MR220

Door Control Unit

User Manual

roboodor

November 3, 2025

HW V1.9

Contents

1 Safety Information

IMPORTANT SAFETY INSTRUCTIONS For your safety, it is crucial to follow these instructions. Failure to comply may result in personal injury or damage to the control unit.

- **Qualified Personnel Requirement:** Setup, operation, and maintenance should only be performed by qualified personnel trained in handling the control unit. Unauthorized personnel should not operate or handle the unit.
- **Power Isolation Before Maintenance:** Ensure that the Control Box (CB) is disconnected from the power supply before opening it. Never open or operate the CB with the cover removed.
- **Damaged Cable Handling:** If the CB cable is damaged or unsealed, it should only be replaced by the manufacturer, an authorized service company, or qualified personnel.
- **Residual Voltage Warning:** DC capacitors in the CB may retain a high voltage even after the power is turned off. Wait at least 1-2 minutes for the voltage to drop below 10V. During this period, avoid any contact with CB components as they could still be dangerous.
- **Grounding Requirement:** Ensure the CB is properly grounded at all times. Operating without proper grounding can cause severe electrical damage and pose a shock hazard.
- **Moisture and Water Exposure:** The CB must never be exposed to water or operated in a humid environment. Exposure to water may cause malfunction or damage to the CB components.
- **Temperature Limits:** Do not operate the CB outside of the specified temperature range. If the operating environment is too cold, a heater may be required to maintain optimal temperatures.
- **Keypad Usage Warning:** The CB should not be used if the keypad or display is damaged. Damaged components must be replaced. Only use fingers to operate the keypad; avoid using sharp objects that might damage it.
- **Cable Connection Verification:** Before the first use, check all electrical connections and portable modules connected to the CB. Incorrect connections can damage the CB.
- **Manual Mode Safety:** In manual mode, operate the door only with an operator present. This mode disables the safety edge and light curtain, so it is crucial to ensure there is no hazard nearby.
- **Parameter Verification:** Verify all parameter settings and safety gear adjustments in the CB before operation. Only qualified personnel should modify these settings.
- **Hazard of Non-Compliance:** Not adhering to these safety instructions may lead to severe harm to the user and potential damage to the control unit.

Warning: Failure to follow safety instructions may result in harm or damage to the CB.

2 Technical Informations

Table 1: MR220 Control Unit Specifications

Property	Specification
Housing Dimensions (W x H x D)	Approx. 300 x 300 x 135 mm (emergency stop excluded)
External Supply Voltage	230 Vac ±10%, 50-60 Hz
Fuses	1 x 2A and 1 x 1A fast-blowing, K characteristics
Control Voltage	24V DC regulated (±5% at nominal 230 V), max. 1200 mA to 40℃, max. 1000 mA to 60℃ 15V DC, max. 200 mA for electronic limit switches and safety edge
Controller Inputs	24 VDC / typ.15 mA, max. 26 VDC / 20 mA
Internal Power Consumption	Max. 10 W (motor not running)
Limit switch	Digital Encoder/ Mechanic Switch For electronic limit switches, terminated with 120 Ω
Safety Chain / E-STOP	2 Inputs NC Contact
Safety Edge Input	For electrical safety edges pneumatic (NC type) and dynamic optical systems (OSE)
Outputs	3 programmable relay outputs
Brake Relay	Changeover contact for brakes, 230 VAC / 4A
Power Output	Supports drives up to 1.5 kW, overload up to 12A for 0.5s
Temperature Range	-10℃ to +50℃ (operating), -20℃ to +70℃ (storage)
Relative Humidity	Up to 95%, non-condensing
Enclosure Rating / Weight	IP54 / Approx. 2.0 kg
Installation Orientation	Vertical

3 Installing the Control Unit

CAUTION: Follow all instructions carefully; improper installation may lead to serious damage.

- Ensure the control system is not connected to mains during installation.
- Check the control unit for damage before installation.
- Avoid touching electronic components, especially processor components, to prevent electrostatic discharge damage.

Installation Location:

- Install the unit in a location that is free from direct sunlight, high humidity, dust, and extreme temperatures.
- Choose a wall that is stable and vibration-free to prevent any operational issues.

Height and Clearance:

- Ensure a minimum height of 1300 mm from the ground to the base of the control unit.
- Maintain a minimum clearance of 100 mm above and below the unit for proper ventilation.

Mounting Position:

- Mount the unit vertically, avoiding any horizontal installation.
- Ensure it is mounted securely on a flat surface.

Safety Precautions:

- Use insulated gloves and appropriate tools to prevent electric shock.
- Ground the unit properly to protect against static electricity.

Electrical Connections:

- Use the correct voltage and current values for the connection. The main input voltage must be single-phase 230V, and connections should be made to phase (L), neutral (N), and ground (PE). Incorrect connections may damage the unit.
- Install fuses and circuit breakers for additional safety.

4 First Installation

CAUTION: Ensure all installation steps have been completed and verified before powering on the control unit for the first time.

- **Power Connection Verification:** Before switching on, double-check that the main power input (single-phase 230V) is correctly connected to phase (L), neutral (N), and ground (PE).
- **Visual Inspection:** Inspect the control unit and surrounding area for any loose connections or exposed wires.
- **Initial Power-On:**
  - Press the Emergency button before switching on.
  - Switch on the power supply carefully and observe the control unit for any unusual sounds or smells.
  - Check that the indicator lights (if available) show normal operation status.
- **Initial Startup & Setting:** Some units may require an initial reset or calibration after the first power-on.
  - After the initial power-on, release the emergency stop button and check the unit for any error messages.
  - If everything is installed correctly, the unit should display the door status such as "Door Stopped" or "Door Opened."
  - If there is an error message, do not enter the learning menu until the issue is resolved.
  - If no errors are present, press and hold the Stop and Up buttons simultaneously to enter the menu.
  - In the menu, go to **8. Motor Information Entry** and enter the label values of the motor connected to the unit. You may set the motor current 1A higher than the rated value to allow the unit's protection to activate if the motor draws excessive current.
  - If a safety edge is installed, go to **13. System Settings**, then select **2. Security Settings** and choose the appropriate safety edge sensor.
  - Next, enter **3. Door Training Settings** to set the lower and upper limits of the door following the instructions on the display. To save the limits, press and hold the Stop button.
  - After setting the upper and lower limits, go back to **2. Door Operation Mode** in the menu and save the automatic mode by pressing and holding the Stop button to exit the menu.
  - After this point, the door will automatically adjust its limits by performing three preliminary movements to fine-tune the limits.
  - It is essential to operate the door three times to ensure it registers the desired limits correctly. **(This step is very important; make sure to operate the door three times after training to finalize the settings.)**
- **Testing Safety Functions:** Confirm that all safety features, such as the emergency stop button, are functioning properly.
  - Press the emergency stop button to ensure it stops the unit as expected.
  - Verify that any connected safety sensors (such as limit switches or safety edges) are working and properly integrated.

