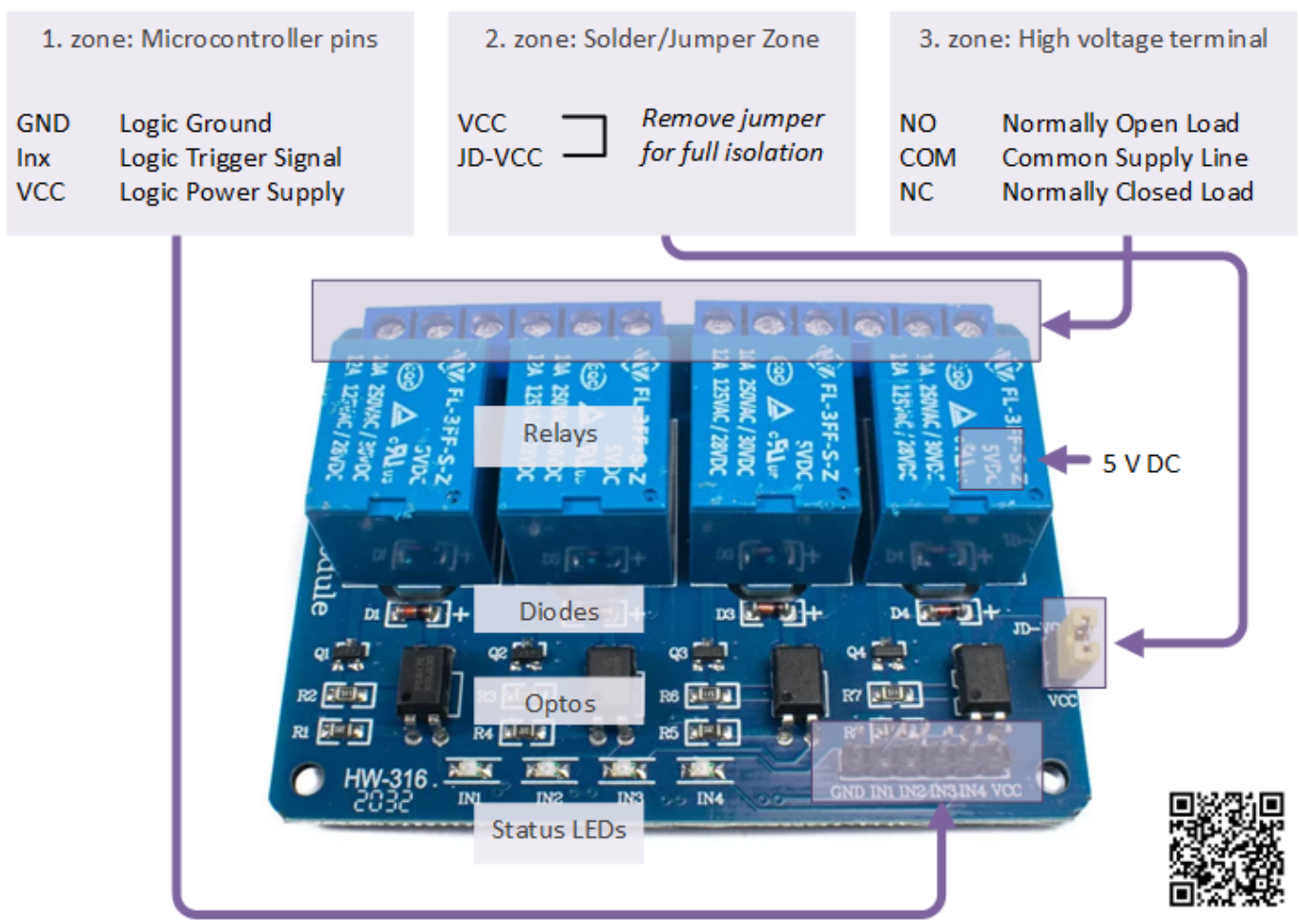


lamaPLC: Multi-channel optocoupled relay module

A multi-channel optocoupled relay module isolates high-voltage AC or DC circuits from low-power microcontrollers using internal infrared optocouplers.

