**KOPAMETER GPRS Protocol**

**Version v.3.3**

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# Intro

This Protocol is based on the provisions of previous protocols and is back compatible with previous GPRS and SMS developments using the SMT32 chip family. The devices uses a TCP connection mode and all messages are coded using ASSCI.

## Assumptions

VODACOM APN TANZANIA

Server disconnects every connection session automatically after all messages in the queue have been sent to the device. This forces to a new session every time and saves processing resources at the server.

# Framework

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | NAME | | Number of bytes | Explanation and example |
| 1 | Message  head | FRAME START | 2 | ## |
| KEYWORD | 4 | Defines the type of message |
| 2 | METER ID | 10 | Mandatory in all the messages TZ01234567 |
| 3 | CUSTOMER\_ID | 7 | If needed  Depends on the message |
| 4 | IDENTIFIER | 4 | Cyclic autocorrelation value |
| 5 | Data content | DATA CONTENT | Varies | Varies |
| 6 | Message tail | DATE & TIME | 12 | RTC from meter time mark  201809031353 |
| 7 | VERIFICATION | 2 | CRC16(Refer to Appendix A) |
| 8 | FOOTER | 2 | \*\* |

# Transmission modes

|  |  |  |
| --- | --- | --- |
| **Mode** | **Description** | **Commands** |
| 1 | **One way communication.**  Automatic meter to server transmission | **BEAT**: Heartbeat to check for meter availability  **CSRP**: Provides a Cooking Session report  **WARN**: Information about conditions that can compromise the good operation of the meter  **DATA**: Provide regular logs from the meter  **HWSR**:Provide hardware status report for meter  **MELO**: meter lock open |
| 2 | **Two way communication.**  Meter initiates communication and server sends commands waiting on queue | **ADMO**: Adds Money into the account for single user meters  **STUP**: Allow to set key parameters  **CONT**: Remote control of actuators  **CYCH**: Allow change of cylinder |
| 3 | **Two way communication and specific response**  Meter initiates and server responds specific command | **CCCH:** Checks credit balance for multi-user  **CCCR:** Reports the credit available for multi-user  **INFQ**: Info Request from the server to meter  **INFS:** Info Response from the meter to server  **REOM:** Remove old meter.  **OLMR**: Old meter remove (get information from old meter).  **ADIF**: Add information to new meter.  UPDATE : UPDATE firmware  **GCSR:** get CSRP |

Meter

server

# Mode 1

When socket is connected, the device is sent to the server, No reply required. Used to identify equipment state and cooking data

### Heartbeat (BEAT)

By default, it is sent every XXXX seconds. Server does not need to reply.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | NAME | | Number of bytes | Explanation and example |
| 1 | MESSAGE  HEAD | FRAME START | 2 | ## |
| 2 | KEYWORD | 4 | BEAT |
| 3 | METER ID | 10 | TZ01234567 |
| 4 | IDENTIFIER | 4 | Cyclic autocorrelation |
| 5 | MESSAGE TAIL | DATETIME | 12 | 201809031353 |
| 6 | VERIFICATION | 4 | CRC16(Refer to Appendix A) |
| 7 | FOOTER | 2 | \*\* |

Example:

