Kammer-Heizung (Chamber Heater) – Complete Beginner Build Guide (EN)

This document is based **exactly** on the provided ESPHome configuration and the following Amazon hardware. It is written for beginners and clearly separates low-voltage (ESP32) and high-voltage (230V AC) wiring. **Working with 230V AC is dangerous. If you are unsure, ask a qualified electrician.**

1. Used Hardware (Exact Amazon Parts)

Role	Exact Product Name	Amazon Link
Controller	LILYGO TTGO T-Display ESP32 (CH9102F, ST7789)	https://www.amazon.de/dp/B099MPFJ9M
Solid State Relays (2x)	BGTXINGI SSR-40DA (DC 3–32V input / AC 24–380V output)	https://www.amazon.de/dp/B09NDFDLLN
Heater	PTC Heater 220V 300W with fan (self-regulating)	https://www.amazon.de/dp/B09XV41P7L

Important clarification:
• Both SSRs are identical BGTXINGI SSR-40DA modules.
• Each SSR has a **DC control side (3–32V)** and an **AC load side (230V)**.
• One SSR switches the **heater**, the second SSR switches the **chamber fan**.

2. Safety Rules (READ FIRST)

• 230V AC can kill you.
• Always disconnect mains power before wiring.
• Use proper insulated terminals and strain relief.
• SSRs must be mounted on a metal surface for heat dissipation.
• Never touch the AC side while powered.

3. System Overview

The ESP32 controls two SSRs using low-voltage GPIO signals. The SSRs safely isolate the ESP32 from the 230V AC heater and fan.

4. ESP32 Pin Mapping (Low Voltage Side)

ESP32 Pin	Function	Connects To
GPIO25	Heater control	SSR #1 DC input +
GPIO26	Fan control	SSR #2 DC input +
GND	Common ground	SSR DC input – (both)
3.3V	Sensor power	BMP280 VCC
GPIO21	I2C SDA	BMP280 SDA
GPIO22	I2C SCL	BMP280 SCL

ESP32 Pin	Function	Connects To

5. SSR Wiring (High Voltage Side – 230V AC)

SSR #1 – Heater:
• AC L (Phase) → SSR terminal 1
• SSR terminal 2 → Heater L input
• Heater N → directly to AC Neutral

SSR #2 – Fan:
• AC L (Phase) → SSR terminal 1
• SSR terminal 2 → Fan L input
• Fan N → directly to AC Neutral

NOTE: Neutral (N) is never switched. Only Phase (L) is switched by the SSRs.

6. First Power-On Checklist

✓ All AC wiring insulated and secured
✓ SSRs mounted on metal surface
✓ ESP32 powered via USB only (first test)
✓ Heater and fan disconnected for initial logic test
✓ ESPHome logs show correct temperature readings

Firmware version: Kammerheizung FW 1.00 (matches ESPHome substitutions)