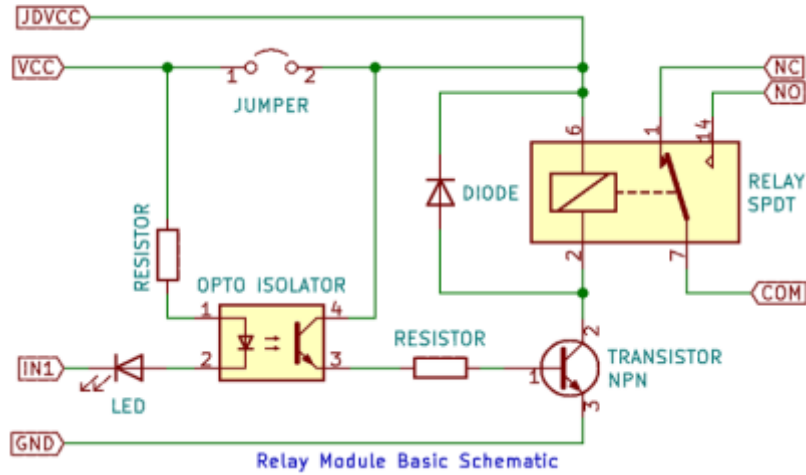
Understanding relay voltage ratings is essential for microcontrollers. For Arduino, 5V/3.3V relays are typical, whereas Raspberry Pi Micro and ESP32/3286 generally require 3.3V relays.

For high-speed AC switching, it is recommended to use a [Multi-channel Solid State Relay \(SSR\) Module](#) instead.



https://lamaplc.com/doku.php?id=actor:relay_modules

These voltage ratings, such as "5VDC" or "3VDC," are marked on the relays along with the maximum load capacity for AC and DC, for example, 10A at 250V AC or 30V DC, and 12A at 125V AC or 28V DC. In my experience, these maximum values are often overstated; I usually cut them in half. For example, for 240V AC, I consider a safe maximum of 5A, roughly 1000 Watts.



Current Required

Current Required per Logic Pin (IN1 to INx)

- **Per Active Channel:** 2 mA to 5 mA
- **The Math:** If you are using a 4-channel module (such as the HL-54) and turn all 4 channels ON at the same time, the logic pins will draw a combined total of 8 mA to 20 mA from your controller side.

The VCC Pin Current (Microcontroller Side)

- **With the VCC/JD-VCC Jumper Removed (Recommended Setup):** The VCC pin consumes approximately 0.5 mA of idle current to bias the optocoupler circuit. The microcontroller does not provide power to the coil. A separate power supply module must be used, and the load it supplies should be considered.
- **With the VCC/JD-VCC Jumper On (Shared Power Setup):** The microcontroller needs to provide high current for the mechanical coils through its 5V pin. Each active relay coil draws between 70 mA and 100 mA. **Turning on four relays at once could require up to 400 mA, which can overload and potentially crash microcontrollers like Raspberry Pi, Arduino, or ESP32.**

If the Arduino output becomes overloaded, the unit will turn off and then restart. If the overload continues, the relays will cycle on and off, producing a distinctive clicking sound.



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2026/02/14 23:38

Compare various multi-channel optocoupled relay modules

Module Name	Channel Count	Controller/Coil DC Input	Output Capacity (Max DC)	Output Capacity (Max AC)	Controller-Side Input Current (Per Active Pin)
HL-54	4 Channels	5V	DC30V DC @ 10A	250V AC @ 10A	2 mA - 5 mA (Logic Only via Optocoupler)
HW-316	4 Channels	5V DC30V DC @ 10A	250V AC @ 10A	15 mA - 20 mA	
KY-019	1 Channel (Available up to 8)	5V DC (3.3V to 12V variants)	30V DC @ 10A (Some boards 28V @ 5A)	250V AC @ 10A (Some boards 50V @ 5A)	15 mA - 20 mA (Transistor base/LED pull)
HFD4/3-S (Raw Relay)	1 Channel (Component)	3V DC (Standalone coil)	220V DC @ 2A	250V AC @ 0.5A	33.3 mA (Requires external driver circuit/diode)
FY-T734 (GEYA)	4 Channels	5V DC, 12V or 24V AC/DC	30V DC @ 10A	250V AC @ 10A	~21.8 mA (Industrial terminal input)

