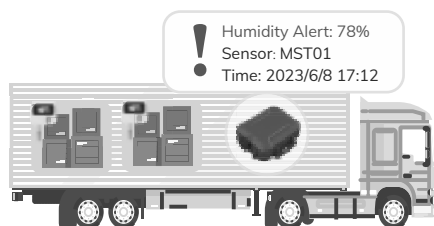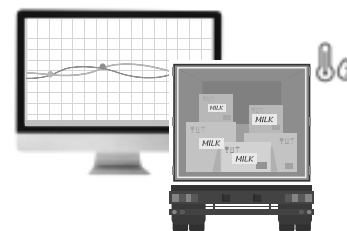## Dairy Product Transportation

Temperature fluctuations pose significant challenges to dairy product transportation. We tackle this by installing temperature sensors on refrigerated trucks for continuous monitoring and real-time data transmission. Fleet managers receive alerts, enabling proactive measures to prevent spoilage, and resulting in improved product quality, safety, customer satisfaction, and loyalty.

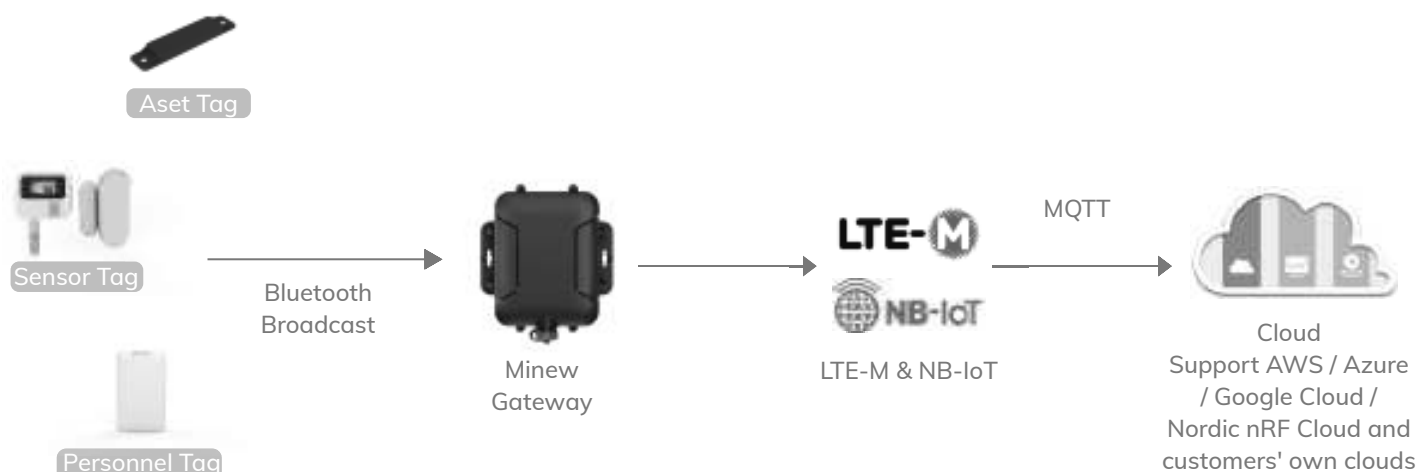Humidity Alert: 78%
Sensor: MST01
Time: 2023/6/8 17:12

Bakery Product Transportation

We address the challenges of bakery product transportation by providing real-time temperature monitoring and alerts. With sensors deployed, we ensure increased visibility into temperature conditions and prompt response to deviations. Real-time analytics enable quick issue identification, while alerts for factors like door openings, power outages, and refrigeration system failures further enhance control.

