KHOMP

# Wide coverage IoT gateway for indoor environments

## Main features

- Two 1-Wire ports for sensor integration, such as temperature or dry contact sensors.

- Two Ethernet ports that provide flexible communication with the local network.

- Module for wireless communication with endpoints via the ZigBee protocol.

- Modules for 2 SIM cards, 3G or 4G**\***

**\*** *Optional items incur additional costs. The modules can be purchased separately.*

## Applications

The Khomp ITG gateway line can be used in various market segments, such as in projects for:

- Hospitals and clinics
- Agribusiness
- Industries
- Corporate
- Electrical
- Commercial

## Overview

The Khomp ITG gateways line was developed to integrate a variety of IoT solutions, meeting needs and optimizing processes that were previously unfeasible.

The ITG manages information from sensors connected to endpoints, transmitting them to the client's external server through the secure MQTT integration protocol. This information can be used by various applications developed by the client, allowing the creation of diverse monitoring platforms.

The ITG gateways line features two 1-Wire ports, enabling integrated use with sensors provided by Khomp (supporting this type of connection). For example, the ITG can be connected to temperature and dip switch sensors, allowing for door opening monitoring.

The ITG-200 ZigBee Indoor gateway is a device with dimensions that facilitate its installation. Additionally, it has a 4-button OLED display, enabling the display and navigation of different system information.

## Product images
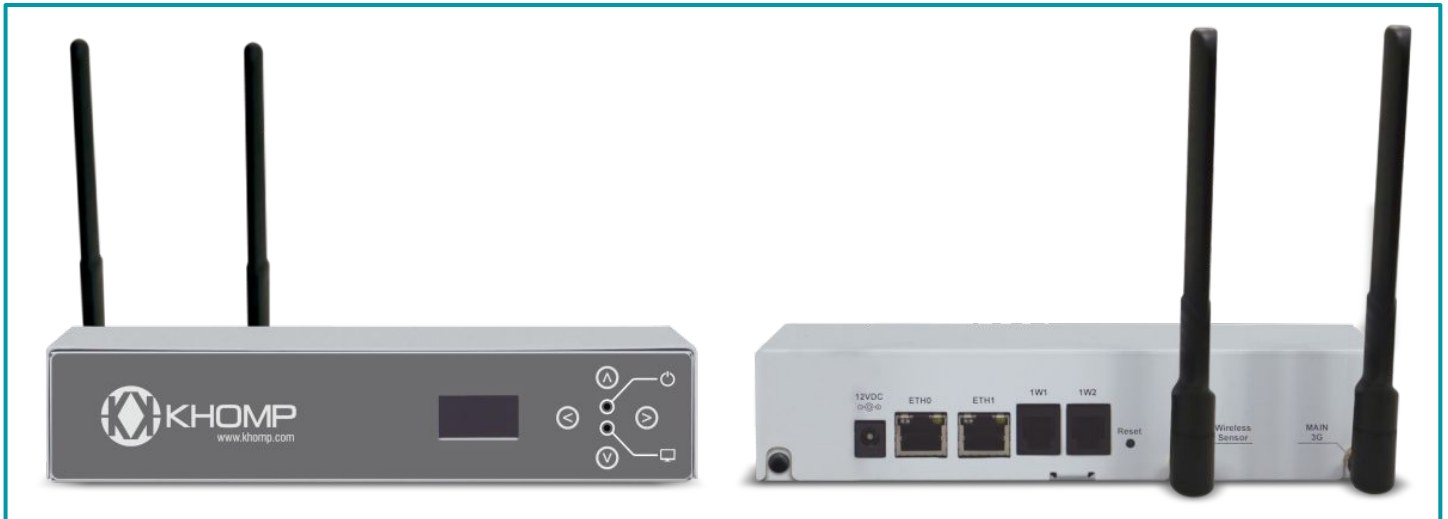


*Front view.*                                              *Rear view.*

## Main functionalities

- Access via Web Interface in English or Portuguese
- Local network fallback to modem
- Failover between installed SIM cards
- Operates on 3G and 4G
- Local buffering of messages during network failures or Ethernet/modem transitions. The local buffering supports up to 500,000 messages
- Automatic clock synchronization
- Remote version updates (provided the gateway has access to Khomp Cloud)
- Configuration import and export
- Dashboard displaying the latest received messages
- OpenVPN client
- DHCP
- Secure integration protocol via MQTT