Sensor topics on lamaPLC

Page	Date	Tags
<ul style="list-style-type: none"> • lamaPLC project: Arduino - OLED SH1106 with AHT20/BMP280 Sensor 	2026/04/23 21:51	bmp280 , aht20 , temperature , humidity , pressure , sensor , arduino , oled , sh1106 , arduino code
<ul style="list-style-type: none"> • lamaPLC project: Arduino - Vibration sensors 	2026/04/15 17:21	vibration , sensor , piezoelectric , mems , eddy-current , electrodynamic , gxfm0459 , ldtm-028k , arduino , arduino code
<ul style="list-style-type: none"> • lamaPLC project: Digitales Potentiometer Board Moduls 	2026/04/11 18:29	sensor , module , arduino code , renesas , x9c series , x9c102 , x9c103 , x9c104 , x9c503 , xdcp , digitally controlled potentiometer
<ul style="list-style-type: none"> • lamaPLC project: Sension SCD CO² measurement module 	2026/04/15 19:34	scd30 , scd40 , scd41 , iaq , ndir , sensor , i2c , arduino code
<ul style="list-style-type: none"> • lamaPLC: A0221AU / A02YYUW Waterproof Ultrasonic Distance Sensor with UART communication 	2026/04/23 21:52	a0221au , a02yyuw , waterproof , ultrasonic , distance , sensor , uart , ip67 , serial , sen0311 , dfrobot
<ul style="list-style-type: none"> • LamaPLC: AHT10 Modul 	2026/03/22 03:14	communication , i2c , temperature , humidity , sensor , aht , aht 10 , modul
<ul style="list-style-type: none"> • LamaPLC: AHT20 / BMP280 Modul 	2026/04/23 21:52	bmp280 , aht20 , adafruit , temperature , humidity , pressure , sensor , arduino , code , i2c
<ul style="list-style-type: none"> • LamaPLC: Allegro ACS758 Hall-effect linear current sensors 	2026/04/23 21:52	cjmcu , cjmcu-758 , acs758 , acs758lcb-050b , acs758lcb-100b , acs758kcb-150b , acs758ecb-200b , hall-effect , current , sensor , analog , arduino , code
<ul style="list-style-type: none"> • LamaPLC: APDS - Avago ALS and proximity detection sensors with I²C communication 	2026/04/23 21:52	avago , apds-9900 , apds-9930 , apds-9960 , als , proximity , detection , gesture recognition , gesture , i2c , communication , sensor , arduino , code

• lamaPLC: Arduino Modul: BME680	2026/05/12 18:40	code , c , 2026 , arduino , bme680 , sensor , i2c , comunication
• lamaPLC: AS5600 Magnetic Induction Angle Measurement Sensor Module	2026/05/13 00:06	communication , i2c , as5600 , as-5600 , magnetic , induction , angle , sensor bme280 , bme680 , bme688 , bmp180 , bmp280 , hw-611 , hw611 , bosch , temperature , humidity , pressure , sensor , arduino , i2c , communication , ai , cjmcu , volatile organic compounds , vocs , volatile sulfur compounds , vscs , iaq
• LamaPLC: BMP/BME Bosch Temperature/Humidity/Pressure sensors with I²C communication	2026/04/23 21:52	bq25570 , sensor , texas instruments , nano-power management , dc-dc boost charger , mppt , solar , thermoelectric , piezoelectric , energy harvesting , eh
• LamaPLC: BQ25570 / CJMCU-2557 - Texas Instruments nano-power management IC and module	2026/04/23 21:52	cjmcu-219 , ina-219 , ina219 , breakout board , i2c , communication , sensor , voltage , current , arduino , code , cjmcu
• LamaPLC: CJMCU-219/INA-219 breakout board/IC with I²C communication	2026/04/23 21:52	cjmcu-3216 , cjmcu , ap-3216 , ap3216 , ambient light , proximity , sensor , arduino , code , i2c , communication
• LamaPLC: CJMCU-3216 / AP-3216 integrated digital ambient light and proximity sensor module/IC with I²C communication	2026/04/23 21:52	cjmcu-3901 , cjmcu , pmw3901 , pmw-3901 , optical flow , sensor , pixart , spi , communication , arduino , code , pmw3901mb-txqt
• LamaPLC: CJMCU-3901/PMW-3901 compact optical flow sensor module/IC by PixArt with SPI communication	2026/04/23 21:52	cjmcu , cjmcu-6701 , acs758 , acs-758 , galvanic skin response , gsr , electrodermal activity , eda , spi , communication , arduino , code , sensor , healthcare
• LamaPLC: CJMCU-6701: Biosensor for measuring Galvanic Skin Response (GSR) with SPI communication	2026/04/23 21:52	analog , cjmcu , cjmcu-6814 , mics6814 , mics-6814 , sensor , arduino , code , carbon monoxide , co , ammonia , nh₃ , nitrogen dioxide , no₂
• LamaPLC: CJMCU-6814 combined gas sensor module for CO, NO₂, NH₃	2026/04/23 21:52	cjmcu-811 , ccs811 , gas , sensor , vocs , tvoc , eco2 , co2 , arduino , air quality , metal oxide , mox , i2c , micropython , rp2040-eth
• lamaPLC: CJMCU-811 CCS811 Gas Sensor (VOCs TVOC CO₂)	2026/04/23 21:52	cjmcu-8221 , ad8221ar , analog devices , amplifier , sensor , cjmcu
• LamaPLC: CJMCU-8221 Analog Devices Precision instrumentation amplifier module	2026/04/23 21:52	d6t , d6t-32l , d6t-44l , d6t-8l , d6t-1a , omron , non-contact , thermal , sensor , i2c , arduino , code
• LamaPLC: D6T Omron Non-Contact Thermal Sensors with I²C communication	2026/04/23 21:52	dht11 , dht20 , dht22 , temperature , humidity , pressure , sensor , 1-wire , arduino , code
• LamaPLC: DHT Temperature /Humidity sensors with 1-wire / I²C communication	2026/04/23 21:52	dps310 , infineon , temperature , pressure , sensor , arduino , i2c , communication , code
• LamaPLC: DPS Infineon Temperature/Pressure sensors with I²C communication	2026/04/23 21:52	