##BEAT/TZ01234567/1234/201809011859/XXXX\*\*

### Cooking Session Report (CSRP)

#### 4.2.1 Meter sent to server

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | NAME | | Number of bytes | Explanation |
| 1 | MESSAGE  HEAD | FRAME START | 2 | ## |
| 2 | KEYWORD | 4 | CSRP |
| 3 | METER ID | 10 | TZ01234567 |
| 4 | CUSTOMER\_ID | 7 | 1234567 |
| 5 | IDENTIFIER | 4 | Cyclic autocorrelation |
| 6 | DATA | CARD\_ID | 18 | 123456789012345678 |
| 6 | SESSION END TYPE | 2 | 01= User closed needle valve  02= No flow for 3 mins  03= Low gas in cylinder  04= Low battery  05= No credit  06=Open lid  XX = other |
| 7 | GAS REMAINING  气体剩余(KG) | 6 | 12.123 |
| 8 | START CUMULATIVE VOLUME | 12 | 123456789.12 |
| 8  9 |
| END CUMULATIVE VOLUME | 12 | 123456799.99 |
| 10 |  | SESSION START TIME | 12 | 20180903135360 |
| 11 |  | SESSION END TIME | 12 | 20180903141260 |
| 12 |  | CREDIT SESSION START | 12 | 123456789.12 |
| 13 |  | CREDIT SESSION END | 12 | 123456788.88 |
| 14 |  | UNIT PRICE  单价(MONEY/ KG) | 8 | 12345.12 |
| 15 |  | GAS DENSITY  气体密度(KG/M3) | 5 | 2.072 |
| 16 | MESSAGE TAIL | DATETIME | 12 | 201809031353 |
| 17 | VERIFICATION | 4 | CRC16(Refer to Appendix A) |
| 18 | FOOTER | 2 | \*\* |

Example:

##CSRP/TZ01234567/1234567/1234/123456789012345678/01/12.123/123456789.12/123456799.99/20180903135360/20180903141260/123456789.12/123456788.88/12345.12/2.072/201809031353/XXXX\*\*

#### 4.2.2 Server reply meter

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | NAME | | Number of bytes | Explanation |
| 1 | MESSAGE  HEAD | FRAME START | 2 | ## |
| 2 | KEYWORD | 4 | CSRP |
| 3 | METER ID | 10 | TZ01234567 |
| 4 | CUSTOMER\_ID | 7 | 1234567 |
| 5 | IDENTIFIER | 4 | Same as send |
| 6 | DATA | CARD\_ID | 18 | 123456789012345678 |
| 15 | MESSAGE TAIL | DATETIME | 12 | 201809031353 |
| 16 | VERIFICATION | 4 | CRC16(Refer to Appendix A) |
| 17 | FOOTER | 2 | \*\* |

### Warnings (WARN)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | name | | Number of bytes | Explain |
| 1 | Message  head | FRAME START | 2 | ## |
| 2 | KEYWORD | 4 | WARN |
| 3 | METER\_ID | 10 | TZ01234567 |
| 4 | CUSTOMER\_ID | 7 | 1234567 |
| 5 | IDENTIFIER | 4 | 1234 |
| 6 | Data content | LOW BATTERY | 1 | 0: No alarm, 1: Low battery |
| 7 | LOW AMOUNT OF PREPAID CREDIT | 1 | 0: No alarm, 1: Low amount |
| 8 | LOW GAS AMOUNT (VOLUME) OF GAS | 1 | 0: No alarm, 1: Low amount |
| 9 | ILLEGAL LID OPENING | 1 | 0: for there is no illegal open cover operation  0：表示没有非法开盖  1: for there is an illegal open cover operation, the alarm prompts the host computer  1:表示非法开盖操作，报警通知上位机 |
| 10 | ELECTRIC LOCK STATUS  表盖锁状态 | 1 | 0: UnLock, 1: Lock |
| 11 | NEEDLE SENSOR STATUS  针阀状态 | 1 | 0:needle up(close), 1: needle down(open) |
| 12 | ELECTRIC VALVE STATUS  阀门状态 | 1 | 0:Valve closed, 1: Valve open |
| 13 | TANK SENSOR STATUS  液化气罐的状态 | 1 | 0: Disassemble, 1: Assemble |
| 14 | TANK SENSOR STATUS  液化气罐锁的状态 | 1 | 0: UnLock, 1: Lock |
| 15 | GSM SIGNAL INTENSITY | 2 | 00-31 |
| 16 | GAS\_TEMPERATURE | 2 | 34  XX:NO SENSOR INSTALLED |
| 17 | Message tail | DATETIME | 12 | 201809031353 |
| 18 | VERIFICATION | 4 | CRC16(Refer to Appendix A) |
| 19 | FOOTER | 2 | \*\* |