- **Functionality Check:** Run a basic operational test to verify that the unit is responding correctly.
  - Activate the unit's basic functions to confirm that it operates as expected without issues.
  - Monitor the control unit for any unexpected behavior during this initial test.

5 Connections

5.1 Power & Motor Connections

As shown in Figure 1, the MR220 controller board supports a 230V mono-phase power input and a three-phase motor output. Below is a detailed explanation of each terminal group and their purpose:

- **T1 (Line):** Phase line of 230V AC mono-phase power input. This line is protected by a 4A fuse located on the board to prevent overcurrent damage.
- **T2 (Neutral):** Connected to the neutral (N) terminal of the mono-phase supply. It provides the return path for AC power input.
- **T3 (PE Terminals):** Protective Earth connections. One PE should go to the controller chassis, and the other to the motor frame. Proper PE wiring is essential for safety and EMC compliance.
- **T4 (Motor Output):** Three-phase motor output terminals:
  - Pin 1 – Phase U
  - Pin 2 – Phase V
  - Pin 3 – Phase W

  These pins supply power to a 230V three-phase asynchronous motor.
- **T5 (Brake Relay):** Controls the 230V brake connection of the motor. The brake is released or activated based on the output state.
- **T6–T8 (Relay Outputs):** Programmable relay terminals (Relay1, Relay2, Relay3) which can be configured for various control or feedback purposes such as:
  - Door open/close status signal
  - Activation of warning lamps
  - Alarm systems or door locking mechanisms

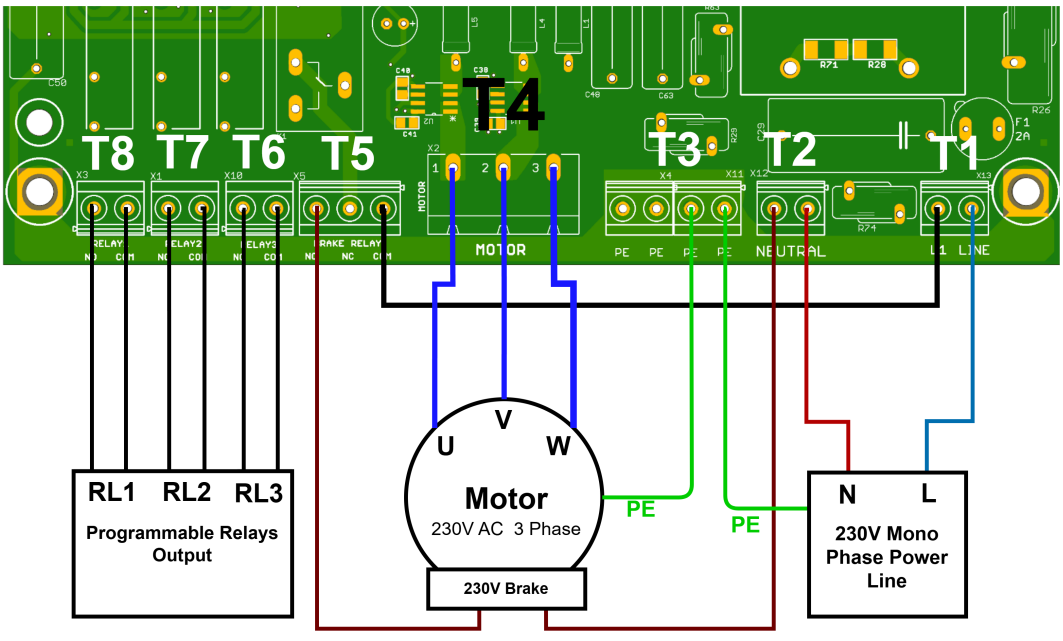


Figure 1: Power & Motor Connection Diagram

5.2 Sensor Connections

As shown in Figure 2, the wiring layout of the MR220 controller board—used in Robodor control systems—supports various safety and control components through its clearly labeled and organized terminal blocks.