• lamaPLC: DS18B20 1-Wire Digital Thermometer	2026/04/23 21:52	ds18b20, sensor, 1-wire, communication, arduino, thermometer, parasitic mode
• lamaPLC: Energy, power, current, and voltage	2025/05/31 23:32	i2c, i c, communication, arduino, energy, power, current, sensor, ina226
• LamaPLC: ENS ScioSense Multi-gas sensors with I ² C communication	2026/04/23 21:52	ens160, sciosense, gas-quality, i2c, communication, sensor, arduino, code, eco2, tvoc, aqi, indoor air quality, iaq, co2, voc
• lamaPLC: ENS160 + AHT21 Air Quality Sensor - CO, ECO, TVOC, Temp & Humidity Module	2026/04/23 21:52	arduino, ens160, aht21, air quality, sensor, co, eco, tvoc, module, aqi
• LamaPLC: Gas sensors	2023/07/01 17:29	gas, sensor, i2c, onewire, communication, mq-3, mq-4, mq-5, mq-6, mq-7, mq-8, mq-9, mq-135, gm-102b, gm-302b, gm-502b, gm-702b, alcohol, ch4, natural gas, smoke, lng, co, co2, lpg, h2, iso-butane, nox, nh3, benzene, town gas, formaldehyde, propane, humidity, temperature, voc, grv gas sens v2
• LamaPLC: GM MEMS Gas-sensors	2026/04/23 21:52	gm-102b, gm-302b, gm-502b, gm-702b, mems, gas-quality, sensor, arduino, code, nitrogen dioxide, no2, volatile organic compounds, voc, carbon monoxide, co, ethyl alcohol, c2h5ch, formaldehyde, ch2o, alcohol, c2h5oh
• lamaPLC: GY-511 6DOF sensor module	2026/03/22 01:44	stmicroelectronics, lsm303dlhc, i2c, lsm303, sensor, gy-511, 6dof, pololu, module, arduino
• LamaPLC: HC-SR04 Ultrasonic Sensor Module	2026/04/23 21:52	hc-sr04, ultrasonic, sensor, arduino, code
• LamaPLC: HDC Texas Instruments Temperature/humidity sensors with I ² C communication	2026/04/23 21:52	sht21, htu21, si7021, gy-21, gy-213v, hdc1080, gy-213v-hdc1080, cjmcu, cjmcu-1080, texas instruments, temperature, humidity, sensor, i2c, communication, arduino, code
• LamaPLC: HTU TE Connectivity temperature/humidity sensors with I ² C communication	2026/04/23 21:52	htu, htu31d, htu21d, htu20d, sht20, htu20, sht21, htu21, si7021, gy-21, gy-213v, hdc1080, si702, gy-20, sht31, htu31, si7031, gy-31, te connectivity, temperature, humidity, i2c, communication, sensor, arduino, code
• LamaPLC: HX711 24-bit analog-to-digital converter (ADC)	2026/04/11 18:28	hx711, hx-711, analog-to-digital, adc, converter, load cell, wheatstone bridge, weight, sensor, communication, arduino, code
• lamaPLC: INA modules with Arduino libraries	2026/04/23 21:52	i2c, i c, communication, arduino, energy, power, current, monitor, sensor, ina219, gy-219, ina226, gy-216, ina228, gy-228, ina237, ina238, ina260, ina3221, ina