Example:

Example :

##WARN/TZ01234567/1234567/1234/0/0/0/1/1/1/1/1/1/24/34/201612231859/XXXX\*\*

### Data Report (DATA)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | NAME | | Number of bytes | Explanation |
| 1 | MESSAGE  HEAD | FRAME START | 2 | ## |
| 2 | KEYWORD | 4 | DATA |
| 3 | METER ID | 10 | TZ01234567 |
| 4 | IDENTIFIER | 4 | 1234 |
| 5 | DATA CONTENT | CUMULATIVE VOLUMETRIC USAGE  累计用气量(L) | 12 | 123456789.12 |
| 6 | GAS REMAINING  气体剩余(KG) | 6 | 12.123 |
| 7 | CREDIT | 12 | 123456789.12 |
| 8 | CYLINDER SERIAL NUMBER | 11 | 01234567891 |
| 9 | MESSAGE TAIL | DATETIME | 12 | 201809031353 |
| 10 | VERIFICATION | 2 | CRC16(Refer to Appendix A) |
| 11 | FOOTER | 2 | \*\* |

Example:

##DATA/TZ01234567/1234/123456789.12/12.123/123456789.12/01234567891/201809031353/XXXX\*\*

**4.5 HARDWARE STATUS REPORT (HWSR) 5 second**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | NAME | | Number of bytes | Explanation |
| 1 | MESSAGE  HEAD | FRAME START | 2 | ## |
| 2 | KEYWORD | 4 | HWSR |
| 3 | METER ID | 10 | TZ01234567 |
| 4 | IDENTIFIER | 4 | 1234 |
| 5 | DATA CONTENT | BATTERY VOLTAGE  电池电量(V) | 3 | 4.2 |
| 6 | LID LIGHT SENSOR STATUS  表盖/传感器状态 | 1 | 0:Lid closed, 1: Lid open |
| 7 | LID ELECTRIC LOCK STATUS  表盖锁状态 | 1 | 0: Locked, 1: Un-Locked |
| 8 | NEEDLE SENSOR STATUS  针阀状态 | 1 | 0: needle closed (up),  1: needle open (down)  X: no sensor installed |
| 9 | ELECTRONIC VALVE STATUS  阀门状态 | 1 | 0:Valve closed, 1: Valve open |
| 10 | TANK SENSOR STATUS  液化气罐的状态 | 1 | RESERVED FOR FUTURE USE  0: Cyl Not attached, 1: Cyl Attached  X: no sensor installed |
| 11 | TANK LOCK STATUS  液化气罐锁的状态 | 1 | 0: UnLock, 1: Lock  X: no sensor installed |
| 12 | GSM SIGNAL INTENSITY (dB) | 2 | 00-31 |
| 13 | GAS TEMPERATURE | 2 | 0-99  XX if no temperature sensor installed |
| 14 | MESSAGE TAIL | DATETIME | 12 | 201809031353 |
| 15 | VERIFICATION | 4 | CRC16(Refer to Appendix A) |
| 16 | FOOTER | 2 | \*\* |

Example:

##HWSR/TZ01234567/1234/4.2/0/0/1/1/X/1/31/99/201809031353/XXXX\*\*

**4.6 MELO**

By default, it is sent every time meter removed from the cylinder to open the lock. Server does not need to reply.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | NAME | | Number of bytes | Explanation and example |
| 1 | MESSAGE  HEAD | FRAME START | 2 | ## |
| 2 | KEYWORD | 4 | MELO |
| 3 | METER ID | 10 | TZ01234567 |
| 4 | IDENTIFIER | 4 | Cyclic autocorrelation |
|  | DATA CONTENT | OPEN CARD NUMBER | 18 | 123456789012345678 |
| 5 | MESSAGE TAIL | DATETIME | 12 | 201809031353 |
| 6 | VERIFICATION | 4 | CRC16(Refer to Appendix A) |
| 7 | FOOTER | 2 | \*\* |

