

说明书

User Manual



RDH40

密度微水变送器

RDH40

Density Micro
Water Transmitter

目录

Catalogue

1. 安全提示

Safety tips

2. 产品特点

Product features

3. 技术参数

Technical parameters

4. 产品尺寸图

product dimension drawing

5. 安装

Installation

6. 使用和维护

Use and maintenance

7. 通信协议

Communication protocol

8. 注意事项

Precautions

1. 安全提示 Safety tips



在安装、启动和操作此仪表时，必须遵守相应国际安全规范，所有的工作必须在无电压状态进行。如果不按规程序操作，会造成严重的人身伤害或财产损失。只有经过专业培训的人员可以调装此仪表。

During installation, startup and operation of this instrument, all relevant international safety codes must be obeyed and all the work must be conducted under the voltage-free status. Failure to comply with specific instructions may cause severe injury or property damage. Only professionally trained personnel can debug or install this instrument.

2. 产品特点 Product features

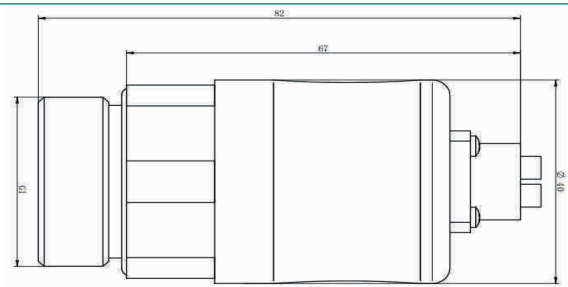
本产品主要用于监视密闭容器中 SF_6 气体的温度、压力、密度和微水含量等数据，具有实时远传监测功能。产品内部采用智能补偿技术，可以实时跟踪 SF_6 气体压力变化的非线性以及微水含量的变化，测量精确，应用广泛。适用于高压系统的监测，可提供新建变电站配套及现有变电站智能化改造等多种解决方案。

This product is mainly used to monitor the temperature, pressure, density, micro water content and other data of SF_6 gas in closed containers, with real-time remote monitoring function. The intelligent compensation technology is used inside the product, which can track the non-linear change of SF_6 gas pressure and the change of micro water content in real time. The measurement is accurate and widely used. It is applicable to the monitoring of high-voltage system and can provide various solutions such as supporting new substations and intelligent transformation of existing substations.

3. 技术参数 Technical parameters

工作电源 Working power supply	DC24V
工作环境 Working environment	-40℃~+80℃
压力测量范围 Pressure measuring range	0~1.4MPa abs. or 0~2.0 bar abs.
温度测量范围 Temperature measurement range	-40℃~+80℃
露点测量范围 Dew point measurement range	-50℃~+20℃
压力测量精度 Pressure measurement accuracy	±0.5% FS.
温度测量精度 Temperature measurement accuracy	±0.5℃
露点测量精度 Dew point measurement accuracy	±3℃
密封性能 Sealing performance	≤1X10 ⁻⁹ Pa.m ³ /s
通讯接口 communication interface	RS485
通讯协议 Communication protocol	Modbus RTU
防护等级 Degree of protection	IP65

4. 产品尺寸图 Product dimension drawing



5. 安装 Installation

A. 机械接口

Mechanical interface

一般仪表常用的技术性规范这里也适用(如:En837-2)，旋转安装时所用的力不允许直接作用到表壳或接线盒上,而是通过合适的工具作用到扳手面上。

Technical codes (e.g., En837-2) applicable to ordinary instrumentation also apply here. The force applied for rotation installation shall not directly act upon the instrument housing or terminal box but act upon the wrenching face through a suitable tool.



B. 电气接口

Electrical interface

接线必须由经过专业培训的人员操作。接线分布在仪表型号牌上给出，并注明了接线柱和接地柱。规定供电电线必须考虑仪表的上限电流需求量并符合 IEC227 或 IEC245 标准。

The wirings shall be performed by professionally trained personnel. Wiring distribution and switching functions are displayed on the instrument type plate with terminal binding posts and ground pole also indicated. The specifications of power line must allow for the upper limit current requirement of the instrument and comply with IEC227 or IEC245.

6. 使用和维护 Use and maintenance

(1) 变送器的安装部位应能较真是地反映设备内气体微水含量；

The installation position of the transmitter shall be able to accurately reflect the micro water content of the gas in the equipment;

- (2) 变送器的安装部位应能较真实地反映设备内气体的温度；
The installation position of the transmitter shall be able to truly reflect the temperature of the gas in the equipment;
- (3) 用肥皂水浸湿的擦布清洁仪表，要清洁接线盒或插头时要先把电源断开，再接通电源前确保所有部件不潮湿。
Clean the instrument with a wiping cloth soaked in soap water. Cut off the power supply before cleaning the terminal box or plugs. Make sure that all components are dry before turning on the power again.

7. 通讯协议 Communication protocol

A. 参数说明
Parameter Description
波特率:9600bps(可配置)
Baud: 9600bps(Configurable)
数据位: 8bit
Data: 8bit
校验位: 无(可配置)
Check bit: No (Configurable)
停止位: 1bit (可配置)
Stop bit: 1bit(Configurable)

B. 地址查询 Address query

广播地址 Broadcast address	功能码 Function code	起始寄存器地址 Start register address		查询地址个数 Number of query addresses		CRC 校验 CRC check	
1Byte	1Byte	2Byte		2Byte		2Byte	
00	04	FF	00	00	01	CRCL	CRCH

应答 Answer

地址 Add.	功能码 Function code	数据长度 Data length	查询到的地址 Address queried		CRC 校验 CRC check	
1Byte	1Byte	1Byte	2Byte		2Byte	
ADD	04	02	00	ADD	CRCL	CRCH

E.g.

