UM01916

RHF1S51/2 Water meter application protocol

V0.7

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Abstract	Water meter application protocol

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1 RHF1S051/2 Water meter application protocol

1.1 Convention

- All the data is expressed in little endian.
- All the frame structure is in the format of "CMD+ ARG+FID", any time only one command is allowed.
  CMD: Command Code, value range from 0x00~0Xff
  ARG: argument, the actual parameter followed by Command, value length is variable, can be 0.
  FID: frame ID; Downlink frame ID is assigned by server, range from 0x00~0Xff ; Regular uplink frame ID will be 0x00, acknowledge uplink frame ID will be same as the corresponding downlink frame ID.
- Unless otherwise specified, all the packets in send as unconfirmed type message.

1.2 Uplink

1.2.1 ACKERR

Data frame	*Code*	*ARG*	*FID*	*Description*
	0x00	1	1	Uplink acknowledge error This is used to response a downlink control or downlink setting
frame structure:				
segment	*length*	*type*		*Description*
(ackcmd)	1	Unsigned integer		The corresponding downlink Command Code

1.2.2 ACKOK

Data frame	*Code*	*ARG*	*FID*	*Description*
	0x01	1	1	Uplink acknowledge OK This is used to response a downlink control or downlink setting
frame structure:				
segment	*length*	*type*		*Description*
(ackcmd)	1	Unsigned integer		The corresponding downlink Command Code

1.2.3 Post accumulated flow data and status

Data frame	*Code*	*ARG*	*FID*	*Description*
	0x02	9	1	Regular Uplink periodically, including water meter flow data and Device Status
frame structure:				
segment	*length*	*type*		*Description*
Accumulated	4	Unsigned integer		Unit: litre (L)

flow			
Device status	1	Unsigned integer	See table 1 below “Device status”
Device alert	1	Unsigned integer	See table 2 below “Device alert”
Battery level	1	Unsigned integer	0x00~0x64: battery level 0~100% 0xFF: Constant DC source supply
Downlink rssi	1	signed integer	Report the last received Downlink RSSI
Downlink snr	1	signed integer	Report the last received Downlink SNR

Table 1: Device status

Bit	D7	D6	D5	D4	D3	D2	D1	D0
definition	Reserve for use					Under voltage	Valve status	
Note	-	-	-	-	-	0: normal 1: undervoltage	00：open 01：close 11：abnormal	

Table 2: Device alert

Bit	D7	D6	D5	D4	D3	D2	D1	D0
definition	Reserve for use	Reserve for use	Hall sensor breakdown	Backup battery switch	Strong magnetic field	Valve abnormal	reverse direction alarm	Battery capacity alarm
Note	-	-	0:normal 1:alarm	0:normal 1:alarm	0:normal 1:alarm	0:normal 1:alarm	0:normal 1:alarm	0:normal 1:alarm

1.2.4 Post history accumulated flow data

Data frame	*Code*	*ARG*	*FID*	*Description*
	0x03	4+4*N	1	Uplink to report history flow data
frame structure:				
segment	*length*	*type*		*Description*
Timestamp (gpsts)	4	Unsigned integer		GPS timestamp of the first one history data, the other history per hour followed by the first one, time will be this GPS timestamp-one hour descending. eg: number N history data time=gpsts - (N-1)*3600
History Accumulated flow	4*N	Unsigned integer		Unit: litre (L)

1.2.5 Post period

Data frame	*Code*	*ARG*	*FID*	*Description*
	0x06	2	1	Uplink the period value that water meter will

				Post accumulated flow data and status.
frame structure:				
segment	*length*	*type*		*Description*
period	2	Unsigned integer		Unit: min 0x0000~0xFFFF

1.2.6 Post battery level

Data frame	*Code*	*ARG*	*FID*	*Description*
	0x08	1	1	Uplink the battery level.
frame structure:				
segment	*length*	*type*		*Description*
Battery level	1	Unsigned integer		0x00~0x64: battery level 0~100% 0xFF: Constant DC source supply

1.2.7 Post device status

Data frame	*Code*	*ARG*	*FID*	*Description*
	0x09	1	1	Uplink the device status.
frame structure:				
segment	*length*	*type*		*Description*
Device status	1	Unsigned integer		The definition refer to table1 “Device status”

1.2.8 Post alert

Data frame	*Code*	*ARG*	*FID*	*Description*
	0x0A	1	1	Uplink the device alert message. When alert event happen, it will uplink this type message automatically. This is Confirmed message.
frame structure:				
segment	*length*	*type*		*Description*
Device alert	1	Unsigned integer		The definition refer to table2 “Device alert”

1.2.9 Post firmware version

Data frame	*Code*	*ARG*	*FID*	*Description*
	0x0B	1	1	Uplink the device firmware version
frame structure:				
segment	*length*	*type*		*Description*
Firmware version	1	Unsigned integer		Major version: bit4~bit7; Minor version: bit0~bit3

1.3 Downlink

1.3.1 Query accumulated flow data and status

	Code	*ARG*	*FID*	*Description*
Data frame	0x02	0	1	Downlink query, Water meter will respond “Post accumulated flow data and status” as acknowledge.

1.3.2 Query history accumulated flow data

	Code	*ARG*	*FID*	*Description*
Data frame	0x03	6	1	Downlink query. If query parameter normal, Water meter will respond “Post history accumulated flow data” as acknowledge. If query parameter abnormal, Water meter will respond “ACKERR” as acknowledge.
frame structure:				
segment	*length*	*type*		*Description*
Timestamp (gpsts)	4	Unsigned integer		GPS timestamp of the Queried first one history data, the other history per hour followed by the first one, time will be this GPS timestamp-one hour descending. eg: number N history data time=gpsts - (N-1)*3600
Query history record count	2	Unsigned integer		Number of history data per hour queried

1.3.3 Downlink Valve control

	Code	*ARG*	*FID*	*Description*
Data frame	0x04	1	1	Downlink control. Water meter will respond “Post device status” as acknowledge.
frame structure:				
segment	*length*	*type*		*Description*
Valve control	1	Unsigned integer		0x55： Open valve 0x99： Close valve

1.3.4 Downlink set accumulated flow

Data frame	*Code*	*ARG*	*FID*	*Description*
	0x05	4	1	Downlink control. Water meter will respond “ACKOK” or “ACKERR” as acknowledge.
frame structure:				
segment	*length*	*type*		*Description*
accumulated flow	4	Unsigned integer		Unit: litre (L)

1.3.5 Query period

Data frame	*Code*	*ARG*	*FID*	*Description*
	0x06	0	1	Down to query the period value that water meter will Post accumulated flow data and status. Water meter will respond “Post period” as acknowledge.

1.3.6 Downlink set period

Data frame	*Code*	*ARG*	*FID*	*Description*
	0x06	2	1	Downlink control. Water meter will respond “ACKOK” or “ACKERR” as acknowledge.
frame structure:				
segment	*length*	*type*		*Description*
period	2	Unsigned integer		Unit: min 0x0000~0xFFFF

1.3.7 Query battery level

Data frame	*Code*	*ARG*	*FID*	*Description*
	0x08	0	1	Downlink to query the battery level. Water meter will respond “Post battery level” as acknowledge.

1.3.8 Query firmware version

Data frame	*Code*	*ARG*	*FID*	*Description*
	0x0B	0	1	Downlink to query the Firmware version. Water meter will respond “Post Firmware version” as acknowledge.

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+ First issue

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