##MELO/TZ01234567/1234/123456789012345678/201809011859/XXXX\*\*

# Mode 2:

When socket is connected, the device is sent to the server, reply required. Used for reporting data on equipment

### Add Money (ADMO)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | NAME | | Number of bytes | Explain |
| 1 | MESSAGE  HEAD | FRAME START | 2 | ## |
| 2 | KEYWORD | 7 | ADMO |
| 3 | METER ID | 10 | TZ01234567 |
| 4 | CUSTOMER\_ID | 4 | 1234567 |
| 5 | IDENTIFIER | 4 | 1234 |
|  | DATA CONTENT | CARD\_ID | 18 | 123456789012345678 |
| 6 | RECHARGE AMOUNT | 12 | 123456789.12 10000 1000000 |
| 7 | UNIT PRICE | 8 | 12345.12 |
| 8 | LPG DENSITY | 5 | 2.072 |
| 9 |  | + OR - | 3 | ADD or SUB |
| 10 | MESSAGE TAIL | DATETIME | 12 | 201809031353 |
| 11 | VERIFICATION | 4 | CRC16(Refer to Appendix A) |
| 12 | FOOTER | 2 | \*\* |

Example:

##ADMO/TZ01234567/1234567/1234/123456789.12/12345.12/2.072/ADD/201809031353/XXXX\*\*

### Cylinder Change (CYCH)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | NAME | | Number of bytes | Explain |
| 1 | MESSAGE  HEAD | FRAME START | 2 | ## |
| 3 | KEYWORD | 4 | CYCH |
| 4 | METER ID | 10 | TZ01234567 |
| 5 | IDENTIFIER | 4 | 1234 |
| 6 | DATA CONTENT | EMPLOYEE ID | 7 | 1234567 |
| 7 | OLD CYLINDER SERIAL NUMBER | 11 | 01234567891 |
| 8 | NEW CYLINDER SERIAL NUMBER | 11 | 01234567892 |
| 9 | NEW CYLINDER GAS AMOUNT (kg) | 6 | 14.123 |
| 10 | LPG DENSITY | 5 | 2.072 |
| 11 | MESSAGE TAIL | DATETIME | 12 | 201809031353 |
| 121 | VERIFICATION | 4 | CRC16(Refer to Appendix A) |
| 13 | FOOTER | 2 | \*\* |

Example:

##CYCH/TZ01234567/1234/1234567/1234567891/1234567892/14.123/2.072/201809031353/XXXX\*\*

### Setup (STUP)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | NAME | | Number of bytes | Explain |
| 1 | MESSAGE  HEAD | FRAME START | 2 | ## |
| 2 | KEYWORD | 4 | STUP |
| 3 | METER ID | 10 | TZ01234567 |
| 4 | IDENTIFIER | 4 | 1234 |
| 5 | DATA CONTENT | DATA UPLOAD PERIOD  (MINUTES) | 6 | 1 for once 1 minutes  2 for once 2 minutes  3 for once 3 minutes  1440 for once 1440 minutes  10080 for once weeks |
| 6 | START send time | 6 | 1=00:01  2=00:02  .  .  1339=23:59  1440=00:00 |
| 7 | WARNING LOW BATTERY VOLTAGE (V) | 4 | 5.22 |
| 8 | WARNING LOW CREDIT BALANCE | 5 | 12345 |
| 9 | LOW GAS VOLUME IN TANK ALARM LEVEL | 4 | 0.10 |
| 10 |  | GAS REMAINING IN TANK | 5 | 14.999 |
| 11 |  | CURRENCY | 3 | TZS or GHC |
| 12 | MESSAGE TAIL | DATETIME | 12 | 201809031353 |
| 13 | VERIFICATION | 4 | CRC16(Refer to Appendix A) |
| 14 | FOOTER | 2 | \*\* |