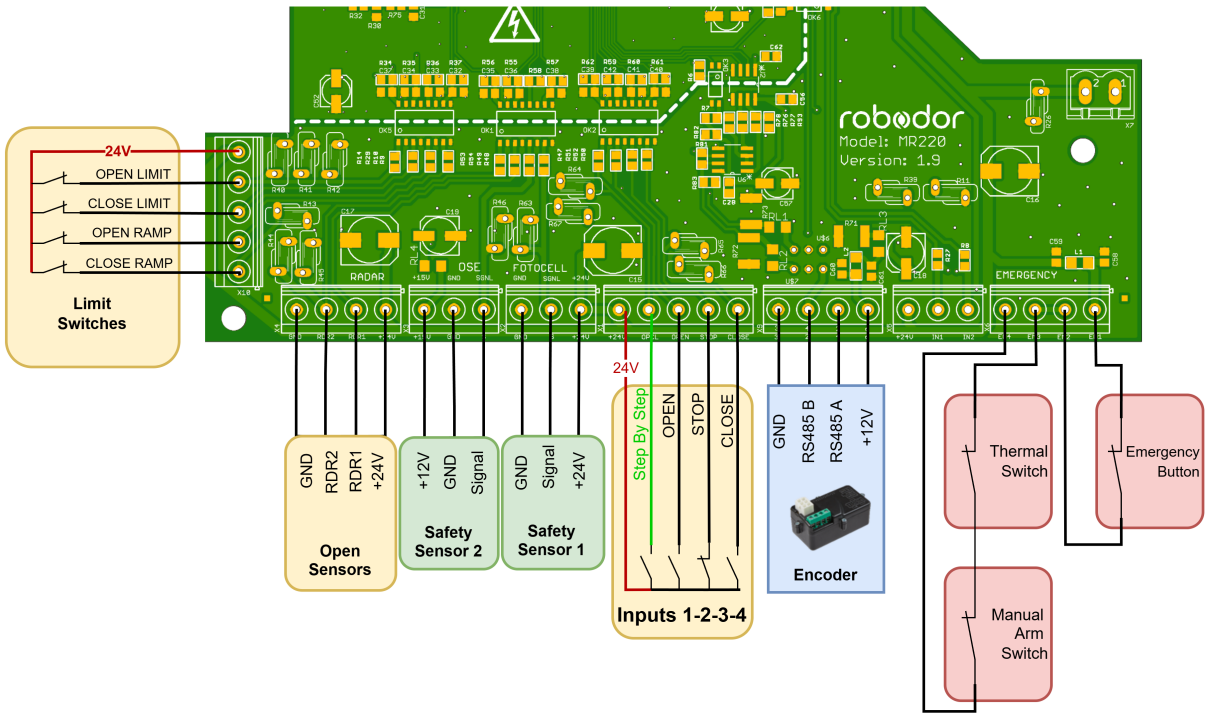


Figure 2: Sensor & Button Connection Diagram

- **Inputs 1–4:** These are digital input lines used for receiving signals from external command devices such as remote controls, push buttons, or sensors.
- **Safety Sensors:** Three individual safety sensors (labeled as Safety Sensor 1, 2) are connected via 3-pin terminals that provide signal, ground, and voltage lines (+12V or +24V). These connections help ensure the door operates safely and opens immediately when an obstacle or hazard is detected.
- **Encoder Module:** A high-resolution digital encoder is connected through a 6-pin terminal, which includes RS485 A/B differential communication lines, dedicated power lines (GND, +15V).
- **Emergency and Safety Chain:** On the far right, critical switches such as the Emergency Stop, Thermal Switch, and Manual Arm Switch are wired into the safety chain terminals. The safety chain ensures the system is immediately interrupted in emergency scenarios and provides layered protection.

6 Main Screen and Information Displays

6.1 Welcome Screen

When the RD1F15 control unit is powered on, the welcome screen is displayed as shown in Figure 3. This screen provides essential information, including the manufacturer's name (ROBODOR), the model number (MR220), and the current firmware version (v2.53d).

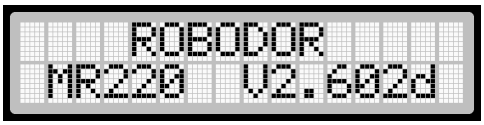
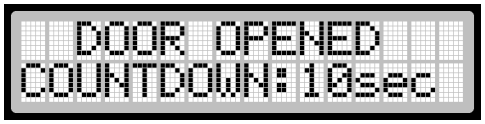


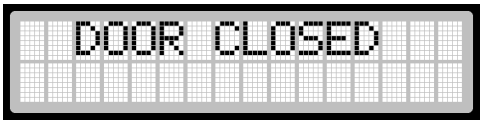
Figure 3: MR220 Welcome Screen Display

6.2 Main Screen Information

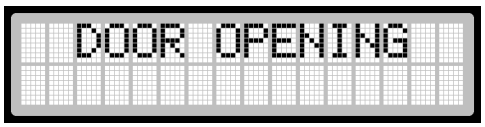
The main screen informs users of the current operational status of the door, including movement direction and any active error warnings. It visually communicates real-time door states such as opening, closing, stopped, or fully opened/closed, providing immediate feedback to both users and operators during operation, as illustrated in Figure 4.



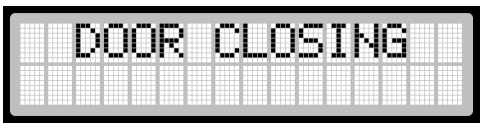
(a) Door is Opened



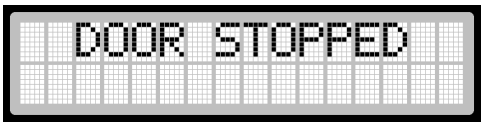
(b) Door is Closed



(c) Door is Opening



(d) Door is Closing



(e) Door is Stopped

Figure 4: Door Operation Status Main Screens

6.3 Diagnostic Screens

The diagnostic information screens, accessible through parameter "9.SCREEN SETTINGS" in the service menu, present detailed parameters such as motor speed, current, voltage, and system diagnostics. These screens facilitate monitoring and troubleshooting by providing essential technical data required for maintenance or operational adjustments.

6.3.1 Info 1

Figure 5 shows the Info Screen 1 display of the MR220 controller. This screen provides real-time motor performance data and electrical status readings, helping operators monitor critical motor conditions during operation.

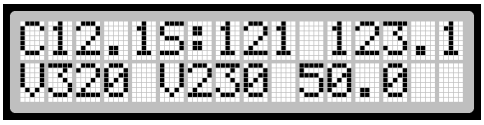


Figure 5: Information 1 Screen Display

- **Top-left (C12.1):** Indicates the motor current (in amperes). This is the actual current measured from the motor driver to the motor phases.
- **Top-center (S:121):** Displays the motor speed in encoder counts per second. This value is derived directly from the feedback received via the encoder.
- **Top-right (123.1):** Shows the motor's power angle. This reflects the phase difference between voltage and current, and can be used to assess motor efficiency or abnormal load behavior.
- **Bottom-left (U320):** Represents the DC bus voltage (also called DC link voltage), which is the internal rectified voltage supplying the inverter stage.
- **Bottom-center (U230):** Indicates the effective output voltage sent to the motor (in volts).
- **Bottom-right (50.0):** Displays the target frequency of the motor operation, in Hz. This corresponds to the speed reference provided by the control algorithm.

6.3.2 Info 2

Figure 6 shows the Info Screen 2 display of the MR220 controller, which provides detailed feedback on encoder signals and positioning accuracy. This screen helps with encoder calibration, mechanical adjustment, and limit verification.

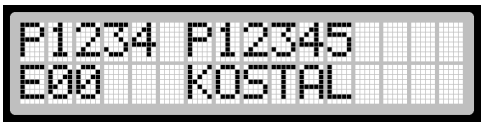


Figure 6: Information 2 Screen Display

- **Top-left (P1234):** Raw encoder count directly read from the encoder hardware. This value changes continuously while the motor is moving and represents absolute or relative position depending on encoder type.
- **Top-right (P12345):** Processed encoder position value computed by the controller. It adjusts the raw signal based on taught door limits and ensures correct referencing within the operating range.
- **Bottom-left (E00):** Encoder stop position error. When the door stops at a limit, this field shows how many encoder counts the actual stop deviated from the taught stop point. A value of 000 indicates perfect alignment.
- **Bottom-right (KOSTAL):** Type or brand of the encoder in use. In this case, "KOSTAL" refers to a specific compatible encoder model.