The primary objective of the ITG gateway is to receive messages from endpoint sensors (ZigBee) and send them to a server (Broker or Network Server), as illustrated in the following image.
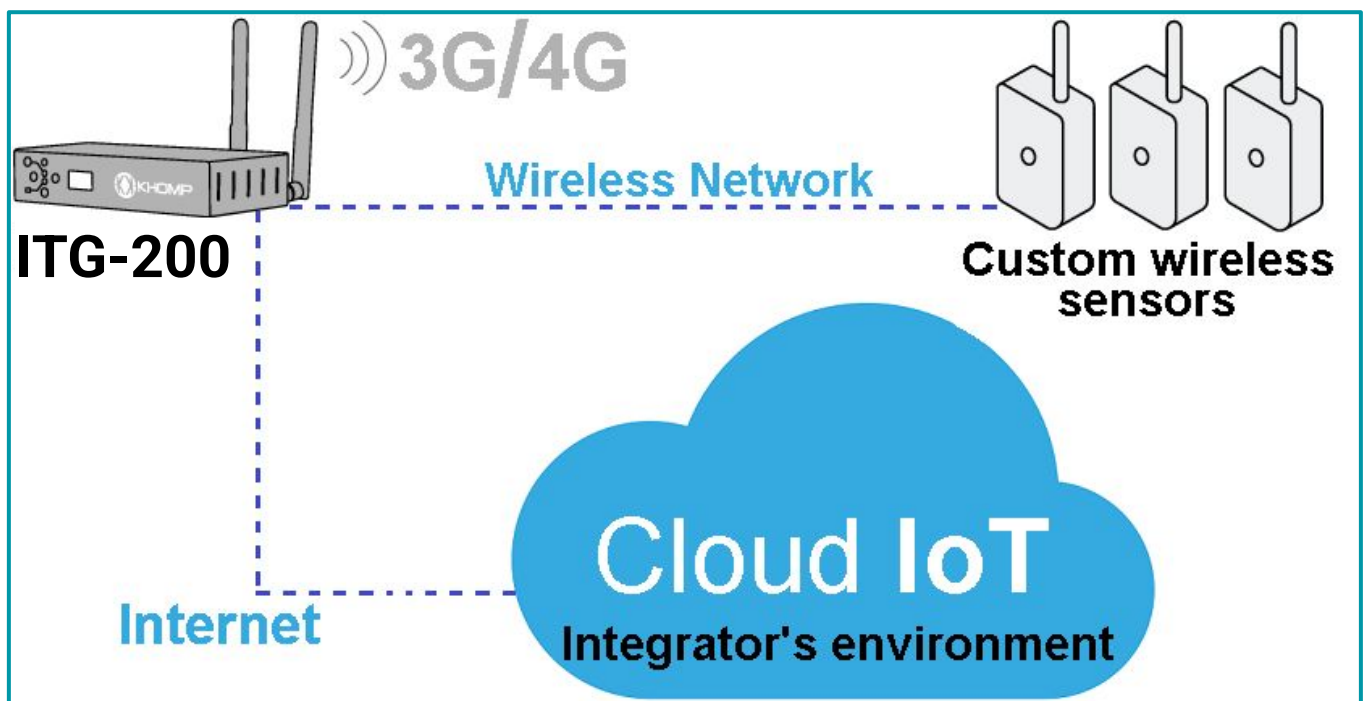
| Supplier | Model | APN | User | Password |
|---|---|---|---|---|
| Linksfield | M2M | lf.br | lf | lf |
| NLT | 2G, 3G or 4G | nlt.com.br | nlt | nlt |
| NLT * | SIM Card M2M/IoT Triple Cut | nlt.com.br | nlt | nlt |
| Arqia | IoT GO | m2m.arqia.br | arqia | arqia |
| Arqia | Broadband | bl.arqia.br | arqia | arqia |
| Arqia | IoT Connect | iot4u.br | arqia | arqia |
| Arqia | Move | iot4u.br | arqia | arqia |
| Vivo | 3G or 4G | zap.vivo.com.br | vivo | vivo |
| Vivo | M2M | inlog.vivo.com.br | datatem | datatem |
| Claro | 3G or 4G | claro.com.br | claro | claro |
| Claro | M2M | inlog.claro.com.br | claro | claro |
| Tim | 3G or 4G | tim.br | tim | tim |
| Tim | M2M | datatem.tim.br | datatem | datatem |
| Quectel | SIM Card Triple Cut | quectel.br | | |

*** SIM cards approved from firmware version **1.1.0.1**.

Due to the great diversity of SIM card models available on the market, it is extremely important for the ITG gateway administrator to confirm with the chip supplier whether the information in the table can be used by the purchased SIM card or not, as configuring the wrong APN can result in the gateway not being operational/accessible via the mobile data network or causing slower access than it should, compromising the ITG performance.

