

Extension Module, analog temperature probe converter with two 1-Wire interfaces



Main features

- Temperature measurement with its own circuit for high precision and large scale
- Compatibility with all Khomp IoT devices with 1-Wire protocol inputs

Applications

- Industries
- Agribusiness
- Smartcity
- Health
- Corporative

Overview

Khomp presents to the market, the EM ACW 100, an extension module, high precision analog temperature and large scale probe converter, with 2 1-Wire interfaces.

Through the 1-Wire protocol, Khomp IoT devices communicate with EM ACW 100, which can use probes with greater precision, such as PTC Probes (PT100, PT1000), type K and type J thermocouples, and / or NTC thermistors. PTC probes can measure temperatures from -200 °C to 600 °C, while type K thermocouples from -270 °C to 1370 °C, and type J thermocouples from -210 °C to 760 °C. NTC thermistors measure from -40 °C to 300 °C.

With these sensors you can measure temperatures in more critical places, such as temperatures in nitrogen tanks, industrial production processes, pipelines, as well as outdoor and indoor locations.

The EM ACW 100, reads according to the period the endpoint / ITS (1-Wire master) where the extension module is connected. An example is: If the device reads every 5 minutes, when it exceeds this time, the master will send the request to read the extension's sensors, and the ACW will return the current sensor reading. The 1-Wire extension modules do not average any data during the period that are not called by the endpoints / ITS.

The 1-Wire protocol allows the communication wire of the converter to be extended, from 1 to 5 meters, being able to install the converter directly or close to the data measurement location.

The EM ACW 100 is compatible with all Khomp IoT devices that have 1-Wire protocol input. Plus, it can be cascaded to other 1-Wire devices, with a maximum of 4 on each endpoint/ITS.

Models

Model	Description
EM ACW 100	Analog Temperature Probe Converter Extension Module with two 1-Wire interfaces



The EM ACW 100 modular extension can only receive one [temperature probe](#) on the PTSM connector.

Technical specifications

Electrical Characteristics

- Power:
 - Option for feeding via 1-Wire cable (parasite):
 - 2X AA batteries powering option (Batteries not included)
 - USB powering option
- **Energy consumption***:
 - Average consumption: 1 mW
 - Set NIT 21Z (ZigBee) or NIT 21L (LoRa) + EM ACW 100 (2 AA batteries in each device)
 - 1-year durability with transmissions every 5 minutes
 - Connected to ITS NB or ITS 3G
 - The ITS is connected to the power source and the battery is only for fallback, so it is not advisable to measure energy consumption

* Test done with 2 batteries at the endpoint and 2 batteries at the extension

Bus

- Type: 1-Wire
- Connectors: RJ12
- Compatible with:
 - ITS 302 and ITS 312 (3G)
 - NIT 20LI and NIT 21LI (LoRa). Compatible with ATC LoraWAN Public Network and Private Networks
 - NIT 20ZI and NIT 21ZI (ZigBee)

Endpoints compatible versions *

- ITG: v2.4.0.0 or higher
- ITS 3G: v1.0.4.0 or higher
- NIT2xZ: v15.1 or higher
- NIT2xL: v2.5.2.0 or higher

* ITG does not read 1-Wire Khomp extension modules. The version mentioned above is the version that the ITG works in conjunction with the NIT2xZI or NIT2xLI endpoints, which will be where the 1-Wire extensions will be connected.

Converter output

- Connector: RJ11/12
- Protection: Resettable fuse

Converter input

- Cable length:
 - 5 meters (maximum)
- Compatible sensors:
 - PT100, PT1000 (2, 3, or 4 wire)
 - Thermocouples type K and J
 - NTC

Sensor reading range

- PTC: -200 °C to 600 °C
- NTC: -40 °C to 300 °C
- Thermocouples type K: -270 °C to 1370 °C
- Thermocouples type J: -210 °C to 760 °C

Probes error

- PT100/PT1000/NTC
- The greater the number of wires in the probe (2 to 4 wires), the better the material tolerance class that the probe is made of, and the shorter the cable length, the smaller the error
- PT100 / PT1000 Class A: Error up to 0.15 °C at 0 °C and ± 1.3 °C at 600 °C
- PT100 / PT1000 Class B: Error up to 0.3 °C to 0 °C and ± 2.5 °C to 600 °C
- NTC: Error up to ± 2.5 °C
- Thermocouples
 - Type K and J: Error up to ± 3 °C