* **Supplementary Remarks:** Else applications such as equipment presence & inspection on smart construction sites, and detection of school buses and student personnel on smart campuses

WORKING PRINCIPLE

Aset Tag

Sensor Tag

Personnel Tag

Bluetooth
Broadcast

Minew
Gateway

LTE-M
NB-IoT
LTE-M & NB-IoT

MQTT

Cloud
Support AWS / Azure
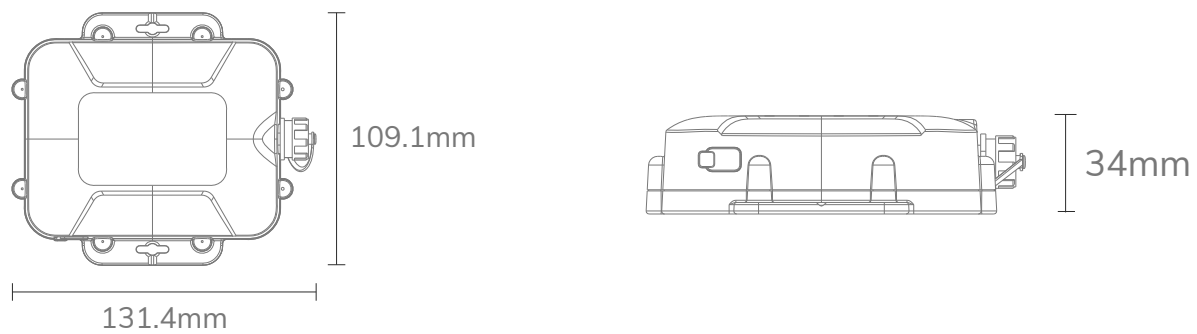/ Google Cloud /
Nordic nRF Cloud and
customers' own clouds

The working principle of MG5 gateway

① Please choose or match the MINEW Bluetooth sensor or asset tags based on the actual needs, as MG5 supports the Bluetooth protocol and other manufacturers' Bluetooth devices can also be compatible.

② Please use the MQTT Assistant tool to configure your own reporting mode based on the actual needs after successfully configuring the network through the Bluetooth App, so that the MG5 can directly use the low-energy mode powered by the back-up battery or the real-time mode powered by the external battery wired.

③ Configure the network between LTE-M or NB-IoT through App or MQTT; Therefore, MG5 will transmit the Bluetooth data uploading by cellular network; Meanwhile, under normal network conditions, MG5 can also upload its own data including GPS coordinates, temperature, ACC,etc.

④ MINEW will provide an SDK for parsing the reported data, so that customers can process the hexadecimal data on their own server, and finally turn it into JSON format. Then, based on the JSON data format document provided by MINEW, they can develop their own applications.

109.1mm

34mm

131.4mm

PRODUCT SPECIFICATIONS

BASIC SPECIFICATIONS

Model	MG5
Name	Outdoor Mobile LTE Gateway
Material	PC (UV Radiation Resistance)
Color	Black / Grey（Optional）
Size	131.4 X 109.1 X 34 mm (External Wires not included)
Weight	● Full function product body (including battery) 109.3g; ● Full function product body (including battery and external wires) 318.6g; ● Simplified product body (excluding battery and external wires) 270.6g;
IP Rating	IP67 housing
IK Rating	IK08 Shock-proof
Power Supply	● 8V~52V DC Input External Power Supply; ● Built-in rechargeable battery (optional, backup);
Sleep Current	≤1mA
Backup Battery	● High temperature resistant rechargeable battery ≤ 3000mAh; ● Conventional non high-temperature rechargeable battery 2000mAh; ● No battery (Simplified Version);
Flash	32MB(256Mb)
LED	4 pcs included ● LED 1, Blue, Switch / Restart; ● LED 2, Yellow, Cellular; ● LED 3, White, GPS positioning; ● LED 4, Green, charging;
Button	1 pc internal button included ● Turn-on; ● Restart;
Accelerometer	Default built-in
Temperature Sensor	Default built-in ● The device reports internal temp erature and prevents the internal battery charging in extreme temperatures; ● Internal temperature provides an indication of ambient temperature but may not always be precise;
Barometer	Supported, optional
SIM	Nano SIM / eSIM
External Wire Interface	● Positive Power line (Red, Positive Pole): 8V~52V; ● Digital Input Line (Orange): 8V~ 52 V, detects whether the car engine is ignited/started; ● Negative Power Line (Black);
Working Environment	Outdoor environment dedicated desig; Mostly for vehicles or trucks,etc.;
Operating Temperature	● -20~70℃ (Powered by an external battery); ● 0~45℃ (During normal charging for built-in backup battery) ;
Stocking Temperature	-10~40℃ recommended
FOTA	● Bluetooth App OTA; ● MQTT remote OTA;
Configuration	● Bluetooth App Configuration; ● MQTT Remote Configuration;
Transmit Protocal	MQTT Supported
Data Security	SSL / TLS
SDK	Supported (for data parsing in client server)

