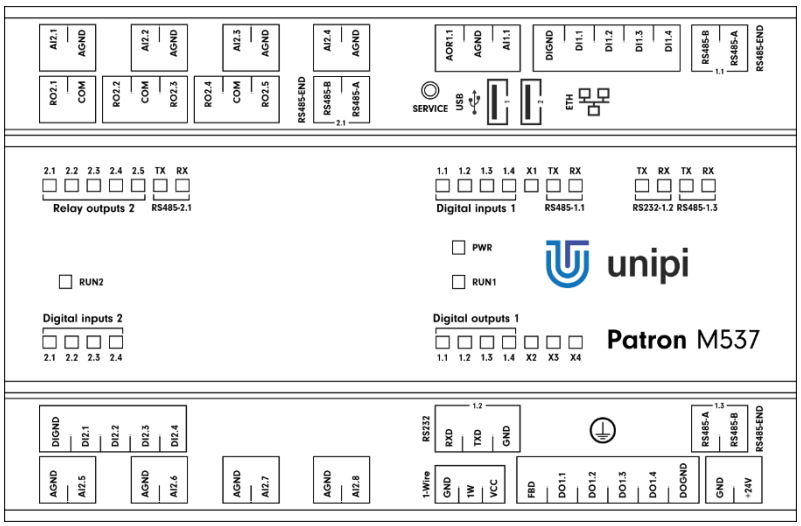
Unipi Patron M537

PRODUCT DESCRIPTION

Unipi Patron M537 is a programmable logic controller (PLC) designed for automation, control, regulation and monitoring. The M537's architecture is focused on a higher number of analog I/Os, but also features a sufficient number of all inputs/outputs available on Unipi products (digital, relay). That makes it suitable for complex projects including measurements and control of analog components. The controller is also equipped with four serial interfaces (RS485 + RS232) for connection of extension modules or gateways, and a 1-Wire interface for connection of digital temperature or humidity sensors.



mervis software included

NXP i.MX 8M

COMPUTING MODULE

i.MX 8M Mini quad-core CPU
(Arm© Cortex©-A53, max 1.8 GHz),
1 GB LPDDR4 RAM, 8 GB eMMC onboard memory

FUNCTIONALITY

Automation, IoT and IIoT, remote online monitoring and regulation, HVAC control (heating, ventilation, air conditioning), SCADA, sensorics, smart home control (lighting, doors, locks, irrigation etc.)

FEATURES

Inputs/outputs

8 × digital input incl. counter
4 × digital output
5 × relay output
9 × analog input
1 × analog output

Communication interfaces

3 × RS485
1 × RS232
1 × 1-Wire bus
1 × 100 Mbit Ethernet
2 × USB 2.0

Software

- Powered by OS Linux
- Mervis – IDE (IEC 61131-3), HMI editor, proxy server, cloud database, SCADA, a wide range of supported protocols
- Open-source solutions – Node-RED, openHAB, Homebridge, FHEM, PiDome, DomotiGa, Domoticz, Pimatic and many more
- Custom SW implementation– EVOK open API, Modbus TCP interface, SysFS

Other features

- The most powerful compact controller on the market
- Developed and manufactured in the EU
- Durable aluminium chassis (IP20)
- Extended warranty (3 years)
- Special functionality – Direct Switch, MasterWatchdog, user LEDs
- Available in OEM variant, broad extension options – PoE/PoE+, microSD, wireless technologies (LTE, Wi-Fi, Zigbee, ...), Secure boot and more

Installation and operating conditions

Control type by purpose	Operating control
Control type by design	Independently mounted control
Operating conditions	0 °C ... + 55 °C, relative humidity 10 % ... 95 %, without aggressive substances, condensing vapour and fog
Storage conditions	-25 °C ... +70 °C, relative humidity 10 % ... 95 %, without aggressive substances, condensing vapour and fog
Degree of protection IP (IEC 529)	IP 20
Operation position	Horizontal inside vertical enclosure
Installation	On 35mm DIN rail into distribution box (holder included)
Connection	Pluggable terminal blocks
Wire gauge	Max. 2.5 mm², AWG14
EMC immunity zone	B (IEC 61000-6-2 compliant)
Protection class	I
Overvoltage category	II
Pollution degree	2
Automatic action control type	1
Software function class	A
Control function class	A

Power supply

Rated voltage - SELV	24 V⎓ (±5%)
Power consumption	Typ. 5 W Max. 15 W
Reverse polarity protection	Yes