6.3.3 Info 3

Figure 7 shows Info Screen 3 of the MR220 controller, which provides timing diagnostics, temperature feedback, and motor performance data. This screen is especially useful for analyzing door movement profiles and thermal behavior during operation.

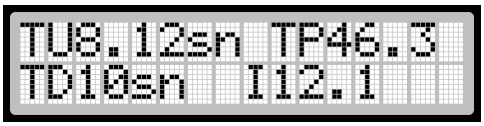


Figure 7: Information 3 Screen Display

- **Top-left (TU8.12s):** TU refers to the measured door opening time including ramps. This is the actual time it takes for the door to open from the closed position under current operating parameters fully.
- **Top-right (TP46.3):** TP indicates the power module temperature in degrees Celsius. Monitoring this value helps prevent overheating and can inform thermal protection triggers.
- **Bottom-left (TD10.8s):** TD shows the countdown time remaining before the door closes after being opened. This is useful in automatic closing scenarios where delay adjustments are critical for user safety and convenience.
- **Bottom-right (I12.1):** Displays the highest current value measured on any motor phase during operation. It helps detect overload or imbalance conditions.

6.3.4 Info 4

Figure 8 shows Info Screen 4 of the MR220 controller, which provides precise diagnostic information related to upper and lower limit positions, fine-tuning values, and encoder behavior. This screen is primarily used during door calibration and for verifying limit consistency.

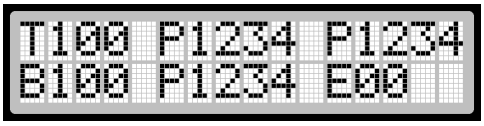


Figure 8: Info Screen 4

- **Top-left (T100):** Indicates the upper limit fine tuning value. This is a manual correction applied to shift the upper limit position by small encoder steps without re-teaching the entire limit.
- **Top-center (P1234):** Shows the stored encoder value corresponding to the taught upper limit position.
- **Top-right (P1234):** Displays the real-time encoder value while the door is operating or stationary. Comparing this with the stored upper limit allows verification of door stopping accuracy.
- **Bottom-left (B100):** Represents the lower limit fine tuning value, similar to the upper limit but for the bottom stop position. It is used to compensate minor mechanical variations.
- **Bottom-center (P1234):** Shows the stored encoder value for the taught lower limit position.
- **Bottom-right (E00):** Indicates the stop error in encoder counts after the door has stopped at a limit. A nonzero value suggests the door stopped slightly off from its calibrated limit position.

7 Faults and Warning

7.1 Faults

7.1.1 E01 – Digital Encoder Error

The controller cannot communicate with the encoder mounted on the motor. Possible causes:

- Incorrect wiring between the encoder and controller.
- Loose socket or terminal screw connections.
- Loose encoder connector on the motor.
- Supply voltage to encoder may be below 10V.
- Electrical noise interference (red LED on driver blinks during motion). Ensure ferrites are used.

Solution: Verify wiring, reset the system (press Stop, Down, and Up buttons for 5 seconds), measure 15V between encoder pins 3 and 6, and consult technical service if unresolved.

7.1.2 E02 – Motorstall Error

The motor cannot move the door. Potential issues include:

- Disconnected motor or controller connector
- Motor still wired in star configuration
- Mechanical obstruction in door system
- Insufficient motor torque
- Open phase or cable fault

Solution: Check mechanical movement, inspect connectors, adjust torque or speed settings, confirm triangle wiring, and contact technical service if unresolved.

7.1.3 E03 – Ipm Fail System Active

Occurs when the current in the driver's power circuit exceeds limits. Likely causes:

- Phase short circuit
- Driver attempts to start while motor is mechanically locked
- Faulty SPM IC (requires service)

7.1.4 E04 –Motor Wrongway Error

Indicates mismatch between button direction and actual door movement. If pressing up causes the door to close, this fault occurs.
Solution: Change Motor Direction setting to "REVERSE" in the Motor Direction menu. If the issue persists, change the Encoder Direction as well.

7.1.5 E05 – Emergency Error

One of the three emergency circuits (button, thermal switch, manual override) is open.
Solution: Check emergency stop button, disable manual movement on the motor, allow cooling if thermal switch triggered, and inspect emergency input terminals.

7.1.6 E06 –Memory Connection Lost

The memory chip used to store values is faulty. Driver must be sent to technical service.

7.1.7 E07 – Memory Data Lost

On reboot, saved parameters are found to be inconsistent. Usually caused by interrupted door training or EEPROM corruption.
Solution: Save settings via menu 2, perform driver reset, re-train door, and confirm persistent storage. If issue repeats, EEPROM failure is likely.

7.1.8 E08 – Over Current Error

Occurs when measured motor current exceeds programmed current for 1 second.
Solution: Increase motor current by 20% from nominal or monitor Test Menu values (C1/C2). Ensure phase currents are balanced; otherwise check motor, wiring, and terminal resistances.

7.1.9 E09 – Over Spm Modul Temperature

This fault occurs when the SPM (Smart Power Module) temperature exceeds 65℃. It indicates that the internal power module has overheated. Once the temperature drops below 60℃ (a decrease of approximately 5℃), the fault is automatically cleared and the system resumes normal operation.

7.2 Warnings

7.2.1 W01 – Under Voltage Warning

Appears when 320V DC supply drops significantly or driver is overloaded.
Solution: Measure input voltage (should be >240V DC). If voltage is normal, inspect connection between main and sub PCB.

7.2.2 W02 – Over Voltage Warning

Occurs when supply voltage exceeds 370V DC or motor regenerates energy without braking resistor.
Solution: Measure input voltage, monitor DC voltage value during braking, and install braking resistor if not present.

7.2.3 W03 – Tunnel System Online

Tunnel input stuck low, indicating a connected system has locked operation.
Solution: Measure voltage between tunnel input and GND. If 0V, disconnect and apply 24V jumper as a temporary solution. Confirm health of other connected drivers.

7.2.4 W04 – Radar Detected

Radar input is activated.
Solution: Measure RDR1/RDR2 inputs. If 24V is present continuously, check the connected radar system. If 0V and warning persists, consult service.

7.2.5 W05 – Braking Resistor Circuit Is Failed

Brake resistor is active when it should be idle. Internal driver fault suspected.
Solution: Disconnect power and contact technical service.

