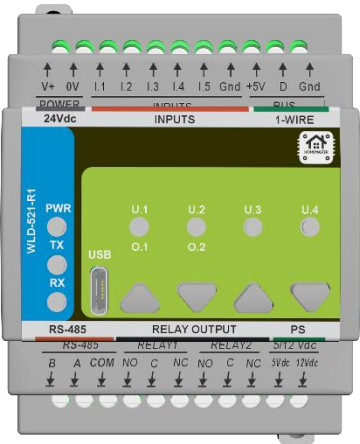# Datasheet

WLD-521-R1 Module

Part No. 0000011

About the product

The **WLD-521-R1** is a smart and reliable input/control module designed for leak detection and water flow monitoring in residential, commercial, and industrial environments. It connects easily to MicroPLC or MiniPLC systems via RS-485 (Modbus RTU) and offers seamless integration with ESPHome and Home Assistant for advanced automation.

Designed for seamless integration with ESPHome and Home Assistant, the gateway allows OTA updates, local LED indicators, and configuration via USB Type-C.

Electrical Data

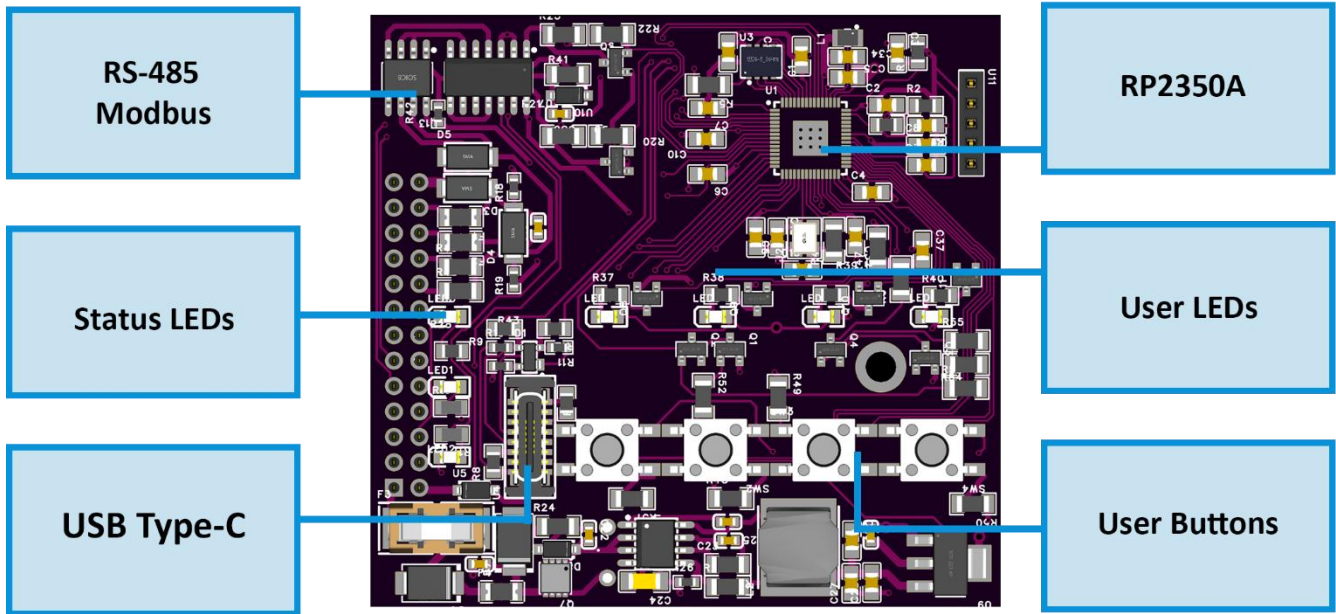|	
Power supply	24VDC, USB-C female (5V DC via USB-C) for programming
Power consumption	typ. 1.85W, max. 3W
Raspberry PI	RP2350A
Outputs	2 digital output (relay with optocoupler and varistor surge protection), dry contact 250VAC 16A at cosᵠ =1, 250VAC 9A at cosᵠ =0.4 30VDC 10A
Digital inputs	5 isolated, surge protected digital sourcing inputs
1-WIRE	1-WIRE bus, 5VDC bus power supply, ESD Protected
RS-485	Half-duplex, data rate 115,2 kbps, short-circuit current limited and protected against excessive power dissipation, fail-safe for open circuit, surge protected
USB	USB type-C USB Specification 2.0 compliant, ESD protected,