Example:

##STUP/TZ01234567/1234/10080/1440/5.22/12345/0.10/14.99/TZS/2201809031353/XXXX\*\*

### Remote Control (CONT)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | NAME | | Number of bytes | Explain |
| 1 | MESSAGE  HEAD | FRAME START | 2 | ## |
| 2 | KEYWORD | 4 | CONT |
| 3 | METER ID | 10 | TZ01234567 |
| 4 | IDENTIFIER | 4 | 1234 |
| 5 | DATA CONTENT | COVER (LID) | 1 | 0:close,  1:open |
| 6 | VALVE | 1 | 0:close,  1:open, |
| 7 | NEEDLE | 1 | 0:up(close), 1:down(open),  X: For future use |
| 8 | TANK LOCK | 1 | 0:close,  1:open,  X: For future use |
| 9 | MESSAGE TAIL | DATETIME | 12 | 201809031353 |
| 10 | VERIFICATION | 4 | CRC16(Refer to Appendix A) |
| 11 | FOOTER | 2 | \*\* |

Example for P3 and P4:

##CONT/TZ01234567/1234/0/0/X/X/201812231859/XXXX\*\*

### IP Change (IPCH)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | NAME | | Number of bytes | Explain |
| 1 | MESSAGE  HEAD | FRAME START | 2 | ## |
| 2 | KEYWORD | 4 | IPCH |
| 3 | METER ID | 10 | TZ01234567 |
| 4 | IDENTIFIER | 4 | 1234 |
| 5 | DATA CONTENT | NEW IP | 15 | 35.177.78.198  Or  035.177.078.198 |
| 6 | NEW PORT | 5 | 05057 |
| 7 | MESSAGE TAIL | DATETIME | 12 | 201809031353 |
| 8 | VERIFICATION | 4 | CRC16(Refer to Appendix A) |
| 9 | FOOTER | 2 | \*\* |

Example:

Server -> Meter:##IPCH/TZ01234567/1234/35.177.78.198/5057/201809031353/XXXX\*\*

Meter -> Server: ##IPCH/TZ01234567/1234/201809031353/XXXX\*\*

# Mode 3:

Meter starts the communication and meter sends specific command that requires to be responded with a matching message.

### Information Response (INFS)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | NAME | | Number of bytes | Explain |
| 1 | MESSAGE  HEAD | FRAME START | 2 | ## |
| 2 | KEYWORD | 4 | INFS |
| 3 | METER ID | 10 | TZ01234567 |
| 4 | CUSTOMER ID | 7 | 1234567 |
| 5 | IDENTIFIER | 4 | Cyclic autocorrelation (needed for SMS format) |
| 6 | DATA CONTENT | [FIRMWARE\_VERSION](https://github.com/KopaGasInc/KopaGas_LPG_Smart_Meter/wiki/GPRS-(DATA)-Protocol#firmware_version) | 9 | P4\_V.X.YY |
| 7 | [PCB\_VERSION](https://github.com/KopaGasInc/KopaGas_LPG_Smart_Meter/wiki/GPRS-(DATA)-Protocol#pcb_version) | 9 | P4\_V.X.YY |
| 8 | [CURRENCY](https://github.com/KopaGasInc/KopaGas_LPG_Smart_Meter/wiki/GPRS-(DATA)-Protocol#currency) | 3 | ISO Symbol: TZS, GHC |
| 9 | [GAS](https://github.com/KopaGasInc/KopaGas_LPG_Smart_Meter/wiki/GPRS-(DATA)-Protocol#cylinder_capacity) IN TANK REMAINING | 6 | 14.123 |
| 10 | ISSUE LIST IN METER | 3 | XXX-NO ISSUE,  01.03,32...  NUMBER OF ISSUE Table in Appendix |
| 11 | CYLINDER SERIAL NUMBER | 11 | 01234567891 |
| 12 | UPDATE PERIOD | 6 | 1 for once 1 minutes  2 for once 2 minutes  3 for once 3 minutes  1440 for once 1440 minutes  10080 for once weeks |
| 13 | START send time | 6 | 1=00:01  2=00:02  .  .  1339=23:59  1440=00:00 |
| 14 | [BATTERY\_MODEL](https://github.com/KopaGasInc/KopaGas_LPG_Smart_Meter/wiki/GPRS-(DATA)-Protocol#battery_model) | 5 | TX123 |
| 15 | MESSAGE TAIL | DATETIME | 12 | 201809031353 |
| 16 | VERIFICATION | 4 | CRC16(Refer to Appendix A) |
| 17 | FOOTER | 2 | \*\* |