Dimensions and weight

Dimensions	140 × 90 × 60 mm	8 DIN modules
Weight	362 g	

Communication

Ethernet	1 × 100 Mbit Ethernet
Serial/bus channels	3 × RS485, 1 × RS232, 1 × 1-Wire
RS485 1.1, 2.1 transmission speed	2400 baud ... 115 200 baud
RS485 1.3 transmission speed	50 baud ... 3 Mbaud
RS485 galvanic isolation	Yes (Basic)
RS485 biasing resistors	Yes, 560 Ω
RS485 terminating resistor	Builtin attachable, 120 Ω
RS232 transmission speed	50 baud ... 3 Mbaud
RS232 galvanic isolation	No
1-Wire galvanic isolation	Yes (Basic)
1-Wire output voltage Vcc	5 V
1-Wire max. current Vcc	50 mA
1-Wire connector	3 × pole, max. 1.5 mm², AWG16
USB	2 × USB 2.0

Digital inputs

No. of inputs × groups	4 × 2
Functions of inputs	Counter (incl. memory), Direct Switch
Input type	SINK
Input terminal	DI
Common ground	DIGND
Maximum voltage for log. 0	3 V⎓
Minimum voltage for log. 1	7 V⎓
Maximum voltage	35 V⎓
Non-defined state	3-7 V⎓
Input resistence for log. 1	6 200 Ω
Voltage drop on DI diode	1.2 V
Minimum pulse length	20 µs
0->1 / 1->0 delay	Typ. 20 µs / 60 µs
Maximum CNT counter input frequency	10 kHz
Galvanic isolation	Yes (Basic, between the groups)
Insulation voltage	1 500 V (pulse)

Digital outputs

No. of inputs × groups	4 × 1
Functions of inputs	PWM
Output type	SINK (NPN – open collector)
Output terminals	DO
Common ground	DOGND
Switching voltage	5–50 V⎓
Switching current continuous/pulse	750 mA / 1 A
Max. total group load	1 A
Inductive load handling	Integrated FBD diode (optional)
Switching period (open/close)	Typ. 130 ns / 20 ns
Maximum PWM resolution	16 bits
Maximum PWM frequency	200 kHz
Galvanic isolation	No

Relay outputs

No. of inputs × groups	1 × 1, 2 × 2
Output type	Electromechanic non-shielded relay
Output terminal	RO
Common terminal	COM
Contact type	Normally open (SPST-NO)
Used relay type	FTR-F3AA024E-HA
Maximum switching voltage	250 V∿ 30 V⎓
Maximum switching current	5 A
Maximum common terminal current	10 A
Short-term current overload	5 A
Mechanical lifespan	5 000 000
Electrical lifespan	Up to 100 000 (according to the connected load)
Operate/release time	10 ms
Designed for load character	Resistive
Load handling	External (RC, varistor, diode, thermistor)
Short circuit protection	No
Overvoltage protection	No
Galvanic isolation	Yes (Basic)
Insultaion voltage	2 500 V (RO-RO) / 4 000 V (to other circuits)

Analog inputs

Section 1

No. of inputs × groups	1 × 1
Input terminals	AI
Common ground	AGND
Input modes	0–10 V⎓ voltage meas. 0–20 mA current meas.
Maximum input voltage	12 V⎓
Input resistance (voltage meas.)	66 kΩ
Input resistance (current meas.)	100 Ω
Accuracy	±0.5 %
Resolution	12 bits
Conversion time	10 µs
Protection type	Integrated overvoltage
Galvanic isolation	No

Section 2

No. of inputs × groups	8 × 1
Input terminals	AI
Common ground	AGND
Overvoltage protection	Integrated transil
Maximum voltage	15 V⎓
Maximum current	40 mA
Connection	SINK (measurement relative to the ground)
Galvanic isolation (pulse)	Yes (Basic), 1500 V between AI and all other circuits

Caution:
Measurements outside the specified range may reduce the accuracy of the measurement and/or reduce the input impedance.

In case of strong interference to the cable (EN 6100-6-4), the measurement accuracy can be reduced to 1 % of the measured value. The use of additional EMC filters and shielded cabling is recommended (connect shield to the ground point of the device).

