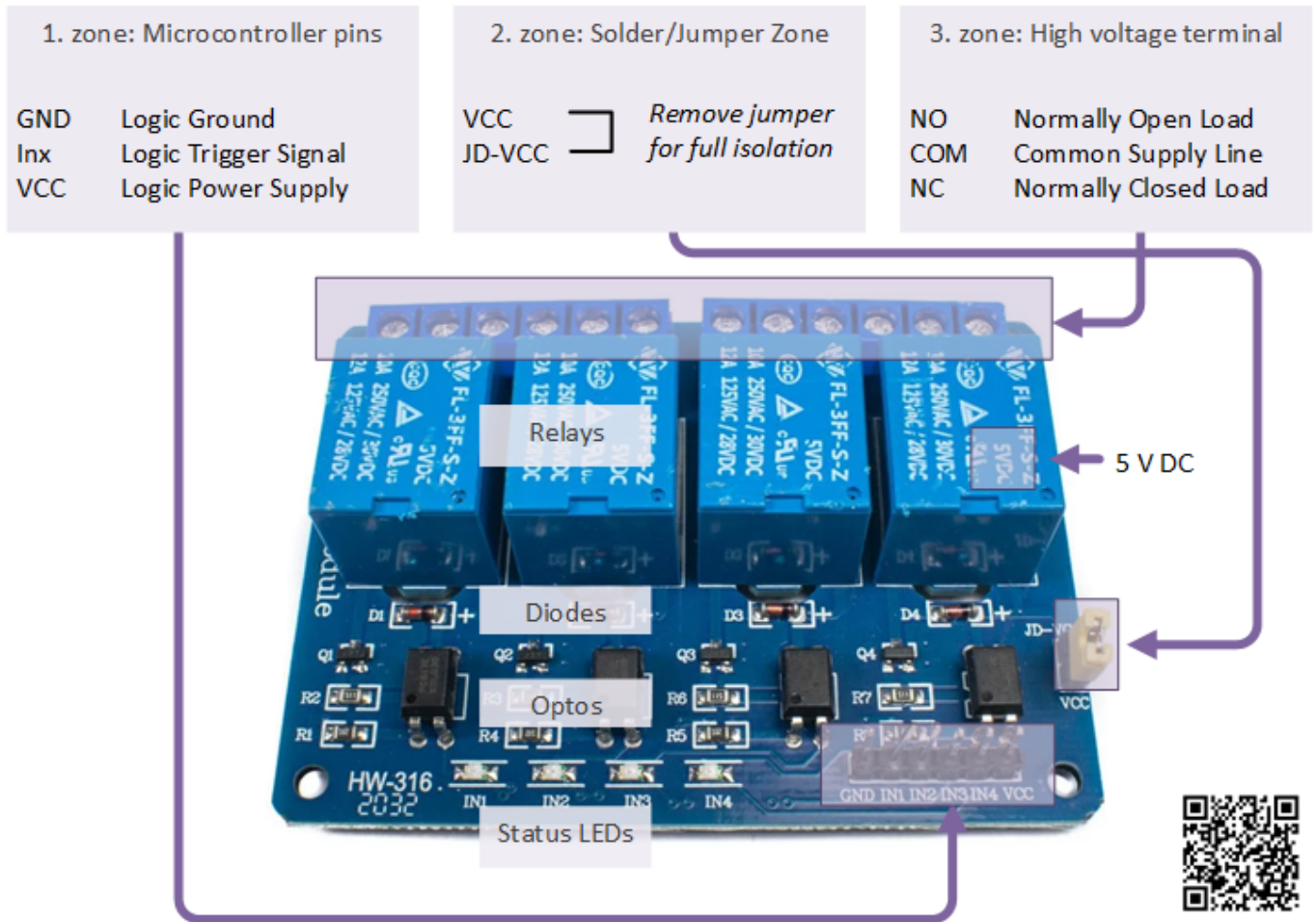


lamaPLC: Multi-channel optocoupled relay module

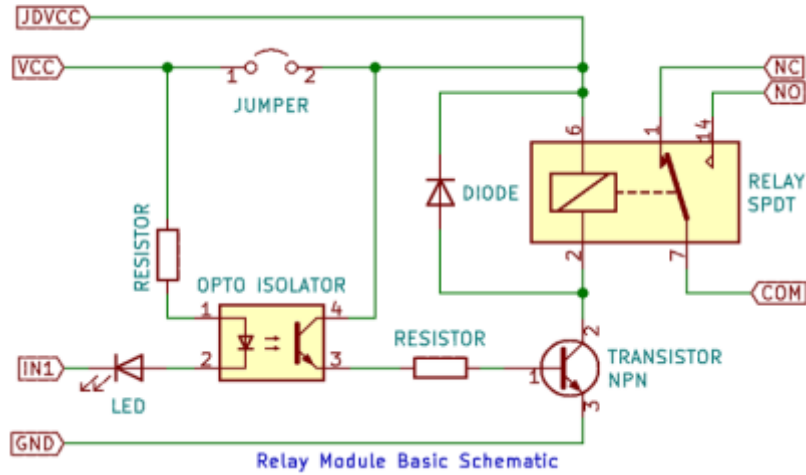
A multi-channel optocoupled relay module isolates high-voltage AC or DC circuits from low-power microcontrollers using internal infrared optocouplers.