7.2.6 W06 – Crashing Detected

Collision: Indicates mechanical obstacle triggered bottom safety sensor (like OSE vs.) during closing.
Solution: Check bottom safety sensor voltage (should read between 5-24V when clear), inspect beam alignment, and verify input logic in Menu 13 (OSE vs. Photocell).

7.2.7 W07 – Object Detected

Obstacle: Indicates photocell output triggered.
Solution: Check photocell voltage (should read 24V when clear), inspect beam alignment.

8 Menus

The keypad has three buttons: UP, DOWN, and STOP. These are used to navigate menus, start motor movements, and adjust settings.
In the main screen, by long pressing STOP and UP buttons, the user can enter the settings menu. You will see the first menu screen.
Note: Pressing STOP, DOWN, and UP buttons together performs a soft reset of the processor.

8.1 Counter

Displays the total number of door openings since the initial installation. Useful for maintenance tracking and usage analytics.

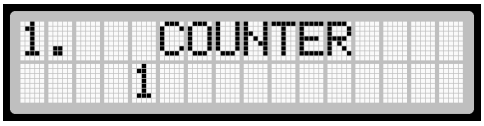


Figure 9: Opening Count screen in User Menu

8.2 Operation Mod Setting

Allows the user to select the desired door control mode. Available options typically include:

- **Automatic:** Standard mode for everyday operation.
- **Manual:** Enables dead-man door movement.
- **Manual Limitless:** Manual mode without safety limits and positions, primarily for service.
- **Test Mode:** Similar to automatic mode, but after the door closes, it automatically reopens after a preset duration. This is mainly used for functional endurance testing or cycle-based performance checks.

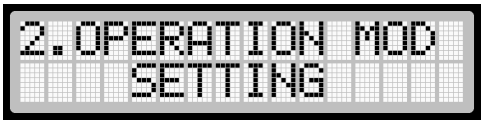


Figure 10: Operation Mode selection screen

8.3 Learning Position

The Learning menu is used to define the mechanical travel limits of the door by teaching the controller where the fully closed and fully open positions are. This process is essential for enabling accurate stopping, preventing mechanical overtravel, and ensuring the safety and consistency of motor control. It must be performed during initial installation or after any mechanical change to the motor, drive system, or door configuration.

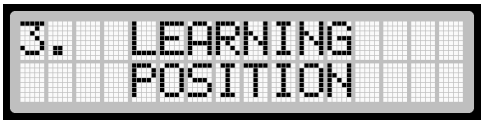


Figure 11: Door Limit Learning screen

1. **Entering the Menu:** Navigate to the “Door Learning” menu using the controller interface. Upon entering, the screen will display: `Move door to down limit` This indicates that the system is ready to record the bottom (closed) position of the door.

2. **Set the Down Limit:** Using the **Up** and **Down** buttons on the controller, move the door slowly to the desired closed position. Once the door is in place, **press and hold the Stop button** until the controller confirms the position. The screen will then display something like: `Down limit: 1234` indicating that the encoder position has been recorded successfully.

3. **Set the Up Limit:** After saving the down limit, the controller will prompt: `Move door to up limit` Again, use the **Up** and **Down** buttons to move the door to its fully open position. Once adjusted, **press and hold the Stop button** to save the position. The screen will confirm: `Up limit: 5678` and automatically return to the menu.

4. **Limit Calibration Process:** After both limits have been saved, the door must be operated **three times up and down by the user** using the Up and Down buttons. This process allows the controller to fine-tune the stopping behavior and finalize the encoder reference points. Skipping this step may result in inaccurate limit behavior during normal operation.

   This process ensures precise operation by automatically adjusting any small discrepancies in movement range.

Note: It is crucial to allow the door to complete the three full movements after teaching. This process allows the controller to refine and finalize the learned limits internally. Skipping this step may result in inaccurate door positioning during operation.

8.4 Fine Tuning Position Setting

The Limit Fine Tuning menu allows for precise manual adjustment of the previously taught upper and lower door limits. This feature is especially useful when small mechanical or positional changes are required without performing the full door learning procedure again.

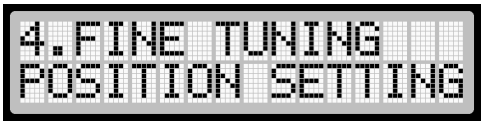


Figure 12: Door Limit Fine Tuning

The menu is divided into two submenus:

- **Upper Limit Fine Tuning**
- **Lower Limit Fine Tuning**

Once the door limits have been taught and the system has completed its self-calibration routine, this menu can be used to make fine positional corrections. These adjustments can shift the door's stop position slightly upward or downward.

When entering the fine tuning screen:

- Pressing the **Up** button will **increase the value** and shift the limit upward.
- Pressing the **Down** button will **decrease the value** and shift the limit downward.

The adjustment is shown as a positive or negative number on the screen. A **positive value** means the door will stop at a position slightly **above** the originally taught limit, while a **negative value** means the door will stop slightly **below** that limit. This method provides a flexible way to fine-tune stopping positions for mechanical alignment or user preference without modifying the main encoder reference points.

Note: Limit fine tuning only affects the stop position offset; it does not override the original taught limit values in the encoder. Use this function for minor corrections only.

8.5 Ramp Setting

The *Ramp Setting* menu is used to configure acceleration and deceleration profiles for the door during opening and closing. These settings ensure smooth motion transitions, reduce mechanical stress, and improve safety and comfort during operation.

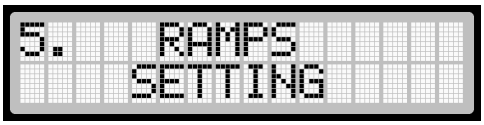


Figure 13: Ramp Configuration screen

There are a total of six ramp segments that can be configured independently:

- Open Start Ramp
- Open Slowdown Ramp
- Open Stop Ramp
- Close Start Ramp
- Close Slowdown Ramp
- Close Stop Ramp

Each ramp is defined as a **percentage of the total travel distance**, indicating when the corresponding speed behavior should begin.

Ramp Definitions:

- **Start Ramp:** Determines how quickly the door accelerates from zero to maximum speed. For example, a value of 15% means the door will gradually accelerate during the first 15% of its travel.
- **Slowdown Ramp:** Defines when the door starts decelerating from maximum speed to stop speed. This transition begins at the specified percentage and continues until the stop ramp begins.
- **Stop Ramp:** Represents the final phase of movement, where the door moves at a low speed to complete its travel and stop smoothly. This phase typically starts after the slowdown ramp ends.