Example:

##INFS/TZ01234567/1234567/1234/P4\_V.X.YY/P4\_V.X.YY/TZS/14.123/01,02/01234567891/1440/1440/TX123/201809011859/XXXX\*\*

### Information Request (INFQ)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | NAME | | Number of bytes | Explain |
| 1 | MESSAGE  HEAD | FRAME START | 2 | ## |
| 3 | KEYWORD | 4 | INFQ |
| 4 | METER ID | 10 | TZ012345678 |
| 5 | IDENTIFIER | 4 | Cyclic autocorrelation (needed for SMS format) |
| 6 | MESSAGE TAIL | DATETIME | 12 | 201809031353 |
| 7 | VERIFICATION | 4 | CRC16(Refer to Appendix A) |
| 8 | FOOTER | 2 | \*\* |

Example:

##INFQ/TZ01234567/1234/201809011859/XXXX\*\*

### Customer Credit Check (CCCH)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | NAME | | Number of bytes | Explain |
| 1 | MESSAGE  HEAD | FRAME START | 2 | ## |
| 2 | KEYWORD | 4 | CCCH |
| 3 | METER\_ID | 10 | TZ01234567 |
| 4 | CUSTOMER\_ID | 7 | 1234567 |
| 5 | IDENTIFIER | 4 | Cyclic autocorrelation |
| 6 | DATA | CARD\_ID | 18 | 123456789012345678 |
| 7 |
| 8 | MESSAGE TAIL | DATETIME | 12 | 201809031353 |
| 9 | VERIFICATION | 4 | CRC16(Refer to Appendix A) |
| 10 | FOOTER | 2 | \*\* |

EXAMPLE:

##CCCH/TZ01234567/12345671234/1234567/201809031353/XXXX\*\*

### Customer Credit Response (CCCR)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | NAME | | Number of bytes | EXPLANATION |
| 1 | MESSAGE  HEAD | FRAME START | 2 | ## |
| 2 | KEYWORD | 4 | CCCR |
| 3 | METER\_ID | 10 | TZ01234567 |
| 4 | CUSTOMER\_ID | 7 | 1234567 |
| 5 | IDENTIFIER | 4 | Cyclic autocorrelation |
| 6 | DATA | CARD\_ID | 18 | 123456789012345678 |
| 7 |
| 8 | CREDIT REMAINING | 12 | 123456788.88 |
| 9 |  | CUMULATIVE VOLUMETRIC USAGE  累计用气量(L) | 12 | 123456789.12 |
| 10 |  | Cumulative credit used | 12 | 10000000012 |
| 11 | MESSAGE TAIL | DATETIME | 12 | 201809031353 |
| 12 | VERIFICATION | 4 | CRC16(Refer to Appendix A) |
| 13 | FOOTER | 2 | \*\* |

EXAMPLE:

##CCCR/TZ01234567/1234567/1234/1234567/123456788.9/123456789.12/10000000012/201809031353/XXXX\*\*

### REMOVE OLD METER (REOM)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | NAME | | Number of bytes | Explain |
| 1 | MESSAGE  HEAD | FRAME START | 2 | ## |
| 3 | KEYWORD | 4 | REOM |
| 4 | METER ID | 10 | TZ012345678 |
| 5 | IDENTIFIER | 4 | Cyclic autocorrelation (needed for SMS format) |
| 6 | MESSAGE TAIL | DATETIME | 12 | 201809031353 |
| 7 | VERIFICATION | 4 | CRC16(Refer to Appendix A) |
| 8 | FOOTER | 2 | \*\* |