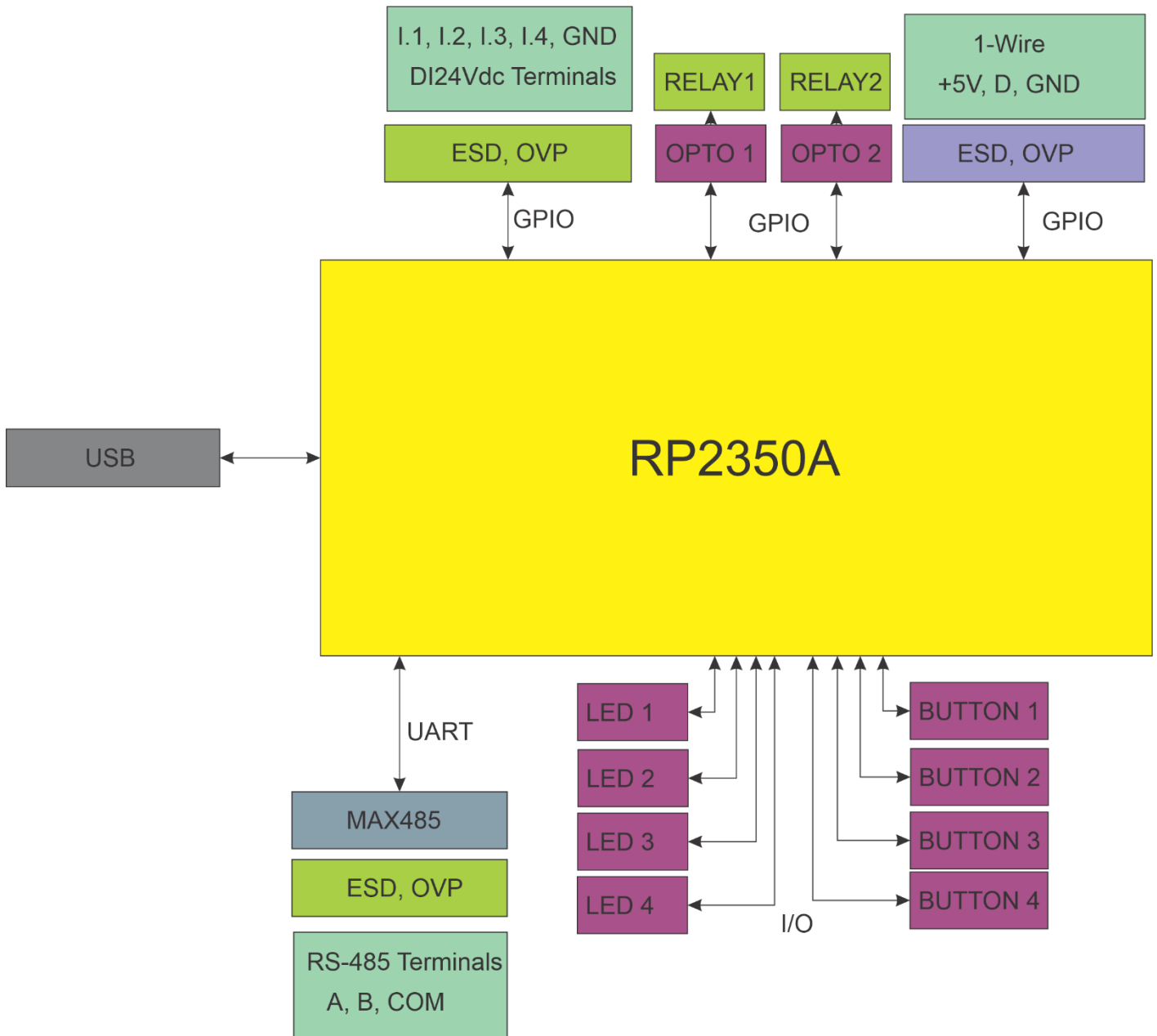|	Silicon Labs CP2102N USB-to-UART bridge controller, Virtual COM Port Device Drivers, Works with existing COM port Applications, Supported on Windows, Mac, and Linux
Real-time clock	PCF8563
Ambient temperature	0 … 40°C / 32 … 104°F
Humidity	max. 95% r.H. (non condensing)

Information: *

High loads at the digital outputs result in heat development, which can influence the lifetime in the long run. We recommend using coupling relays with loads greater than 5A.

