DR3463 Pressure Transmitter

-LoRa Communication Protocol

Fandesensor

Website: www.fandesensor.com
Email: jiang@fandesensor.com
MOBIL/WhatsApp: +86 15902990387

This protocol is applicable to the intelligent wireless products (pressure, liquid level, temperature, temperature and humidity, vibration, water immersion data) produced by Fandesensor, and this protocol is applicable to the LoRa wireless transmission method.

Terminal Report Frame Format

Field Length (Byte)	Description	Value	Note
2	Frame head	0xA55A	Indicates the beginning of a frame
1	Command type	0x10	The active reporting command type is 10
1	Frame length	0-FF	The total length from the beginning of the frame to the end of the frame
4	Device ID	0xFFFFFFFF	LoRa device code, for example, 0X1232345 represents decimal ID 19080005. (This ID is an 8-digit character of the nameplate number, such as SHMK19080005, where the first four SHMKs refer to the customer's abbreviation)
1	Battery status	0- FF	Used to indicate battery power and power supply mode, refer to Table 1
1	Signal strength	0- FF	Signed 8-bit integer, used to indicate signal strength, the unit is dBm. e.g., 0Xe7, 0Xe7-0X100=0X19=-25dB
1	Pressure unit/Device type	0-31	Reference Table 2
1	Device alarm status	0- FF	For device alarm status, refer to Table 3.
Variable	Current real-time data	Parameter structure	The structure of the current real-time data. The parameters of this structure change with the device type. Please refer to Table 4 for the length and parameter values.
2	CRC Code	0x0000-0xFFFF	CRC check field, initial value 0xFFFF, name: CRC16/MODBUS, polynomial 8005
2	Frame end	0x55AA	End of frame, fixed at 0x55AA

Note: The data in this protocol are expressed in big endian unless otherwise specified

Table 1 Battery status bit structure

BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
Current power supply source (note 1)	Power supply method (note 2)		Battery level indicator, 00 is empty, 1 is 5%, 2 is 10%, 3 is 15%,...5% interval a value				

Note 1: 0-battery, 1-external power supply

Note 2: 00 is dual power supply, 01-single battery power supply, 10-single external power supply, 11-reserved.

Table 2 Device Type

Type value	Description	Number of sensors	Data length byte	Parameter Type	Minimum unit value
0	Pressure gauge kPa	1	2	①16-bit signed integer	①1LSB=0.1kPa
1	Pressure gauge MPa	1	2	①16-bit signed integer	①1LSB=0.001MPa,
2	Pressure gauge BAR	1	2	①16-bit signed integer	①1LSB=0.01Bar
3	Pressure gauge PSI	1	2	①16-bit signed integer	① 1LSB=0.01PSI
4	Pressure gauge Pa	1	2	①16-bit signed integer	①1LSB=1Pa
5	Pressure gauge mBAR	1	2	①16-bit signed integer	①1LSB=1mBAR
6	Pressure gauge Kgf/cm2	1	2	①16-bit signed integer	①1LSB=0.01Kgf/cm2
7	Pressure gauge mmHg	1	2	①16-bit signed integer	①1LSB=0.01mmHg
8	Level gauge m	1	2	①16-bit signed integer	①1LSB=0.01m
9	Liquid level gauge cm	1	2	①16-bit signed integer	①1LSB=0.1cm
10	Liquid level gauge mm	1	2	①16-bit signed integer	①1LSB=1mm
11	Thermometer °C,	1	2	①16-bit signed integer	①1LSB=0.1℃
12	Thermometer ℉	1	2	①16-bit signed integer	①1LSB=0.1F
13	Hygrometer %RH	1	2	①16-bit signed integer	① 1LSB=0.1%RH
14	Ammeter	1	2	①16-bit signed integer	①1LSB=0.1A
15	Voltmeter	1	2	①16-bit signed integer	①1LSB=0.1V
16	Differential pressure gauge (①Static pressure	2	4	16-bit signed integer*2	①static pressure 1LSB=0.001MPa、② differential pressure 1LSB=0.1kPa
17	MPa, ②differential pressure kPa),	2	4	16-bit signed integer*2	①Pressure 1LSB=0.001MPa, ②Temperature 1LSB=0.1℃