读取命令 Read command

00	04	FF	00	00	01	00	0F
----	----	----	----	----	----	----	----

返回数据（地址为 03） Return Data(Add: 03)

03	04	02	00	03	80	F1
----	----	----	----	----	----	----

C. 地址修改 Address modification

设备地址 Device address	功能码 Function code	命令码 Command code		修改后地址 Address after modification		CRC 校验 CRC check	
1Byte	1Byte	2Byte		2Byte		2Byte	
ADD	06	FF	00	00	ADD	CRCL	CRCH

应答 Answer

修改后地址 Address after modification	功能码 Function code	数据长度 Data length	修改后地址 Address after modification		CRC 校验 CRC check	
1Byte	1Byte	1Byte	2Byte		2Byte	
ADD	06	02	00	ADD	CRCL	CRCH

E.g.

读取命令 Read command

00	06	FF	00	00	01	79	CF
----	----	----	----	----	----	----	----

返回数据（地址为 03） Return Data(Add: 03)

01	06	02	00	01	79	48
----	----	----	----	----	----	----

D. 数据查询 Data query

设备地址 Device address	功能码 Function code	起始寄存器地址 Start register address		寄存器个数 Number of registers		CRC 校验 CRC check	
1Byte	1Byte	2Byte		Number*2Byte		2Byte	
ADD	04	H	L	H	L	CRCL	CRCH

应答 Answer

修改后地址 Address after modification	功能码 Function code	数据长度 Data length	数据 Data		CRC 校验 CRC check	
1Byte	1Byte	1Byte	Number*2Byte		2Byte	
ADD	04	Number*2	DATA	DATA	CRCL	CRCH

寄存器地址说明 Register address description

地址 Add.	指向 Point
00 00	温度 Temperature
00 01	压力 Pressure
00 02	P ₂₀
00 03	密度（注：此处密度单位为 g/l） Density (Note: the unit of density here is g/l)
00 04	微水含量（ppm） Micro water content (ppm)
00 05	带压露点 Pressure dew point
00 06	常压露点 Atmospheric dew point
00 07	相对湿度 Relative humidity

E.g.

读取命令 Read command

01	04	00	00	00	08	F1	CC
----	----	----	----	----	----	----	----

返回数据（地址为 03） Return Data(Add: 03)

0	0	1	0	0	0	E	0	D	0	5	3	5	0	0	0	8	0	D	3	D
1	4	0	A	C	3	E	3	A	2	E	1	8	4	8	3	E	E	2	7	E

通过返回的数据包，解析如下：

The returned data package is parsed as follows:

温度： Temperature = （Temperature High | Temperature Low）
/100 °C

压力：Pressure = (Pressure High | Pressure Low) /10000MPa (abs.)
P₂₀： P₂₀ = (P₂₀ High | P₂₀ Low) /10000MPa (abs.)
密度：Density = (Density High | Density Low) /100g/l
微水含量：ppm = (Density High | Density Low) ppm
带压露点：Td= (Td High | Td Low) /100℃
常压露点：Td0= (Td0 High | Td0 Low) /100℃
相对湿度：RH= (RH High | RH Low) /100RH%

E. 修改通讯参数命令：0xFE

Command to modify communication parameters: 0xFE

地址 Add.	功能码 Function code	寄存器地址 Register Add.		寄存器指针 Register pointer		CRC16 校验 CRC16 check	
1 Byte	1 Byte	2 Byte		2 Byte		2 Byte	
地址 ADD	FE	Register (H)	Address (L)	Register (H)	Pointer (L)	CR CL	CR CH

参数寄存器说明：

Parameter register description：

寄存器地址 Register Add.	寄存器内容 Register contents	寄存器指针 Register pointer	指针内容 Pointer content
00 00	波特率 Baud	00 00	1200
		00 01	2400
		00 02	4800
		00 03	9600 (默认) 9600(Default)
		00 04	14400
		00 05	19200
		00 06	38400
		00 07	57600
		00 08	115200

00 01	校验位 Check bit	00 00	无校验（默认） No verification (default)
		00 01	奇校验 Odd check
		00 02	偶校验 Even check
00 02	停止位 Stop bit	00 00	1 位（默认） 1 bit (default)
		00 01	2 位 2bit

8. 注意事项 Precautions

安装接线时，请注意相关线缆安装是否正确；
When installing wiring, please pay attention to whether relevant cables are installed correctly;

变送器与气路连接时，为防止漏气，请注意密封圈是否安装正确；
When connecting the transmitter with the gas circuit, please pay attention to whether the sealing ring is installed correctly to prevent gas leakage;

避免使用引压管对气室内密度和微水进行测量，否则会影响测量精度。
Avoid using impulse pipes to measure the density and micro water in the air chamber, otherwise the measurement accuracy will be affected.

注：说明书中为基础配置，其余定制化需求见客户图。
Note: Basic type is included in the manual, and other customized requirements are shown in the customer's drawing.



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