SMART FUNCTIONS

Power Supply Switching Prompt	When the external power supply is disconnected normally, MG5 automatically switches to backup battery power supply, maintains operation, and reports a switching signal signal. MG5 keeps reporting the latest power supply status data for customer to detect power supply switching.
Tamper Alerts	When the external power supply is abnormally cut off, MG5 reports an abnormal signal.
Real-time Tracking	Under external power supply, MG5 can continuously report by setting real-time mode to achieve real-time asset tracking during transportation.
Device Low Battery Reminder	MG5 can automatically detect the built-in battery level. If the battery level is too low, it can report an abnormality.
Ignition Detection	1 x dedicated ignition digital input 8V~48V DC detection on / off for engine.
Subrounding Cellular Signal Strength Detection	Support regular detection and reporting of cellular base station signals around the device, providing networking quality parameters to the client.
Subrounding Bluetooth Signal Detection	If there is no Bluetooth signal nearby, MG5 only reports its own data, such as Temp, Acc, GPS, RSRP, etc.
Flexible Adjustment for Reporting Mode	The flexible adjustment for reporting mode adopts a combination of heartbeat reporting and sampling interval, combined with an smart trigger reporting mechanism, for saving energy and selectively monitors data changes in real-time.
Reconnection after Network Down	When it returns to a normal eare from a disconnected situation, MG5 automatically reconnects.
Edge Data Filtering	Data can be filtered based on surrounding Bluetooth sensor signal strength, Mac, and other conditions to reduce invalid data uploading.
Third Party Cloud Services (Optional)	Amazon AWS, Microsoft Azure, Google Cloud, nRF Cloud（Pending）
Geo-fence	Geo-fence can be realized based on the GPS coordinates and other data uploaded by MG5.

COMMUNICATION & RF

BLUETOOTH SPECIFICATIONS

Protocol Version	Bluetooth Low Energy 5.0
Frequency Band	2.4Ghz，40 channels (2400 ~ 2483.5MHz)
Modulation	GFSK
Communication Range	● 100M（328ft）or more for scanning ● 85M (278.8ft) or more for broadcasting (Open environment testing for referance)
Broadcast Interval	Configurable, default by 2 Secs
Scanning Interval	Configurable
Configuration	Supported with App
Throughput	● 10 Bluetooth packets / s for NB-IoT ● 60 Bluetooth packets / s for LTE-M
Antenna	Internal

CELLULAR SPECIFICATIONS

Cellular Connection	LTE-M (eMTC / Cat.M1) NB-IoT (NB1, Default after shippting, Configurable)
Cellular Data Rates	Ideally connection as below: • LTE-M (eMTC) : Max. 300Kbps (DL); Max.375Kbps (UL) • NB-IoT (NB1): Max.32kbps (DL), Max. 70Kbps (UL)
Cellular Networks Bands	• 698-960MHz low frequency & 1710-2200MHz high frequency; • LTE frequency band : B1, B2, B3, B4, B5, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B66;
Cellular Antenna	Internal，full band

GNSS SPECIFICATIONS

Parallel GNSS	GPS + Beidou
Positioning Accuracy	2.5M~10M (16.4~32.8ft, depending on the installation environment and deployment conditions)
Sensity	Cold Start: -148dBm Tracking:-162dBm
Standalone TTFF	Cold Start：≤32s Warm Start: ≤1s Hot Start: ≤1s
Location Update Rate	Up to 1 Hz
GNSS Antenna	Internal