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.



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.

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) |

| Module Name | Channel Count | Controller/Coil DC Input | Output Capacity (Max DC) | Output Capacity (Max AC) | Controller-Side Input Current (Per Active Pin) |
|----------------------|-----------------------|--------------------------|--------------------------|--------------------------|--|
| 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 |
| <ul style="list-style-type: none"> • lamaPLC: Arduino Modul: BME680 | 2026/05/12 18:40 | code , c , 2026 , arduino , bme680 , sensor , i2c , comunication |
| <ul style="list-style-type: none"> • lamaPLC: AS5600 Magnetic Induction Angle Measurement Sensor Module | 2026/04/23 21:52 | communication , i2c , as5600 , as-5600 , magnetic , induction , angle , sensor |

| | | |
|---|---------------------|--|
| <ul style="list-style-type: none"> • LamaPLC: BMP/BME Bosch Temperature/Humidity/Pressure sensors with I²C communication | 2026/04/23 21:52 | 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, vsocs, iaq |
| <ul style="list-style-type: none"> • LamaPLC: BQ25570 / CJMCU-2557 - Texas Instruments nano-power management IC and module | 2026/04/23 21:52 | bq25570, sensor, texas instruments, nano-power management, dc-dc boost charger, mppt, solar, thermoelectric, piezoelectric, energy harvesting, eh |
| <ul style="list-style-type: none"> • LamaPLC: CJMCU-219/INA-219 breakout board/IC with I²C communication | 2026/04/23 21:52 | cjmcu-219, ina-219, ina219, breakout board, i2c, communication, sensor, voltage, current, arduino, code, cjmcu |
| <ul style="list-style-type: none"> • LamaPLC: CJMCU-3216 / AP-3216 integrated digital ambient light and proximity sensor module/IC with I²C communication | 2026/04/23 21:52 | cjmcu-3216, cjmcu, ap-3216, ap3216, ambient light, proximity, sensor, arduino, code, i2c, communication |
| <ul style="list-style-type: none"> • LamaPLC: CJMCU-3901/PMW-3901 compact optical flow sensor module/IC by PixArt with SPI communication | 2026/04/23 21:52 | cjmcu-3901, cjmcu, pmw3901, pmw-3901, optical flow, sensor, pixart, spi, communication, arduino, code, pmw3901mb-txqt |
| <ul style="list-style-type: none"> • LamaPLC: CJMCU-6701: Biosensor for measuring Galvanic Skin Response (GSR) 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 |
| <ul style="list-style-type: none"> • LamaPLC: CJMCU-6814 combined gas sensor module for CO, NO₂, NH₃ | 2026/04/23 21:52 | analog, cjmcu, cjmcu-6814, mics6814, mics-6814, sensor, arduino, code, carbon monoxide, co, ammonia, nh ₃ , nitrogen dioxide, no ₂ |
| <ul style="list-style-type: none"> • LamaPLC: CJMCU-811 CCS811 Gas Sensor (VOCs TVOC CO₂) | 2026/04/23 21:52 | cjmcu-811, ccs811, gas, sensor, vocs, tvoc, eco2, co2, arduino, air quality metal oxide, mox, i2c, micropython, rp2040-eth |
| <ul style="list-style-type: none"> • LamaPLC: CJMCU-8221 Analog Devices Precision instrumentation amplifier module | 2026/04/23 21:52 | cjmcu-8221, ad8221ar, analog devices, amplifier, sensor, cjmcu |
| <ul style="list-style-type: none"> • LamaPLC: D6T Omron Non-Contact Thermal Sensors with I²C communication | 2026/04/23 21:52 | d6t, d6t-32l, d6t-44l, d6t-8l, d6t-1a, omron, non-contact, thermal, sensor, i2c, arduino, code |
| <ul style="list-style-type: none"> • LamaPLC: DHT Temperature /Humidity sensors with 1-wire / I²C communication | 2026/04/23 21:52 | dht11, dht20, dht22, temperature, humidity, pressure, sensor, 1-wire, arduino, code |
| <ul style="list-style-type: none"> • LamaPLC: DPS Infineon Temperature/Pressure sensors with I²C communication | 2026/04/23 21:52 | dps310, infineon, temperature, pressure, sensor, arduino, i2c, communication, code |
| <ul style="list-style-type: none"> • LamaPLC: DS18B20 1-Wire Digital Thermometer | 2026/04/23 21:52 | ds18b20, sensor, 1-wire, communication, arduino, thermometer, parasitic mode |
| <ul style="list-style-type: none"> • 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 I²C 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 I²C 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 I²C 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](#) 2026/04/11 19:54

[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](#)

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| • 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 |

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| • 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: 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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