The previously configured APNs on the gateways are just examples. Delete this information (if not useful) and configure the information of the SIM cards installed on the gateways.

| ⓘ | Note | After changing any information associated with the modem, it will be necessary to restart the ITG so that the new settings take effect. |
|---|---|---|

## TAC and FAC

The TAC and FAC numbers can be found printed on the modem plate (inside the ITG gateway). The first 6 digits indicate the origin of the phone and are called TAC (Type Allocation Code). The next 2 digits in the sequence are called FAC (Final Assembly Code).

# 3G or 4G for greater guarantee when sending data

The ITG gateway line allows for the installation of a 3G or 4G module, which accepts up to two SIM cards to provide a fallback system. This module enhances the reliability of information delivery, creating a more dependable system. In the first scenario, the mobile data network (3G or 4G) is typically used when the Ethernet network is unavailable. As a second option, the gateway can be disconnected from a local network and send data solely via the 3G or 4G module (**optional item**).

> (i) **Note**
> - The 3G mobile module has been **discontinued**.
> - The 4G mobile module remains an optional item.

## Wireless communication

The ZigBee module for wireless communication with endpoints provides high scalability to the gateway, allowing for an increase in the number of reading sensors and monitoring area by installing sensors within the gateway's coverage field.

Khomp offers the ZigBee module for operation with the ITG-200 ZigBee Indoor.

The ZigBee module is suitable for indoor projects that require monitoring smaller areas. The network provided covers a few dozen meters and can have up to 200 associated endpoints.

This module is perfect for locations that need extensive ZigBee network coverage, such as an industry, for instance.

## SIM card configuration

The operability of the SIM card is of extreme importance for the correct operation of the ITG gateway line, not only in terms of network quality and stability but also in relation to the data plan associated with the chip and its correct configuration in the gateway.

The quality of the network is a very particular characteristic of the carrier (provider) and the location where the gateway is installed. For example, it is common to come across situations where the ITG operates more stably with "carrier1" and less stably with "carrier2". With this information in mind, it is up to the system administrator to verify and validate the SIM card before even activating the project.

Regarding the data plan, it is not an easy task to initially estimate which data plan best suits the project. In the first few weeks, for system stabilization, remote access for monitoring / configuration of the endpoints network and the ITG gateway itself is common. To have an idea of the probable traffic generated by the gateway, refer to the "Data Consumption" section of this datasheet.

The "APN", "username", and "password" associated with the SIM card must be specified correctly. The supplier of the purchased SIM card should indicate the type of application of the SIM card, the type of network or data plan, the region, among other chip information. Khomp tested and approved the following observed SIM cards. When used, they should be configured according to the table.

# Modem Configuration

## Select SIM card

**SIM card 1:**  (toggle on)

**SIM card 2:**  (toggle off)

## Editar Configurações Atuais

**SLL:**  (toggle off)

**Failover Automático:**  (toggle off)

| APN 1: | Nome de Usuário APN 1: | Senha APN 1: | SIM 1 Padrão: | SIM 2 Padrão: |
|---|---|---|---|---|
| khomp.algar.br | algar | 1212 | (off) | (off) |

| APN 2: | Nome de Usuário APN 2: | Senha APN 2: | SIM 1 Padrão: | SIM 2 Padrão: |
|---|---|---|---|---|
| tim.br | tim | tim | (off) | (on) |

| APN 3: | Nome de Usuário APN 3: | Senha APN 3: | SIM 1 Padrão: | SIM 2 Padrão: |
|---|---|---|---|---|
| gprs.oi.com.br | oi | oi | (off) | (off) |

| APN 4: | Nome de Usuário APN 4: | Senha APN 4: | SIM 1 Padrão: | SIM 2 Padrão: |
|---|---|---|---|---|
| zap.vivo.com.b | vivo | vivo | (on) | (off) |

[ Submit configuration ]  [ Clear configuration ]  [ Discard changes ]

## Data consumption

In this section, we highlight the actual scenario, in which modem traffic was monitored for several weeks, allowing us to estimate the volume of data sent to your project's Cloud.

| | ZigBee tecnology |
|---|---|
| **Endpoint** | NIT 21ZI |
| **Number of endpoints** | 5 |
| **Frequency of sending messages to the Cloud** | 5 minutes |
| **Daily intake** | ± 16.5 Mb |
| **Weekly consumption** | ± 115.5 Mb |
| **Monthly consumption** | ± 495 Mb |