- [lamaPLC: INA226 - current/voltage/power monitor with I²C communication](#) 2026/04/23 21:52 [i2c, i c, communication, arduino, energy, power, current, monitor, sensor, ina226, ina219, ina](#)
- [lamaPLC: LTC3588 - Nanopower energy harvesting power supply IC](#) 2026/04/23 21:52 [communication, arduino, sensor, energy harvesting, eh, energy, ambient power](#)
- [LamaPLC: M01 - V0.4 Laser ranging sensor with UART communication](#) 2026/04/23 21:52 [distance measurement, laser, distance, sensor, m01](#)
- [LamaPLC: MAX30100/MAX30102 Heart Rate Click Sensor Module](#) 2026/04/23 21:52 [max30102, max30100, heart rate click, sensor, communication, i2c, arduino, code](#)
- [lamaPLC: Max31865 RTD to Digital Converter - PT100/PT1000 Platine](#) 2026/04/23 21:52 [max31865, rtd, pt 100, pt 1000, temperature, spi, platinum, arduino, code, sensor, adafruit](#)
- [LamaPLC: MAX4466/MAX9814: Low-noise Microphone Preamplifiers](#) 2026/04/23 21:52 [audio, microphone, analogue audio, max4466, max9814, max 4466, max 9814, agc, preamplifiers, sensor, arduino, code](#)
- [LamaPLC: MH-Z19 series of NDIR CO₂ sensors](#) 2026/04/23 21:52 [mh-z19, mh-z19d, mh-z19c, mh-z19b, mh-z19e, ndir, co₂, sensor, winsen, uart, pwm, communication, non-dispersive infrared, infrared, ir, temperature, arduino, code, tasmota](#)
- [lamaPLC: MPU-6050 \(HW-123, GY-521\) 6-axis MotionTracking device](#) 2026/04/23 21:52 [mpu-6050, hw-123, gy-521, 6-axis motiontracking, dmp, temperature, sensor, mems, arduino code, arduino, accelerometer, gyroscope, tilt](#)
- [LamaPLC: MQ Winsen Gas-sensors](#) 2026/04/23 21:52 [mq, mq-2, mq-3, mq-4, mq-5, mq-6, mq-7, mq-8, mq-9, mq-131, mq-135, mq-137, winsen, gas-sensor, sensor, arduino, code, alcohol, c₂h₅oh, benzine gas, smoke, lpg, propane, c₃h₈, hydrogen, h₂, methane, ch₄, iso-butane, town gas, ammonia, nh₃](#)
- [LamaPLC: PIR sensors](#) 2026/04/23 21:52 [hc-sr501, hc-sr505, am-312, ekmb ekmc, pir, motion, sensor, arduino, code](#)
- [LamaPLC: Pixart PAJ7620U2 Gesture recognition sensors/module with I²C communication](#) 2026/04/23 21:52 [paj7620u2, gy-paj7620, pixart, gesture recognition, i2c, communication, sensor, arduino, code](#)
- [lamaPLC: PT100 / PT1000](#) 2025/09/23 18:59 [pt100, pt1000, temperature, sensor, platine, rtd](#)
- [lamaPLC: PTA8C04 4-channel PT100 Modbus Modul](#) 2026/02/14 18:42 [pta8c04, sensor, modbus, rtu, rs-485, communication, platine, um72](#)
- [LamaPLC: RCWL - Microwave radar sensor](#) 2026/04/23 21:52 [rcwl-0516, rcwl, microwave, radar, sensor, arduino, code](#)
- [lamaPLC: RD-xx - Ai-Thinker Radar Module with UART communication](#) 2026/04/23 21:52 [radar, s3km1110, fmcw, rd-01, rd-03, rd-03d, ai-thinker, k-band, 24 ghz, sensor, distance, micro-movements](#)
- [lamaPLC: RP2040_ETH_Modul: Read BME 680/688 sensor data](#) 2026/05/12 21:06 [code, micropython, 2026, rp2040 eth, bme680, i2c, sensor, communication](#)
- [lamaPLC: RP2040_ETH_Modul: Read BME 680/688 sensor data and store in Modbus input registers](#) 2026/05/12 18:58 [code, micropython, 2026, rp2040 eth, bme680, i2c, sensor, communication](#)