Connections

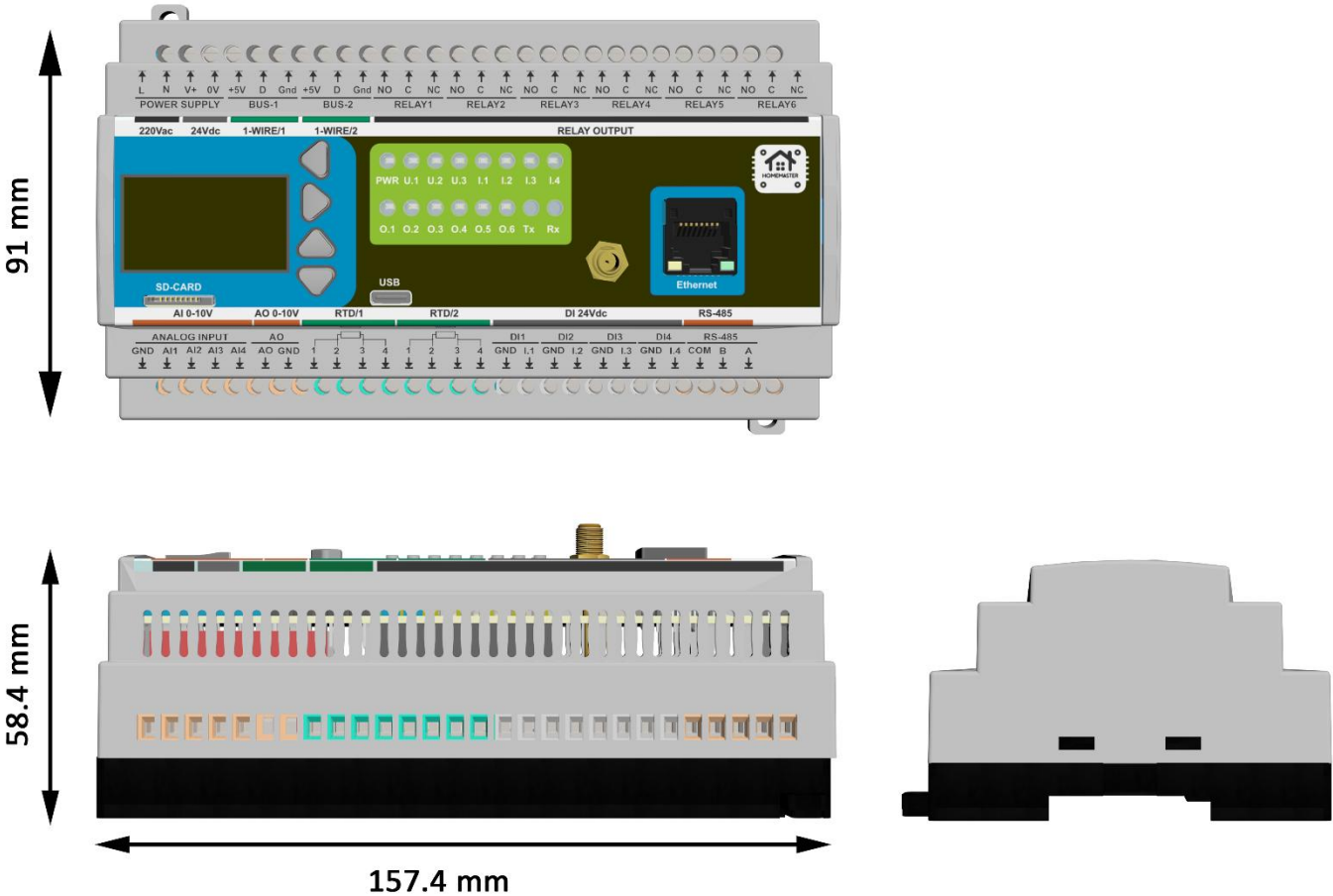| Terminals	300V 20A 26-12 AWG 2.5mm2, Torque of terminal blocks 0.5 … 0.6Nm /0.37 … 0.44 lbf ft, Pitch: 5.08mm(.200")
WiFi antena	SMA male
USB	USB type-C