Example:

##REOM/TZ012345678/1234/201809011859/XXXX\*\*

### OLD METER RESPONSE(OLMR)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | NAME | | Number of bytes | EXPLANATION |
| 1 | MESSAGE  HEAD | FRAME START | 2 | ## |
| 2 | KEYWORD | 4 | OLMR |
| 3 | METER\_ID | 10 | TZ012345678 |
| 4 | CUSTOMER\_ID | 7 | 1234567 |
| 5 | IDENTIFIER | 4 | Cyclic autocorrelation |
| 6 | DATA | CARD\_ID | 18 | 123456789012345678 |
| 7 |
| 8 | CREDIT REMAINING | 12 | 123456788.88 |
| 9 |  | CUMULATIVE VOLUMETRIC USAGE  累计用气量(L) | 12 | 123456789.12 |
| 10 |  | Cumulative credit used | 12 | 10000000012 |
| 11 | MESSAGE TAIL | DATETIME | 12 | 201809031353 |
| 12 | VERIFICATION | 4 | CRC16(Refer to Appendix A) |
| 13 | FOOTER | 2 | \*\* |

EXAMPLE:

##OLMR/TZ012345678/1234567/1234/1234567/123456788.9/123456789.12/10000000012/201809031353/XXXX\*\*

### ADD INFORMATION (ADIF)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | NAME | | Number of bytes | EXPLANATION |
| 1 | MESSAGE  HEAD | FRAME START | 2 | ## |
| 2 | KEYWORD | 4 | OLMR |
| 3 | NEW METER\_ID( new meter) | 10 | TZ01234567 |
| 4 | CUSTOMER\_ID | 7 | 1234567 |
| 5 | IDENTIFIER | 4 | Cyclic autocorrelation |
| 6 | DATA | CARD\_ID | 18 | 123456789012345678 |
| 7 |
| 8 | CREDIT REMAINING | 12 | 123456788.88 |
| 9 |  | CUMULATIVE VOLUMETRIC USAGE  累计用气量(L) | 12 | 123456789.12 |
| 10 |  | Cumulative credit used | 12 | 10000000012 |
| 11 | MESSAGE TAIL | DATETIME | 12 | 201809031353 |
| 12 | VERIFICATION | 4 | CRC16(Refer to Appendix A) |
| 13 | FOOTER | 2 | \*\* |

EXAMPLE:

##ADIF/TZ01234567/1234567/1234/1234567/123456788.9/123456789.12/10000000012/201809031353/XXXX\*\*

### 6.8 UPDATE firmware (UPDATE)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | NAME | | Number of bytes | EXPLANATION |
| 1 | MESSAGE  HEAD | FRAME START | 2 | ## |
| 2 | KEYWORD | 4 | UPDATE |
| 3 | NEW METER\_ID( new meter) | 10 | TZ01234567 |
| 5 | IDENTIFIER | 4 | Cyclic autocorrelation |
| 7 | data | MD5 |  | 96c588a959c4dcbb6b20161427ce7173 |
| 8 | URL |  | 47.95.200.195:8080/bin/userapp-mini.bin |
| 11 | MESSAGE TAIL | DATETIME | 12 | 201809031353 |
| 12 | VERIFICATION | 4 | CRC16(Refer to Appendix A) |
| 13 | FOOTER | 2 | \*\* |

EXAMPLE:

##UPDATE/ TZ01234567/1234/96c588a959c4dcbb6b20161427ce7173/47.95.200.195:8080/bin/userapp-mini.bin/ 201809031353/XXXX\*\*