# Technical specifications

## Environmental Physicist
- Two fast Ethernet 10/100 Mbps RJ45 ports
- Two 1-Wire RJ11 ports
- OLED display with 4 buttons
- Reset button
- Power LED
- Equipment status LED
- Dimensions (LxHxW): 202x42x101 mm
- Approximate weight: 590 g (without packaging)
- Connector for 12 VDC power adapter, Jack P4 type, 2.1 mm
  - Maximum current of 5A
- Power adapter:
  - Input: 100–240 VAC, 50/60 Hz
  - Output: 10–13.5 VDC
  - Power: 5 W
- Operating temperature: 0 ºC to +50 ºC
- Operating humidity: 10–90% non-condensing
- Storage temperature: 0 ºC to +85 ºC
- Storage humidity: 10–90% non-condensing

## ZigBee module
- Operation frequency: 2405–2480 MHz
- Transmission power: 10 dBM
- Sensitivity: -102.7 dBm
- Modulation: OPQSK-DSSS
- Maximum number of endpoints: 200, with a message sending frequency of 10 minutes
- Maximum number of hops: 30
- Maximum number of direct child devices: 32

## Antennas
- Two omnidirectional antennas:
  - 3G or 4G mobile data network
  - ZigBee network
- Gain: 5 dBi
- Impedance: 50 ohms
- Power: 50 W
- Polarization: vertical
- Connectors: SMA Female

## Optional Items *
- 4G data module for up to 2 SIM cards
- 3G data module for up to 2 SIM cards

## Guarantees and certifications
- Total warranty (legal + Khomp warranty): 1 year
  - Legal warranty: 90 days
  - Khomp warranty: 9 months
- Anatel certification
- ISO 9001 certified industry

## 3G module*
- 3G operating bands: B5, B8, B2, B1, B4
- Frequency bands: 800/850, 900, AWS1700, 1900, 2100 MHz
- Supports 2 SIM cards of the Mini SIM (2FF) standard
- Transfer rate (DL/UL):
  - HSPA: 21/5,7 Mbps
  - WCDMA: 384/384 Kbps
  - EDGE: 296/236 Kbps
  - GPRS: 107/85.6 Kbps

## 4G module *
- Supports 2 Nano SIM (4FF) SIM cards
- Operating/frequency bands:
  - LTE B1: -99.5 dBm (10 MHz)
  - LTE B2: -99.9 dBm (10 MHz)
  - LTE B3: -99.7 dBm (10 MHz)
  - LTE B4: -99.7 dBm (10 MHz)
  - LTE B5: -99.9 dBm (10 MHz)
  - LTE B7: -99.2 dBm (10 MHz)
  - LTE B8: -99.8 dBm (10 MHz)
  - LTE B12: -99.8 dBm (10 MHz)
  - LTE B13: -99.5 dBm (10 MHz)
  - LTE B18: -100 dBm (10 MHz)
  - LTE B19: -99.9 dBm (10 MHz)
  - LTE B20: -99.8 dBm (10 MHz)
  - LTE B25: -100 dBm (10 MHz)
  - LTE B26: -99.5 dBm (10 MHz)
  - LTE B28: -99.6 dBm (10 MHz)
  - LTE B38: -99 dBm (10 MHz)
  - LTE B39: -99.5 dBm (10 MHz)
  - LTE B40: -99.2 dBm (10 MHz)
  - LTE B41: -99 dBm (10 MHz)
  - WCDMA B1: -109.2 dBm
  - WCDMA B2: -110 dBm
  - WCDMA B4: -109.5 dBm
  - WCDMA B5: -110.4 dBm
  - WCDMA B6: -110.5 dBm
  - WCDMA B8: -109.5 dBm
  - WCDMA B19: -110.1 dBm
  - GSM850: -108 dBm
  - EGSM900: -108 dBm
  - DCS1800: -107.4 dBm
  - PCS1900: -107.5 dBm
- Transfer rate (DL / UL)
  - LTE:
    - LTE-FDD: 150/50 Mbps
    - LTE-TDD: 130/30 Mbps
  - UMTS:
    - DC-HSDPA: 42 Mbps (DL)
    - HSUPA: 5.76 Mbps (UL)
    - WCDMA: 384/384 kbps
  - GSM:
    - EDGE: 296/236.8 kbps
    - GPRS: 107/85.6 kbps

**\*** *Optional items incur additional costs. Modules can be purchased separately.*

## Application model



3G or 4G

ITG-200

INTERNET

Cloud IoT

Integrator environment

REDE WIRELESS

Customized wireless sensors