24Vdc Input

Data Isolators

Modbus Connector

Relay and Varistor

Relay Optical Isolation

QSPI_SS		
QSPI_SD1		
QSPI_SD2		
QSPI_SD0		
QSPI_SCLK		
QSPI_SD3		

D+ D-

| QSPI_SS | QSPI_SD1 | QSPI_SD2 | QSPI_SD0 | QSPI_SCLK | QSPI_SD3 | QSPI_IOVDD | USB_OTP_VDD | USB_DP | USB_DM | VERG_FB | VREG_VIN | VREG_LX | VREG_PGND | VREG_AVDD |

60	59	58	57	56	55	54	53	52	51	50	49	48	47	46

IOVDD	1		45	IOVDD
GPIO0	2		44	AVDD
GPIO1	3		43	GPI29
GPIO2	4		42	GPIO28
GPIO3	5		41	GPIO27
DVDD	6		40	GPIO26
RX GPIO4	7		39	DVDD
TX GPIO5	8		38	IOVDD
SDA GPIO6	9		37	GPIO25 BUTTON4
SCL GPIO7	10		36	GPIO24 BUTTON3
IOVDD	11		35	GPIO23 BUTTON2
GPIO8	12	GND	34	GPIO22 BUTTON1
GPIO19	13		33	GPIO21 LED4
SPI_SCLK GPIO10	14		32	GPIO20 LED3
SPI_MOSI GPIO11	15	TOP VIEW	31	GPIO19 LED2

16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

| GPIO12 | GPIO13 | GPIO14 | GPIO15 | IOVDD | XIN | XOUT | DVDD | SWCLK | SWDIO | RUN | GPIO16 | GPIO17 | GPIO18 | IOVDD |

CWCLK SWDIO

SPI_MISO SPI_RTD1 SPI_RTD2

LED1

I.1, I.2, I.3, I.4, GND
DI24Vdc Terminals

ESD, OVP

GPIO

RELAY1

RELAY2

OPTO 1

OPTO 2

GPIO

1-Wire
+5V, D, GND

ESD, OVP

GPIO

RP2350A

USB

UART

MAX485

ESD, OVP

RS-485 Terminals
A, B, COM

LED 1

LED 2

LED 3

LED 4

I/O

BUTTON 1

BUTTON 2

BUTTON 3

BUTTON 4

Product Characteristics

Mounting type	DIN rail according to EN50022, 35mm
Colors	Light Gray/Black, Smoke Panel
Material	PC/ABS/V0
Finish	Matte

Weight & Dimensions

Net weight	420g
Total weight	580g
Product dimensions	157.4 x 91 x 58.4 mm (6.2 x 3.58 x 2.3 in) (LxWxH), 9 division units
Pack size	230x140x87mm (9 x 5.5 x 3.4 in) (LxWxH),

Certifications & Standards

Safety rating	IP20
Operation	Type 1 (UL60730-1, CSA E60730-1)
Rated impulse voltage for digital output	2.5kV (UL60730-1, max. Altitude 2000m)
Degree of pollution	2
Certifications	CE, UL60730-1, CSA E60730-1

The ESP32 MiniPLC enables a variety of connected devices to work with HOMEMASTER technology.

See https://www.home-master.eu for more details.

Communication between iPhone, iPad, Apple Watch, HomePod, or Mac and the HomeKit- enabled

ESP32 MiniPLC is secured by ESPHome and Home Assistant technology.

Installation must be carried out by a qualified electrician in accordance with the relevant regulations.