Principle of operation

The module is supplied in the powered-on state and transmits using the WMBUS protocol with its predefined configuration. After 1,680 transmissions, the device sends a transmission using the LoRaWAN protocol with an acknowledgement (ACK) request. If the module receives a response from the gateway, it will continue to transmit via LoRaWAN using its predefined configuration; otherwise, it will resume transmitting via WMBUS and subsequently retry a LoRaWAN transmission.

How WMBUS works

Transmission interval: 120 seconds, Mon–Fri, 8 am–5 pm
Transmission frequency: 868MHz
Supplier: GTM
Device Serial Number: See the bottom of the device

The module transmits information every two minutes. You can force a transmission at any time by placing a magnet on the label showing the DevEUI for approximately 6 seconds.

How LoRaWAN works

When the switch to LoRaWAN takes place, the module transmits an ‘I’m Alive’ signal.

Frame “I'm Alive”

0	1
0x30	Status (YZ)

In the Status field, only Y = Transmission cycle counter (0..7) will be transmitted, whilst Z will be 0.

The module is configured to transmit a daily history.
The history is recorded over 12 samples (this value cannot be changed), for which it is possible to configure the reading interval and the time of the first sample. By default, the time of the first sample is set to 00:00 and the sampling interval is set to 60 minutes; this means that there will be two sets of historical data each day, one sampled between 00:00 and 11:00 and the other between 12:00 and 23:00
The first historical record is transmitted at a random time between 12:00 and 23:00, whilst the second is transmitted between 00:00 and 11:00 the following day

Historical context

The frame of the historical data sent via uplink from the module is as follows:

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	..	..	30
0x70	Status	AA-M-G-hh-mm				F	F	F	F	D1	D1	D2	D2	D3	D3	..	..	

Where :
0x70 identify the code for retrieving historical reading
data. Status indicates the module's status using a number
of flags. Status = 0xYZ
Y = Number of the historical record transmitted (0..7)
Z- Bit 0 : General Alert (0 = Ok; 1 = Alert)
Z- Bit 1 : Flow Direction (0 = Normal; 1 = Reverse)
Z- Bit 2 : Fraud alert (0 = Ok; 1 = Alert)
Z- Bit 3 : Battery Alert (0 = Ok; 1 = Low battery)
Y- bit 3: Leakage Alert (0 = OK, 1 = Leakage Detected)
AA-M-G-hh-mm = Year, Month, Day, Hours, Minutes of the time the log was sent.

Year = bit 20..31	=0..4095
Month = bit 16..19	=1..12
Day = bit 11..15	=1..31
Hours = bit 6..10	=0..23
Minutes= bit 0..5	=0..59

FFFF = Instantaneous meter reading taken at the set time; the value is 32-bit and is expressed in hexadecimal in Little-Endian format.
GGGGDxDx = Difference between the instantaneous meter reading taken at the set time and the previous one; the value is 16-bit and is expressed in hexadecimal in Little-Endian format.
HHHHExample of a received frame:
70 20 5B C4 31 7E 7F 05 00 00 14 00 16 00 20 00 22 00 30 00 45 00 55 00 66 00 23 01 98 01 00 02

Status = 0x20 → Y = 2 → Historical n.2 ; Z = 0 → No
cause for alarm AA-M-G-hh-mm = 5B C4 31 7E = 24/01/2019
17:27 FFFF = 0x00 00 05 7F = 1407 litres.

		Reconstructed values
00 00 05 7F	First value 1407	1407
00 14	20 delta	1427
00 16	22 delta	1449
00 20	32 delta	1481
00 22	34 delta	1515
00 30	48 delta	1563
00 45	69 delta	1632
00 55	85 delta	1717
00 66	102 delta	1819
01 23	291 delta	2110
01 98	408 delta	2518
02 00	512 delta	3030

The module is configured to analyse and report any night-time leaks.
Specifically, it is configured to take five readings at 60-minute intervals, with the first reading taken at midnight.

Time:	**Reading n**
00:00	1
01:00	2
02:00	3
03:00	4
04:00	5

At the end of the fifth reading, the difference is calculated for each interval. If, for all intervals, the calculated consumption exceeds the set threshold (10 litres/hour), the corresponding alarm bit is set in the status (Leakage Alarm), which will be transmitted together with the historical data.