18	Temperature and humidity meter (① temperature ℃, ② humidity %RH)	2	4	16-bit signed integer*2	①Temperature 1LSB=0.1℃, ②Humidity 1LSB=0.1%RH
19	Vibration	1	2	① 16-bit signed integer	①1LSB=1 vibration analog
61	Pressure gauge MPa	1	2	①16-bit signed integer	1LSB=0.01MPa

Note:

1LSB represents the minimum value of the uploaded data of the integer parameter type, for example, 0~16MPa range, 1LSB=0.01MPa, that is, the uploaded collected data is 1563, then according to 1LSB=0.01MPa, the actual value is 1563 *0.01MPa

= 15.63Mpa; if it is a floating-point type, ignore this value and directly quote.

Table 3 Device alarm bit format

BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
	Second sensor high alarm	Second sensor low alarm	Gateway connection exception	Abnormal sensor	Battery alarm	High alarm	Low alarm

Table 4 Real-time measuring data format

Field length (Byte)	Description	Value	Note
2	Sensor 1 data	0x0000-0xFFFF	Please refer to Table 2 for the value corresponding to 1LSB
2	Sensor 2 data	0x0000-0xFFFF	If there is a second sensor, this field exists, please refer to Table 2 for the value corresponding to 1LSB

NS Command Downlink Frame Format

Field length (Byte)	Description	Value	Note
2	Frame head	0xA55A	Indicates the start of a frame
1	Command type	0xEF	Command type issued by the platform
1	Total frame length	0x00-0xFF	Total length from frame start to frame end
4	Device ID	0xFFFFFFFF	LoRa device code, for example: 0X1232345 represents the decimal ID 19080005. 0X00000000 is a broadcast message, and the device does not need to respond.
Variable	Parameter setting data unit	parameter setting structure	Setting reference "Parameter setting data unit"
2	CRC check	0x0000 -0xFFFF	CRC16 check, from the frame start marker to the CRC16 check before the check digit.
2	Frame end	0x55AA	This field is fixed at 0x55AA

Parameter setting data unit

Data type number	Data length	Data function	Data range	Note
1	4	Clear	0-0xFFFFFFFF	Clear operation when sending 0
2	4	Set high alarm value	0-0xFFFFFFFF	High alarm value, such as pressure high alarm value 30MPa, while the device type is 61, then the setting data is 30 ÷ 0.01=3000, data is 0X00000bb8.
3	4	Set low alarm value	0-0xFFFFFFFF	Low alarm value, such as low pressure alarm value 1Mp, while the equipment class type is 61, then the setting data is 1÷0.01=100, data is 0x00000064.
5	4	Set the upload interval	0-0xFFFFFFFF	Send interval, if the upload interval is 60 minutes, then send 0x0000003C, the value range is 3-9999 minutes.

13	4	Set collection interval	0-0xFFFFFFFF	Set the collection interval, for example: to collect data once every 3 seconds, the next Send 0x00000003.
14	4	Set fluctuation alarm value	0-0xFFFFFFFF	Set the fluctuation alarm value, for example: set 0.1MPa fluctuation alarm, then issue 100, the hexadecimal value is 0x00000064.

Note: The difference between high and low alarm should be greater than 5% of the total range, such as 16MPa, device type 61, then the maximum setting value of high alarm is 1600, the difference between high and low alarms must be greater than 80, and the high alarm must be greater than the low alarm, otherwise the setting will not take effect.