Each of these settings applies separately to the **upward (opening)** and **downward (closing)** directions, allowing full customization based on door weight, motor strength, and safety requirements.

Example: If the upward start ramp is set to 10%, the door will accelerate from zero to full speed in the first 10% of its opening distance. Similarly, if the downward stop ramp is set to 5%, the door will reduce to stop speed and gently finish its travel in the final 5% of the closing distance.

Note: Careful tuning of these parameters helps prevent sudden jolts, minimizes wear on mechanical components, and ensures precise

8.6 Speed Setting

The *Speed Setting* menu allows configuration of various speed parameters that control how fast the door moves under different operating conditions. These settings are crucial for adjusting door performance according to mechanical constraints, safety requirements, and user expectations.

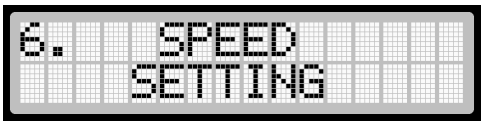


Figure 14: Speed Configuration screen

All values in this menu are entered in **Hertz (Hz)**, which directly corresponds to the motor's drive frequency and therefore its speed.

Available Speed Parameters:

- **Automatic Opening Speed:** The maximum speed used during automatic door opening.
- **Automatic Closing Speed:** The maximum speed used during automatic door closing.
- **Manual Opening Speed:** The speed used when the door is opened manually with the deadman mode.
- **Manual Closing Speed:** The speed used during manual closing with the deadman mode.
- **Opening Stop Speed:** The reduced speed applied just before the door fully opens to ensure smooth stopping.
- **Closing Stop Speed:** The reduced speed applied before the door fully closes for accurate and gentle landing.
- **Start Speed:** The initial speed used when the door begins moving from a stationary state.

Note: Proper configuration of these speed parameters is essential for balancing performance and durability. Too high speeds can cause safety issues and excessive wear, while overly low speeds may reduce operational efficiency.

8.7 Torque Setting

The *Torque Setting* menu allows fine-tuning of the motor's torque output during different phases of door movement. This feature is particularly useful for overcoming mechanical resistance during startup and ensuring sufficient force during acceleration and stopping.

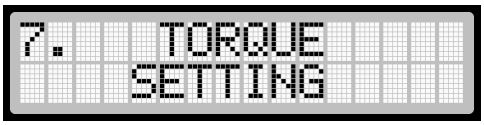


Figure 15: Torque Configuration screen

There are four torque parameters available in this menu:

- **Torque Boost During Opening:** Increases motor torque during the acceleration phase of door opening.
- **Torque Boost During Closing:** Applies additional torque when the door is accelerating during closing.

- **Torque Boost Opening Stop:** Extra torque applied when the door speed falls below 20 Hz at the end of opening, helping to stabilize the door before it fully stops.
- **Torque Boost Closing Stop:** Similar to above, but applied when the door is about to complete closing. Useful for maintaining position and preventing rebound.

All torque values are entered as percentages, representing the additional torque relative to the motor's nominal operating level.

Recommendation: It is generally advised to keep torque boost levels within a maximum of **15%**. Excessively high torque settings may lead to motor overheating or mechanical wear over time.

Note: These torque boosts are particularly helpful in doors with high friction, heavy panels, or tight mechanical constraints.

8.8 Motor Info Config

The *Motor Info Config* menu is used to enter the basic electrical parameters of the connected motor, which are essential for safe and efficient drive operation. These values are typically found on the motor's nameplate and must be entered correctly to ensure proper current control, overload protection, and speed calculation.

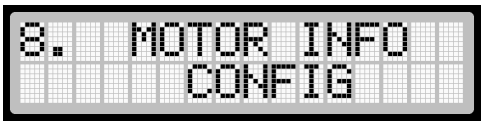


Figure 16: Motor Parameter Configuration

The configuration proceeds in the following order:

1. **Motor Voltage** The system first prompts the user to enter the rated voltage of the motor (e.g., 230V). After entering the correct value, **press and hold the Stop button** to save the input.
2. **Motor Frequency** Once the voltage is saved, the screen will ask for the motor's rated frequency (typically 50 Hz or 60 Hz). Enter the correct value and again **press and hold the Stop button** to confirm and continue.
3. **Motor Current** Finally, the system will prompt for the motor's rated current in amperes. This value determines the controller's internal current limits and is crucial for activating motor overload protection.

   Note: It is possible to enter a motor current value slightly higher than the motor's nameplate rating (e.g., by 10–25%) if immediate overcurrent protection is not desired during initial testing. However, this should be used with caution and only when necessary for system tuning. For normal operation, always enter the exact rated current shown on the motor label.

Correctly entering these values ensures the controller can regulate motor behavior reliably and protect both the drive and the mechanical system.

8.9 Screen Setting

Enables selection of diagnostic information screens (e.g., motor voltage, current, temperature) to assist technical analysis. (see Section 6.3)

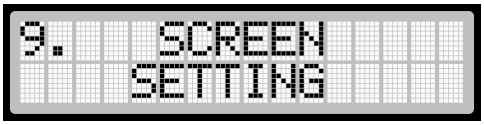


Figure 17: Screen Debug Mode Setting

8.10 Waiting Time Setting

This setting defines the duration the door remains open before automatically closing in Automatic or Test Mode.

The value entered in this menu is expressed in **seconds**. Once the door reaches its fully open position, the controller starts counting down this waiting time. When the countdown reaches zero, the door begins its closing operation automatically.

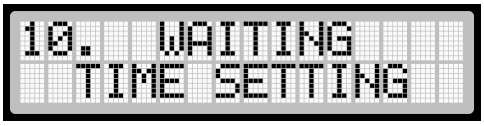


Figure 18: Waiting Time Setting Screen

8.11 Language Setting

Lets users choose the interface language. Currently supported options include:

- **English**
- **Turkish**

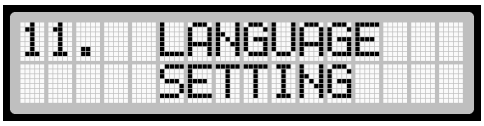


Figure 19: Language selection screen

8.12 Motor Way Setting

The *Motor Way Setting* menu provides two essential submenus:

- **Motor Direction Setting**
- **Encoder Direction Setting**

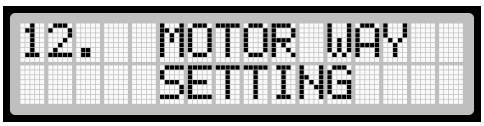


Figure 20: Motor Way Setting

These settings allow users to configure the correct movement direction of both the motor and the encoder feedback system.