ADC error

- ADS1148 error up to 0.5% of temperature value

Physical/Environmental

- Dimensions of the protective case:
 - 73x73x41 mm
- Weight: 77 g
- Operating temperature: 14 °F to 140 °F
- Operating humidity: 0–90% (not condensed)

Approved Suppliers *

- CAMTEC - PT100 Class B, PT1000 Class B, Type K Thermocouple and Type J Thermocouple
- IOPE - PT100 Class A and Class B, PT1000 Class A and Class B, NTC 10k, Type K Thermocouple and Type J Thermocouple
- SALCAS - PT100 Class B, PT1000 Class B, Type K Thermocouple
- NOVUS - PT100 Class B
- Sensors World - PT100 Class B

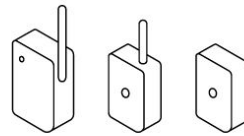
** To know the part numbers, probe ranges, cable size and other information, access the manual.*

1-Wire cascadeable devices

- [Temperature probe](#)
- EM ACW 100
- EM THW 200/201
- EM THW 100 V2
- EM THW 100

Application models

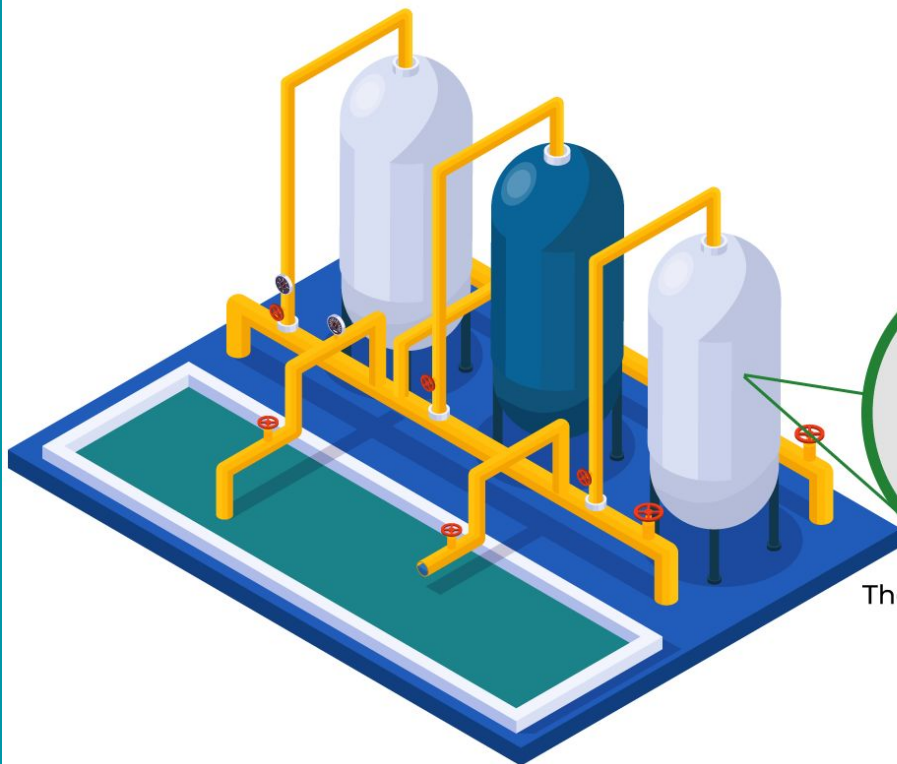
Endpoints LoRa, ZigBee or ITS



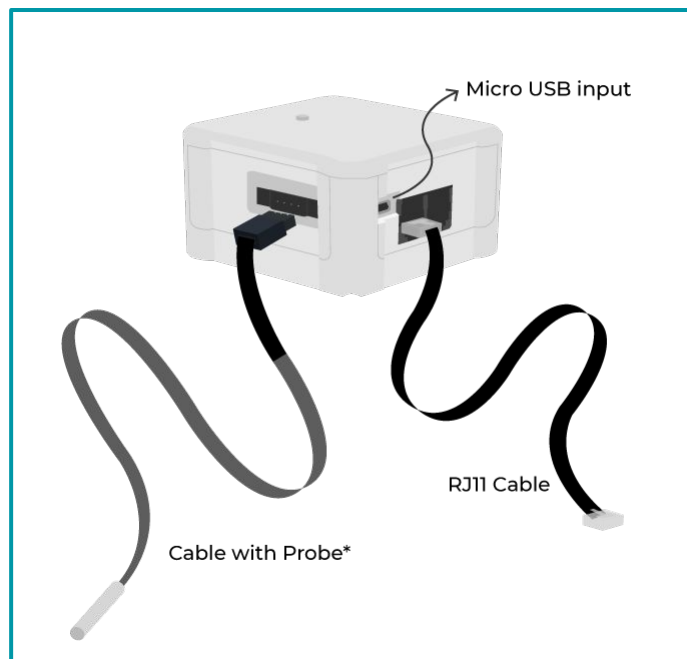
+ EM ACW 100



Cable with Probe



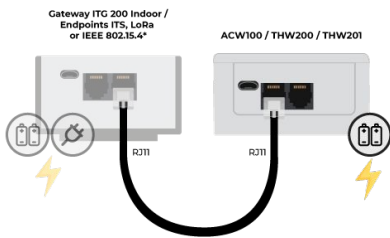
The probe detects **low temperature** from the cryogen tube.



Check the recommended distance.

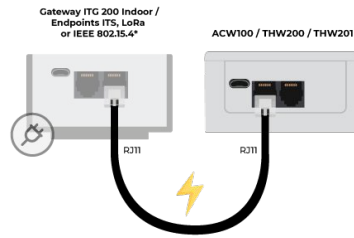
POWER SUPPLY MODES

1. BATTERY



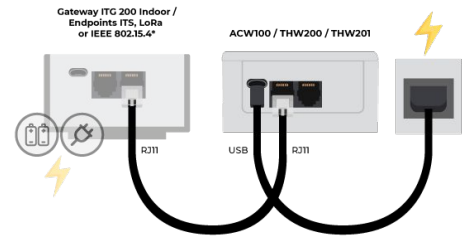
Power supply via battery

2. PARASITE



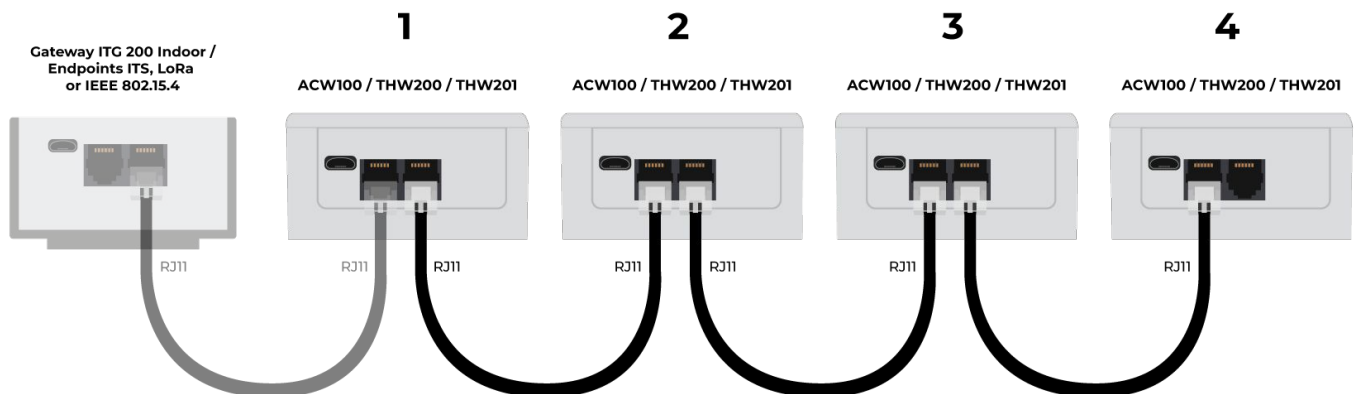
Power supply via RJ11

3. USB



Power supply via external USB source

SEVERAL SENSORS ON A SINGLE BUS



The device can be cascaded with all cascadeable devices with a maximum of 4 modules to each endpoint/ITS.