Parameter setting data format

Data type 1 (1 byte)	Corresponding data type number, for example, it is 2 when setting high alarm
Data length 1 (1 byte)	Corresponding data length x, for example, 4 bytes when setting high alarm
set data value 1(x bytes)	Corresponding data setting value
Data type n (1 byte)	See the definition in "Parameter Setting Data Unit"
Data length n (1 byte)	See the definition in "Parameter Setting Data Unit"
set data value n (x bytes)	See the definition in "Parameter Setting Data Unit"

Downlink setting parameter format

Parameter…		
Parameter type (1B)	**Parameter length (1B)**	**Parameter value**

Terminal Response Uplink Frame Format

After the device receives the downlink command from the platform, the terminal corresponding to the device number needs to reply to the command. The data structure of the reply is as follows。

Field length (Byte)	Description	Value	Note
2	Frame head	0xA55A	Indicates the start of a frame
1	Command type	0xEF	Command type issued by the platform
1	Total frame length	0x00-0xFF	Total length from frame start to frame end
4	Device ID	0xFFFFFFFF F	LoRa device code, for example: 0X1232345 represents decimal ID 19080005.
Variable	Parameter setting reply unit		If the downlink of the platform is a setting command, this field is used to reply the execution result; if the downlink of the platform is a query command, this field is used to reply the parameter value of the query.
2	CRC check	0x0000-0x FFFF	CRC16 check, from the frame start marker to the CRC16 check before the check digit.
2	Frame end	0x55AA	This field is fixed at 0x55AA

Example:

- Downlink: a5 5a ef 30 01 5f 68 f1 02 04 00 00 05 dc 03 04 00 00 00 64 A1 1E 55 aa

-0xa55a: Frame header

-0xef: Types of commands issued by the platform

-0x30: Total frame length 30

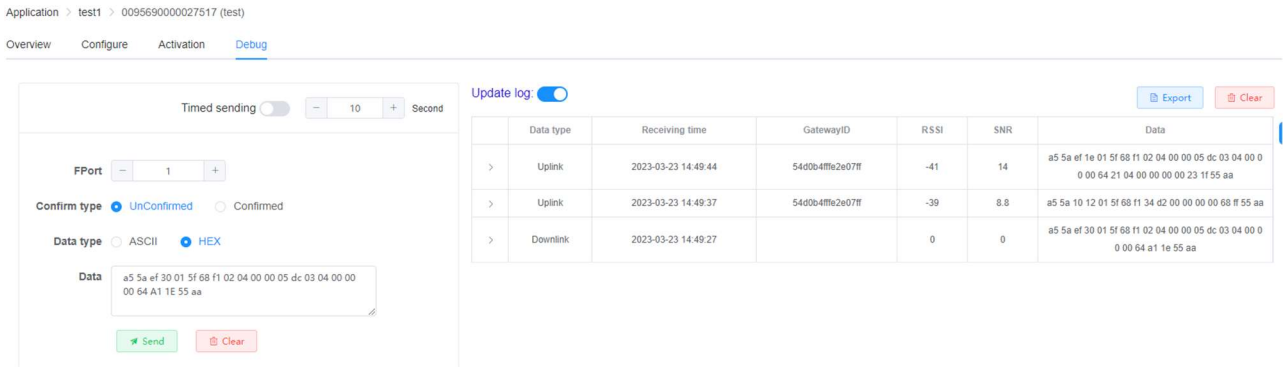
-0x01 5f 68 f1: ->23030001, Device ID 23030001

-0x02 Set high alarm value, 0x04 Set parameter length 4 bytes, 0x000005dc High alarm value 15MPa

-0x03 Set low alarm value, 0x04 Set parameter length 4 bytes, 0x00000064 low alarm value 1Pa

-0x64 A1: CRC16 check code

-0x55aa: Frame end



- Uplink: a5 5a ef 1e 01 5f 68 f1 02 04 00 00 05 dc 03 04 00 00 00 64 21 04 00 00 00 00 23 1f 55 aa