Motor Direction Setting: If the door moves in the opposite direction than expected when a directional button (e.g., "Open" or "Close") is pressed, the motor direction must be reversed using this setting. Adjusting this parameter ensures that control commands match the actual physical movement of the door.

Encoder Direction Setting: If the door moves in the correct direction, but the controller displays the error message: **Motor Direction Error**, this typically means that the encoder feedback is inverted relative to the motor rotation. In such cases, the encoder direction must be changed in the *Encoder Direction Setting* submenu.

Resetting the Error: After correcting the encoder direction, press the **Emergency Stop** button to reset the error. Once the system resets, re-initiate the motor configuration or door learning steps as needed.

Note: Correct motor and encoder direction settings are critical for precise speed control, limit detection, and safe operation.

8.13 System Settings

8.13.1 Past Error Code

Displays the list of recent system faults with codes and timestamps to assist in diagnostics and troubleshooting.

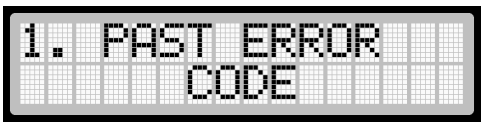


Figure 21: Fault History screen

8.13.2 Bottom Safety

The *Bottom Safety* menu is used to configure the type of safety sensor connected to the input labeled **Safety Sensor 2** on the control board. This input is typically used for detecting obstructions or ensuring user safety near the bottom edge of the door.

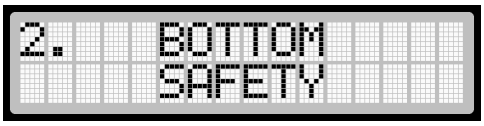


Figure 22: Safety Sensor Function settings

There are three configuration options available in this menu:

- **Photocell**
- **OSE (Optical Safety Edge)**
- **Disabled**

Photocell: Select this option when using a standard photocell sensor. In this configuration:

- The sensor must have a **Normally Closed (NC)** output.
- The **COM line should be connected to 24V DC**.

The system will monitor continuity on this input to detect safety violations. If the NC circuit is opened, the controller will open or prevent door movement.

OSE (Optical Safety Edge): Choose this mode when connecting an optical safety edge that produces a square wave output. The controller expects a signal of approximately **800–900 Hz** from the sensor input. If the signal stops or falls out of range, it is interpreted as a safety trigger and the door will be halted accordingly.

Disabled: If no sensor is connected to Safety Sensor 2, this option can be selected to disable monitoring on this input. In this mode, the controller will ignore this channel entirely.

Note: Proper configuration of the Bottom Safety sensor ensures safe operation near ground level, preventing injuries and equipment damage due to unexpected obstructions.

8.13.3 Protection Level Setting

The *Protection Level Setting* menu is used to define how far into the door's closing movement the safety sensors remain active. It allows the controller to deactivate safety inputs at a specified percentage of the closing stroke. This feature is useful for optimizing system behavior and avoiding false triggers near the end of door travel.

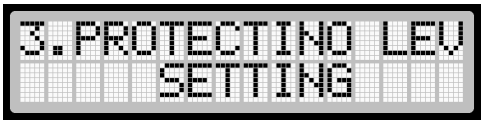


Figure 23: Safety Blind Position setting

Within this menu, configuration is available separately for:

- **Photocell Input**
- **OSE Input**

Each sensor can be assigned a percentage value (0–99), indicating the portion of the closing stroke during which the sensor remains active.

How it works:

- A setting of **0%** means the safety sensor is active throughout the entire closing movement.
- A setting of **10%**, for example, means the sensor is only active until the final 10% of the closing stroke. During the last 10%, the sensor will be automatically ignored by the controller.

This feature is particularly helpful when mechanical tolerances or environmental factors cause unnecessary triggering near the fully closed position.

Note: For maximum safety, it is recommended to keep the protection level as low as possible unless there is a valid reason to deactivate the sensor near the end of travel.

8.13.4 Door Position Sensor

The *Door Position Sensor* menu is used to select the type of position sensing method that will be used to track the door's movement and limits. This setting is crucial for ensuring accurate position feedback and safe operation.

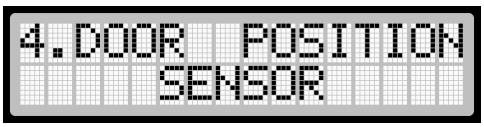


Figure 24: Door Position Sensor

Available sensor types include:

- **KOSTAL 9600** – KOSTAL encoder with 9600 baud communication speed
- **KOSTAL 19200** – KOSTAL encoder with 19200 baud communication speed
- **GFA Encoder** – Encoder type used in GFA-brand.
- **Mechanical Limit Switches** – Traditional physical switches that detect open and close ramp and limit positions (4 switches)

Selection Guidance:

- Choose the correct sensor type based on the actual hardware connected to the system.
- If a digital encoder such as **KOSTAL 9600** or **KOSTAL 19200** is selected, ensure that the baud rate matches the encoder's specifications.
- After selecting a digital encoder option, **a full power cycle of the controller is required** for the change to take effect.

Note: Incorrect selection may result in missing or unstable position feedback, leading to malfunction during door movement. Always refer to the encoder's datasheet or motor specifications when choosing the appropriate sensor type.

8.13.5 Reverse Motion Waiting Time

The *Reverse Motion Waiting Time* menu defines the delay duration between the moment the door detects a safety-related open signal (e.g., from safety sensors or an open command) while closing, and the moment it begins to move in the reverse (opening) direction.

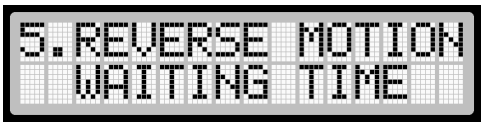


Figure 25: Reverse Motion Wait Time

This feature helps to:

- Prevent abrupt direction changes,
- Reduce mechanical stress on heavy or high-inertia doors,
- Provide a smoother transition between movements.

How it works:

- When a trigger (e.g., safety sensor activation) occurs during downward motion, the door first stops.
- The controller waits for the configured delay time before initiating the upward movement.
- The time value is entered in **seconds**.