Analog Input Configuration - Section 2

Voltage 0-10 V

Measuring range	0.1–10 V
Accuracy	±0.2 % (of range)
Input resistance	12 kΩ ±20 %
Resolution	24 bits
Conversion time	200 ms

Voltage 0-2 V

Measuring range	0.1–2 V
Accuracy	±1 % (of range)
Input resistance	1 MΩ ±50 %
Resolution	24 bits
Conversion time	200 ms

Current 4-20 mA

Measuring range	1–20 mA
Accuracy	±0.2 % (of range)
Input resistance	100 Ω ±1 %
Resolution	24 bits
Conversion time	200 ms

Resistance 2 kΩ

Measuring range	75–2000 Ω
Connection	Two-wire
Measuring current	< 0.3 mA (average)
Resolution	24 bits
Accuracy	±0.3 % (of range) / 0.5 Ω
Conversion time	200 ms
Compatible sensors	Pt100/Pt1000 (tol. ±0.75 °C), Ni100/Ni1000/2k reostat, etc ...

Please note:
The compensation of the lead resistance and the conversion to temperature according to the selected sensor is up to the user application.

Resistance 20 kΩ

Measuring range	1–20 kΩ
Connection	Two-wire
Measuring current	< 0.03 mA (average)
Resolution	24 bits
Accuracy	±1 % (of value) / 10 Ω
Conversion time	200 ms
Compatible sensors	Reostat

Analog outputs

No. of inputs × groups	1 × 1
Output terminals	AOR
Common conductor	AGND
Output functions	0–10 V⎓ voltage source 0–20 mA current source 0–1960 Ω resistance meas.
Output voltage range	0–10 V⎓
Output current range	0–20 mA
Maximum output current	20 mA
Output accuracy	±0.5 %
Resolution	12 bits
Conversion	1 ms
Protection type	Integrated overvoltage
Galvanic isolation	No

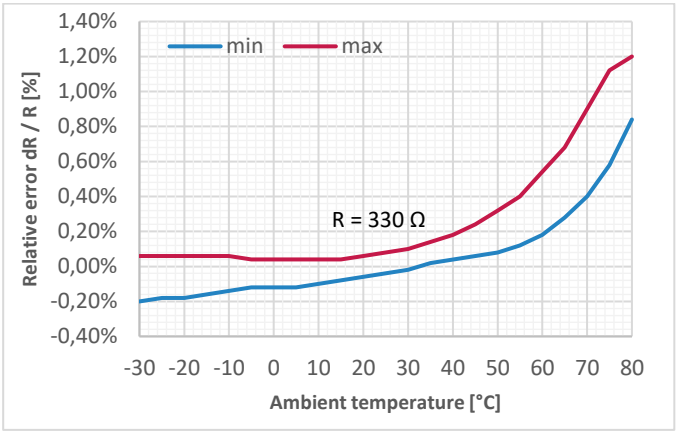
Note: Licenses of the software used are included in the OS image, in the /usr/share/doc/ directory.

Temperature dependence of resistance measurement (section 2)

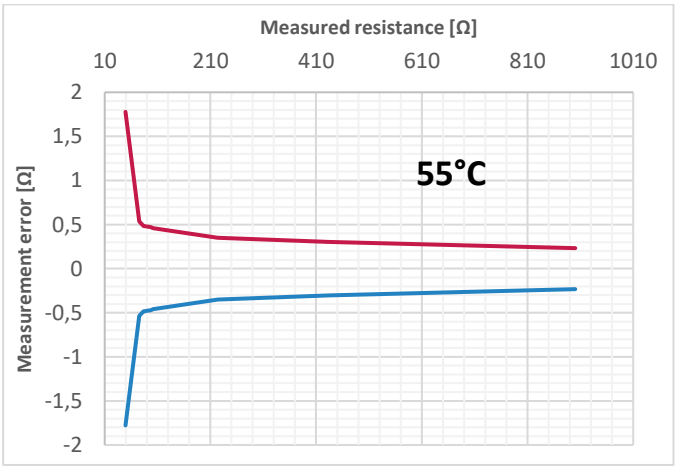
When measuring resistance, it is necessary to include the temperature-dependent measurement error of the device, especially at the lower limit of the measuring range.

The graph represents the dependence of the measured value error range compared to the measured value at 20 °C for a set of 16 channels with 3 sigma coverage (99.7 % in-band measurement), various production batches.

- Measurement mode: 2 kΩ
- Measured resistance: 330 Ω



Measurement tolerance for unit temperature 55 °C and 2 kΩ mode:



Directive compliance

LVD:	2014/35/EU
EMC:	2014/30/EU
RoHS:	2015/863/EU
WEEE:	2012/19/EU