/s^2 brake acc. and 2.0 % floor slope

Load ≤ 1100 kg (excl. 30 kg pallet)



GoPal U24W Stability Diagrams
for 0.65 m/s^2 brake acc. and 2.0 % floor slope

Load ≤ 1200 kg (excl. 30 kg pallet)



17 Appendix B - Declaration of conformity

robotize

EC Declaration of Conformity

Robotize ApS, Maglebjergvej 5B, DK-2800 Kgs. Lyngby, Denmark
hereby declares that the GoPal system consisting of the following parts:

Product	Type no.	Serial no. batch
GoPal 400 EUR-pallet Transport Robot	ATR 3111	3-99
GoPal Pallet Station	PST 011	1-999
GoPal Conveyor Pallet Station	PST 030	1-999
GoPal Elevation Pallet Station	PST 040	1-999
GoPal Power Station *)	PST 020	1-99
GoPal Call Button	RWU 010	1-999

*) excl. charger unit, see separate Declaration of Conformity

Complies with all requirements in the particular directives and standards in the European Community (EC) which applies to the products.

Specifically Robotize declares that the products are in conformity with the following European directives and harmonized European standards.

Directives	Applied standards (whole or in part)
2006/42/EU "Machinery Directive"	EN 12100:2010 (Safety of machinery) EN 13849-1/-2:2015/2012 (Safety of control systems) EN 1525:1997 (Safety of driverless trucks) EN 15066:2016 (Collaborative robots) EN 13850:2015 (Emergency stops) EN 60204-1:2006 (Safety of machine elec. Equipment)
2014/30/EU "Electromagnetic Compatibility (EMC) Directive"	EN 61000-3-2:2015 (Emission, line harmonic current) EN 61000-3-3/A1:2014 (Susceptibility, line voltage) EN 61000-4-2:2009 (ESD) EN 61000-6-2:2005 (Immunity, industrial) EN 61000-6-3/A1/AC:2012 (Emission, light industrial)

Kgs. Lyngby; 9 April 2018

Anders Pjetursson, CEO Robotize ApS

Robotize doc. no. 010650-0

Robotize ApS, Maglebjergvej 5B, DK-2800 Kgs. Lyngby, Denmark, CVR: 37222941

robotize

EC Declaration of Conformity

Robotize ApS, Maglebjergvej 5B, DK-2800 Kgs. Lyngby, Denmark
hereby declares that the GoPal E24 system consisting of the following parts:

Product	Type no.	Serial no. batch
GoPal E24 Pallet Transport Robot	ATR3112	00801-00999
GoPal Pallet Station	PST012	N/A
GoPal Conveyor Pallet Station 1.5 t Wide	PST031	00201-00499
GoPal Power Station, incl. RUW024 *)	CST020	00001-00299
AUX Interface Box	RWU020	00101-00999
Call Button 1	RWU022	10001-10999
Charger Control SPE	RWU024	00001-00999

*) Excl. charger unit, see separate Declaration of Conformity

Complies with all requirements in the particular directives and standards in the European Community (EC) which applies to the products.

Specifically Robotize declares that the products are in conformity with the following European directives and harmonized European standards.

Directives	Applied standards, whole or in part
2006/42/EU "Machinery Directive"	EN 12100:2010 (Safety of machinery) EN 13849-1/-2:2015/2012 (Safety of control systems) EN 1525:1997 (Safety of driverless trucks) EN 15066:2016 (Collaborative robots) EN 13850:2015 (Emergency stops) EN 60204-1+A1:2009 (Safety of machine elec. equip.) EN 619+A1:2010 (Safety of continuous handling sys.)
2014/30/EU "Electromagnetic Compatibility (EMC) Directive"	EN 61000-4-2:2009 (ESD) EN 61000-6-2:2005 (Immunity, industrial) EN 61000-6-3+A1/AC:2012 (Emission, light industrial)
2014/53/EU "Radio Equipment (RED) Directive"	EN 300 328 V2.1.1 (Data transmission, 2.4 GHz) EN 300 440 V2.1.1 (Short range Radio Devices) EN 301 893 V2.1.0 (Data transmission, 5 GHz) EN 302 502 V2.1.1 (Data transmission, 5.8 GHz)
2014/35/EU "Low Voltage (LVD) Directive"	EN 62368-1:2014 (Elec. safety, IT etc. equipment)

Kgs. Lyngby, 28 Feb. 2020

Anders Pjetursson
CEO Robotize ApS

Robotize doc. no. 011063-B

Robotize ApS, Maglebjergvej 5B, DK-2800 Kgs. Lyngby, Denmark, CVR: 37222941

robotize

EC Declaration of Conformity

Robotize ApS, Maglebjergvej 5B, DK-2800 Kgs. Lyngby, Denmark
hereby declares that the GoPal E24W system consisting of the following parts:

Product	Type no.	Serial no. batch
GoPal E24W Pallet Transport Robot Wide	ATR4112	01201-01299
GoPal Pallet Station Wide	PST015	N/A
GoPal Conveyor Pallet Station 1.5 t Wide	PST031	00201-00499
GoPal Power Station Wide, incl. RUW024 *)	CST030	00001-00299
AUX Interface Box	RWU020	00101-00999
Call Button 1	RWU022	10001-10999
Charger Control SPE	RWU024	00001-00999

*) Excl. charger unit, see separate Declaration of Conformity

Complies with all requirements in the particular directives and standards in the European Community (EC) which applies to the products.

Specifically Robotize declares that the products are in conformity with the following European directives and harmonized European standards.

Directives	Applied standards, whole or in part
2006/42/EU "Machinery Directive"	EN 12100:2010 (Safety of machinery) EN 13849-1/-2:2015/2012 (Safety of control systems) EN 1525:1997 (Safety of driverless trucks) EN 15066:2016 (Collaborative robots) EN 13850:2015 (Emergency stops) EN 60204-1+A1:2009 (Safety of machine elec. equip.) EN 619+A1:2010 (Safety of continuous handling sys.)
2014/30/EU "Electromagnetic Compatibility (EMC) Directive"	EN 61000-4-2:2009 (ESD) EN 61000-6-2:2005 (Immunity, industrial) EN 61000-6-3+A1/AC:2012 (Emission, light industrial)
2014/53/EU "Radio Equipment (RED) Directive"	EN 300 328 V2.1.1 (Data transmission, 2.4 GHz) EN 300 440 V2.1.1 (Short range Radio Devices) EN 301 893 V2.1.0 (Data transmission, 5 GHz) EN 302 502 V2.1.1 (Data transmission, 5.8 GHz)
2014/35/EU "Low Voltage (LVD) Directive"	EN 62368-1:2014 (Elec. safety, IT etc. equipment)

Kgs. Lyngby, 28 Feb. 2020

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18 Appendix C – GoPal Block Diagram