### 6.9 GCSR: get CSRP

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | NAME | | Number of bytes | Explain |
| 1 | MESSAGE  HEAD | FRAME START | 2 | ## |
| 2 | KEYWORD | 4 | **GCSR** |
| 3 | METER\_ID | 10 | TZ01234567 |
| 4 | CUSTOMER\_ID | 7 | 1234567 |
| 5 | IDENTIFIER | 4 | Cyclic autocorrelation |
| 6 | DATA | CARD\_ID | 18 | 123456789012345678 |
| 7 |
| 8 | start time | 12 | 201809031353 |
| 9 | End time | 12 | 201809041353 |
| 10 | MESSAGE TAIL | DATETIME | 12 | 201809031353 |
| 11 | VERIFICATION | 4 | CRC16(Refer to Appendix A) |
| 12 | FOOTER | 2 | \*\* |

EXAMPLE:

##GCSR/TZ01234567/1234567/1234/123456789012345678/201809031353/201809031353/201809031353/XXXX\*\*

# Issues List

|  |  |  |
| --- | --- | --- |
| User | 00 | General User Issue |
| 01 | No Credit |
| 02 | No valid Card |
| System | 10 | General System Issue |
| 11 | Low Battery |
| 12 | Low Gas |
| 13 | No flow for more than 3 mins |
| Firmware | 20 | General Firmware Issue |
| 21 | Memory full 637 |
| 22 | Corrupted files |
| Sensors | 30 | General Sensor failure 0.47V< and > 2.5V show 30 |
| 31 | Light lid sensor activated |
| 32 | Lid lock malfunction open 32 |
| 33 | Needle sensor malfunction [for future use] |
| 34 | Electronic valve malfunction [for future use] |
| 35 | Tank lock malfunction [for future use] |
| 36 | GSM model malfunction |
| 37 | RFID sensor malfunction [not implemented] |
| 38 | Bluetooth sensor malfunction [for future use] |
| 39 | Overpressure sensor malfunction [not implemented] |
| Connectivity | 40 | General Network Error |
| 41 | No SIM card |
| 42 | No GSM signal |
| 43 | No registering in the network |
| 44 | No landing on server (no data session) |
| Data | 50 | General Data |
| 51 | Not able to reach Inergy |
| 52 | More than 3 failures to synchronize |
| 53 | More than 24h since last synchronization |
| 54 | Messages with truncated information (SumCheck error) |
| Warnings  (when 2 conditions are met) | 60 | General warning |
| 61 | Needle valve is open and light sensor is activated (This is dangerous because can produce an explosion) |
| 62 | Needle valve is close but flow detected (This is dangerous because can produce an explosion) |
| Actions | 70 |  |
| 71 | Valve closed because low battery |
| 72 | Valve closed because lid light sensor detects light |

The above red representation has been implemented.

# RFID Multi-user operation

# 

# 

# 

# 

# Glossary

|  |  |
| --- | --- |
| Checksum | The checksum is cumulative and the overflow is high, from the first value to the time behind |

.

# Appendix A CRC16

Like the following

##DATA/TZ01234567/1234/123456789.12/12.123/01234567891/201809031353/XXXX\*\*

Verification as shown in the red part of the example, Inclusion “/”,The calculation result is two binary data,

0x3F,0x62, Convert to displayable form,like:3F62.

The complete form is as follows:

## DATA/TZ01234567/1234/123456789.12/12.123/01234567891/201809031353/3F62\*\*

The function is implemented as follows:

public static UInt16 Cal\_CRC16(byte[] ptr, int len)

{

UInt16 crc;

int i, ptri;

crc = 0xFFFF;

ptri = 0;

while (len-- != 0)

{

crc = (UInt16)(crc ^ (ptr[ptri]));

for (i = 0; i < 8; i++)

{

if ((crc & 0x0001) == 0x0001)

{

crc >>= 1;

crc ^= 0xA001;

}

else

{

crc >>= 1;

}

}

ptri++;

}

return (crc);

}