• LamaPLC: SGP Sensirion TVOC/VOC sensors with I ² C communication	2026/04/15 19:41	sgp30, sgp40, sgp41, sensirion, gas-sensor, i2c, communication, sensor, arduino, code, eco2, voc, tvoc, indoor air quality, iaq, nox, hydrogen
• LamaPLC: SHT Sensirion Temperature/humidity sensor with I ² C communication	2026/04/23 21:52	sht20, sht21, sht25, sht30, sht31, sht35, sht40, gy21, temperature, humidity, i2c, communication, sensor, arduino, code
• LamaPLC: Texas Instruments ADCs: Delta-sigma multi-channel Analog Converters with SPI communication	2026/04/23 21:52	ads111x, ads12xx, delta-sigma, converter, texas instruments, adc, spi, communication, sensor, arduino, code, ads1110, ads1112, ads1113, ads1114, ads1115, ads1118, ads1119, ads1220, ads1232, ads1234, ads1256, ads1261, ads1263, multi channel
• LamaPLC: TOFnnnC STMicroelectronics Time-of-Flight (ToF) sensors with I ² C communication	2026/04/23 21:52	tof050c, vl6180, tof200c, vl53l0x, tof400c, vl53l1x, stmicroelectronics, time-of-flight, tof, i2c, communication, sensor, arduino, code
• LamaPLC: UICPAL Temp.humi.sensor	2023/06/25 00:43	simatic, s7, modbus, communication, temperature, humidity, sensor
• LamaPLC: VL53Lnn STMicroelectronics time-of-flight (ToF) laser-ranging sensors with I ² C communication	2026/04/23 21:52	vl53l0x, vl53l1x, vl53l0 1xv2, gy-530, time-of-flight, tof, laser-ranging, i2c, communication, sensor, arduino, code
• LamaPLC: VL6180X STMicroelectronics Time-of-Flight (ToF) sensor with I ² C communication	2026/04/23 21:52	vl6180x, stmicroelectronics, time-of-flight, tof, i2c, communication, sensor, arduino, code
• LamaPLC: Waveshare TOF Laser Range Sensor with UART / I ² C communication	2026/04/23 21:52	distance measurement, laser, range, sensor, tof, waveshare
• lamaPLC: XGZP68xx: Silicon Pressure Sensors/Module	2026/05/15 15:17	communication, i2c, sensor, modul, pressure, cfsensor, xgzp68xx, xgzp6810d, xgzp6857d, xgzp6859d, xgzp6887d, xgzp6897d, xgzp6899a, piezoresistive, capacitive
• lamaPLC: YR-3180 - Weight sensor module with UART or Modbus communication	2026/02/15 00:00	communication, modbus, rtu, sensor, weight, yr-3180, hx710b, arduino, ttl, rs-485
• LM393: Dual differential comparator (flame, light, sound sensors)	2026/05/12 22:18	communication, analog, lm393, lm-393, flame, ir, sound, hall, sensor, ky-026, hw-484, ky-037, ky-038, fc-03, hc-89, ky-024, modul
• Magnetic angle sensors	2026/03/05 21:19	magnetic angle sensor, magnetic flux, sensor, spi, i2c, pwm, communication, modul, as5047p, as5600, mt6701, mt6816, mt6835, tle5012b, amr, gmr, tmr, anisotropic magnetoresistive
• NT18B07: 7 Kanal RS485 Temperatur Sensor with Modbus RTU	2026/02/14 18:49	nt18b07, sensor, modbus, rtu, rs-485, communication, platine
• PT100 / PT1000 sensors	2026/04/23 21:52	rtd, pt100, pt1000, sensor, temperature

- [Radar Module RD-xx](#) 2026/04/23 21:52 [radar, s3km1110, fmcw, rd-03, k-band, 24 ghz, sensor, distance, micro-movements](#)

[Multi-channel, optocoupled, relay, actor, modul, Arduino, HL-54, HW-316, KY-019, HFD4/3-S, FY-T734, Geya](#)

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