PLEASE NOTE: The data transmitted in the history log relate to the values recorded on the day prior to the day of transmission, but the LEAKAGE ALARM bit relates to the day of transmission itself. Specifically, it will be activated after the last value has been read (in this case, after 04:00), so it may be the case that for historical data transmissions prior to 04:00, the alarm will not be active, whilst it will be active for transmissions after 04:00.

The module transmits a snapshot frame every 24 hours; this can also be triggered at any time by holding a magnet close to the cover, as shown earlier.

Instant-read frame

The instantaneous readout frame sent via uplink by the module is as follows:

0	1	2	3	4	5
0x50	Status (YZ)	A	A	A	A

Where :
0x50 identify the instant-read transmission code.
Status indicates the module's status using a number of flags. Status = 0xYZ

Y = Cyclic transmission counter (0..7)
Z- Bit 0 : General Alert (0 = Ok; 1 = Alert)
Z- Bit 1 : Flow Direction (0 = Normal; 1 = Reverse)
Z- Bit 2 : Fraud Alert (0 = Ok; 1 = Alert)
Z- Bit 3 : Battery Alert (0 = Ok; 1 = Low battery)
Y- bit 3: Leakage Alert (0 = OK, 1 = Leakage Detected)

AAAA = Instantaneous meter reading: the value is 32-bit and is expressed in hexadecimal as LittleEndian.

Example of a received frame:
0x50 32 17 E2 00 00
Status = 0x32 □ Y = 3; Z = 2 □ Reverse flow direction
AAAA = 0x00 00 E2 17 = 57,879 litres.

Instant-read frame with timestamp

If enabled, the instant readout frame sent via uplink by the module may also contain timestamp information:

0	1	2	3	4	5	6	7	8	9
0x50	Status	A	A	A	A	AA-M-G-hh-mm			

Where :
0x54 identify the instant-read transmission code with flow rates. 'Status' indicates the module's status via a number of flags. Status = 0xYZ

Y = Cyclic transmission counter (0..7)
Z- Bit 0 : General alert (0 = Ok; 1 = Allarme)
Z- Bit 1 : Flow Direction (0 = Normal; 1 = Reverse)
Z- Bit 2 : Fraud Alert (0 = Ok; 1 = Alert)
Z- Bit 3 : Battery alert (0 = Ok; 1 = Low battery)
Y- bit 3: Leakage alert (0 = OK, 1 = Leakage detected)

AAAA= Instantaneous meter reading: the value is 32-bit and is expressed in hexadecimal in Little-Endian format.
AA-M-G-hh-mm = Year, Month, Day, Hours, Minutes at the time the frame was sent.

Year = bit 20..31	=0..4095
Month = bit 16..19	=1..12
Day = bit 11..15	=1..31
Hours = bit 6..10	=0..23
Minutes = bit 0..5	=0..59

Disposal

Smart meters contain lithium batteries; therefore, the product falls within the scope of Directive 2012/19/EU on the management of waste electrical and electronic equipment (WEEE). The device must not be disposed of with household waste as it is made up of various materials that can be recycled at appropriate facilities. At the end of its life cycle, ensure the safe removal and responsible disposal of its components, including the recycling of the batteries, in accordance with the environmental regulations in force in the country of installation.
Please contact your local authority to find out the locations of recycling centres that accept this product for disposal and subsequent proper recycling. The product does not pose a potential risk to human health or the environment, but if discarded in the environment, it has a negative impact on the ecosystem.



The symbol of the crossed-out wheelie bin, which appears on the label affixed to the appliance, indicates that this product complies with the regulations on waste electrical and electronic equipment. Abandoning the appliance in the environment or disposing of it illegally is an offence punishable by law.

Instructions property of

G2 Misuratori S.r.l.
THE VALUE OF METERING

CERTIFICAZIONE SISTEMA DI GESTIONE DNV ISO 9001 - ISO 14001 ISO 45001

Laboratorio Taratura contatori d'acqua. Certificato di accreditamento n. 01469 - ISO 17025

LoRa Alliance Member