SOFTWARE & TOOL SUPPORT

Bluetooth Configuration App	APK files can be provided for pre deployment close range configuration, distribution network or firmware upgrades, etc
MQTT Assistant PC Tool	Available for remote configuration or data reading after successful networking, and can be configured to the customer's own server for testing or deployment.
Uploaded Data Parsing SDK	Available for calling in the client server and unpacking the uploaded data and parsing it into JSON format.
Document for Parsed JSON Format Data	Available for illustrating the JSON data format obtained after parsing.
Bluetooth Tags Data Format Document	Available for BeaconPlus or V3 protocol for MINEW's Bluetooth tags.

PRECAUTIONS

Vehicle Internal Mounting	Fix your MG5 inside your trailer engine cabinet, please Try not to set up metal objects on the frontside of the device as much as possible. It is recommended to reserve a clearance area to achieve the best GPS satellite search effect possible.
Tight Contact Between Ground Wire	When connecting the black (ground) wire from the wiring harness, look for bolts, screws, or wires that come into contact with exposed metal on the trailer chassis. Loosen the bolt, slide the grounding wire down, and then tighten the bolt. If your grounding wire does not come into contact with exposed metal, your MG5 will not work. Loose or weak grounding connections may cause inconsistent readings of MG5.
Country/Region	If you use the appropriate global roaming Nano SIM or virtual network operator, please use MG5 in countries or regions that support LTE-M or NB IoT.
Working Environment Temperature	Do not use it for a long time in an environment exceeding 70 ℃, otherwise it may cause damage to the built-in battery or other devices.
Other Document Support	If you need more documents, please consult MINEW sales & technical team for more information.
Preset-APN	APN parameters can be pre-set before shipping, based on the different operators used by different customers in different countries.
Factory Set Network	The device defaults to NB-IoT networking after shipping. When configuring the network, users should combine their own SIM card and modify it to a suitable one, such as LTE-M. The default SIM card for MG5 only supports LTE-M.

INSTALLATION

Red Power Line	Must connect to a your reefer trailers battery 12V DC or above (Positive) contact.
Black Ground Line	Connect ground wire to your trailers' battery (Negative contact) or trailers chassis.
Orange Digital Input Line	● Connect to the car ACC interface, and detect whether the motor vehicle is ignited and started (8V~48V); ● Can be also used as a digital input if not required; ● If there is no usage requirement, it can be ignored;
Easy Mounting	● 3M double-sided tape (recommended); ● Screws; ● Ties; ● Bracket (Optional，not available yet, shown as below figure, 2 images);
Vehicle External Installation	In order to achieve the best GPS positioning and LTE communication performance, MG5 can also be installed outside the vehicle/truck according to the customer's own needs since the device has IP and IK protection, but this will accelerate the aging process of the device and is not conducive to long-term use.

* MG5 with the bracket

* Bracket

CERTIFICATIONS

FCC

FCC warning:
Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
-Reorient or relocate the receiving antenna.
-Increase the separation between the equipment and receiver.
-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-Consult the dealer or an experienced radio/TV technician for help.

To maintain compliance with FCC's RF Exposure guidelines, This equipment should be installed and operated with minimum distance between 20cm the radiator your body: Use only the supplied antenna.

QUALITY ASSURANCE

The factory has already obtained the certification of ISO9001 Quality System. Each product has been strictly tested (tests include transmission power, sensitivity, power consumption, stability, aging, etc.).
Warranty Period: 12 months from the date of shipping (Battery and other accessories excluded).

DECLARATION

Statement of Rights:

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Minew team reserves the right to the final explanation of the document and product differences. The Minew group is not responsible for liability of property or personal injury with the wrong operation if users develop related products without checking the technical specifications of this manual.

SHENZHEN MINEW TECHNOLOGIES CO., LTD.

MINEW

+86 (755) 2103 8160

www.minew.com

info@minew.com

www.minewstore.com

No.8, Qinglong Road, Longhua District, Shenzhen, China