Special Case: If the time is set to **0**, the door will immediately change direction without stopping. This may be suitable for lightweight doors or fast-response systems, but is not recommended for heavier applications.

Recommended Setting: For heavy or high-power doors, a waiting time of around **0.5 seconds** is typically suggested to avoid sudden load reversals and mechanical wear.

Note: Selecting an appropriate delay improves both system safety and component longevity.

8.13.6 Staff Opening Setting

The *Staff Opening Setting* menu allows partial door opening using a dedicated input signal, typically intended for personnel passage. Instead of fully opening the door, this feature enables it to open only to a predefined intermediate position, optimizing both energy efficiency and door wear.

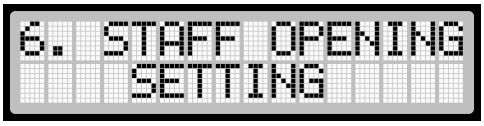


Figure 26: Personel Opening Configuration

This function is especially useful in environments where frequent but partial access is needed, such as staff entrances or maintenance access zones.

How it works:

1. Upon entering the menu, the system first prompts you to **enable the staff opening function**.
2. After activation, the controller asks you to **move the door to the desired partial open position**.

3. Use the **Up** and **Down** buttons to adjust the door to the exact position needed for staff access.

4. Once the desired position is reached, **press and hold the Stop button** to save it.

Trigger Input: The staff opening command is triggered via a dedicated input terminal. This input is shared with the terminal labeled `Mechanical Close Limit`. You may connect a switch or automation output to this terminal to activate staff-level opening.

Note: The door will open only up to the recorded position when this input is activated. To ensure safety, make sure the partial opening is sufficient for personnel to pass through comfortably without obstruction.

8.13.7 Mechanical Brake Control

The *Mechanical Brake Control* menu is used to configure the engagement and release behavior of the mechanical brake attached to the motor. This setting is particularly important for heavy doors, where unintended movement due to gravity must be prevented when the motor is not actively driving.

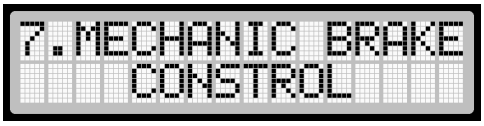


Figure 27: Mechanical Brake Configuration

Functionality:

The parameter configured in this menu is a frequency value, expressed in **Hz**. It defines the threshold at which the brake is released or engaged:

- When the motor is being driven at a frequency **higher than** the set value, the brake is **released**.
- When the motor frequency falls **below** the threshold, the brake is **engaged**.

This mechanism ensures that the brake is only released when the motor is actively driving with sufficient torque, preventing the door from moving under its own weight during idle conditions.

Important Note: The brake release frequency must be set **lower than the minimum motor drive frequency** used in normal operation. If it is set too high, the motor may attempt to run while the brake is still engaged, potentially leading to mechanical stress or controller fault conditions.

Recommended Usage: In applications involving large, heavy doors or vertical movement, brake control becomes critical. Proper adjustment of this parameter improves stability and prevents load slippage when the motor is not powered.

8.14 Relays Settings

This menu allows the user to configure one of the three available relays.

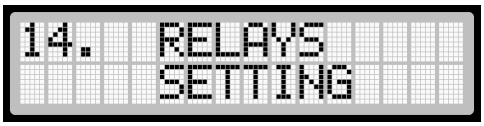


Figure 28: Relay Settings configuration screen

Upon entering this setting, the user is first prompted to select which relay to program:

- **Relay 1**

- **Relay 2**
- **Relay 3**

Once a relay is selected, the user proceeds to two configuration options described below.

8.14.1 Relay Function

This setting defines the logic or condition under which the selected relay is activated. Available functions include:

- **When Door is Opened** — Relay activates while the door is in fully opened position.
- **When Door is Closed** — Relay activates while the door is fully closed.
- **While Door is Opening** — Relay activates during the opening movement.
- **While Door is Closing** — Relay activates during the closing movement.
- **While Door is Moving** — Relay activates during any movement (opening or closing).
- **While Door is Not Moving** — Relay activates only when the door is idle.
- **While Door is on Error** — Relay activates when the system detects an error.

8.14.2 Relay State

This setting determines the relay's electrical switching behavior. The available states are:

- **Passive:** The relay is inactive.
- **Normally Open (NO):** The circuit is open when inactive and closes upon activation.
- **Normally Closed (NC):** The circuit is closed when inactive and opens when activated.
- **Toggle Mode:** Each activation inverts the relay state, acting like a flip-flop.

8.15 System Reset

Resets all configurations to factory defaults after password confirmation. Used to restore the initial system state.

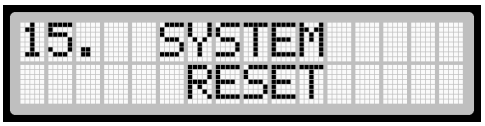


Figure 29: System Reset Screen

9 Terms and Warranty

Return Policy

You may return the product within seven (7) days of delivery by providing a petition that includes the invoice and reason for return. The product must remain unused beyond trial purposes, and its originality must be intact. If the product has been altered, damaged, or used extensively, a return will not be accepted.

Inspecting for Damage Upon Delivery

At the time of delivery, inspect the package in the presence of the cargo authority for any visible damage. If damage is identified, do not accept the product, and ensure a record is made by the cargo company. Accepting the package confirms that the cargo company has met its obligations fully.

Conditions for Return Acceptance

Products that are returned must have their original packaging intact and be in the same condition as delivered. If the product or packaging shows signs of damage, deterioration, or extensive use upon inspection, a return will not be processed, and no refund will be issued.

Consulting Authorized Services

For any issues after delivery, consult the manufacturer's authorized services to address potential concerns with the product.

Warranty and Repair Periods

During the warranty period, any repair time will be added to the warranty duration. The maximum repair time is fourteen (14) working days. In case of a defect arising from manufacturing, assembly, or material faults, the repair will be carried out at no cost to the customer, covering all labor and part replacement expenses.

Warranty Exclusions

Faults due to user misuse or non-compliance with the instructions in the operating manual are not covered by the warranty. Additionally, if a device sent for service is not claimed within three (3) months from the service date, the manufacturer holds no responsibility for its delivery.

Manufacturer's Limitations

The manufacturer will not be liable for any repairs or damages caused by failure to comply with these terms or for faults outside of the warranty scope.