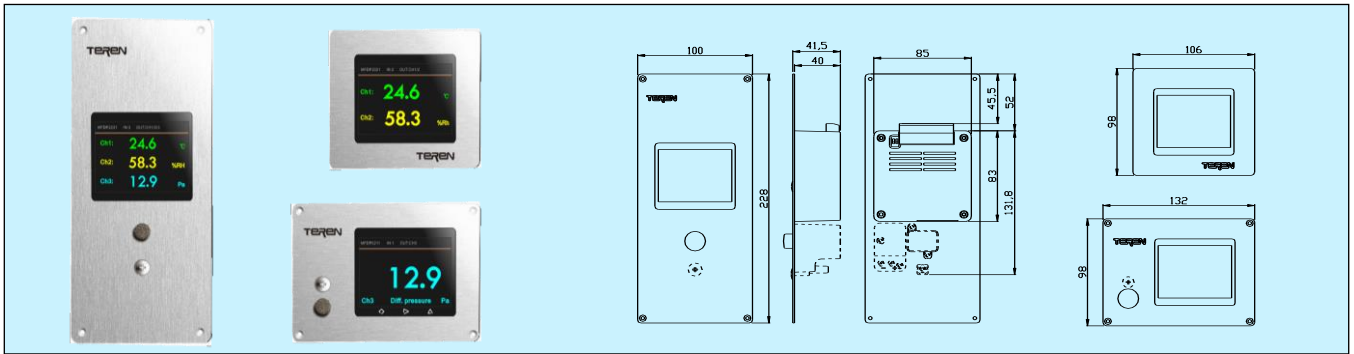


MFDP Multi-function Display Unit/Transmitter



Applications & Features

- Designed for flush mount, measure and display environment temperature, humidity and diff. pressure
- 316L front panel, PMMA window, flat surface, no dust stay, good for all detergents, sanitizers and bactericides
- Parallel or alternatively display input channels 1 to 3
- Large high light 3.2" color TFT LCD display
- Multiple inputs and outputs for different applications
- High accuracy sensor, 100% field changeable
- Optional 3 analog 4~20mA/0~10V inputs signals
- Optional 3 analog 0~10V outputs signals
- Optional RS485/Modbus RTU and key functions
- Compatible to any DDC/PLC/SCADA or other data collect and control systems
- Very high performance/price ratio: replace the single channel (T/RH/DP) display instruments, provide value added multi-function combination including local measurement, displaying and networking

Specifications

Display

Display: high light 3.2" color TFT LCD, resolution 320×240

Display panel material: PMMA

Resolution: ±0.1 engineering unit

Channels: 1~3 channels, parallel (simultaneously) or single row(alternate) display

Engineering unit: 3 preset units, °C/°F, %RH and Pa

Update time: <1s

Housing

Front panel material: 316L stainless steel, 1.5mm thick

Back housing parts: fire-proof ABS+PC UL94 V-0 class

Protection: front panel IP65 (Not include DP and T/RH sensors)

Weight: MINI: about 380g; Horizontal: about 450g; Vertical: about 650g

Technical Specifications

Power Supply: 16~28VAC/16~35VDC

Consumption: 0.5VA

Built-in sensor:

	Temperature	Humidity	Diff. pressure
Range	0~50°C	0~100%RH	0~60Pa
Accuracy	0.4°C 或 0.3°C (@15~40°C)	3%或 2%RH (@25°C, 20~80%RH)	1%或 0.5%FS
Nonlinear	/	<0.1%RH	/
Repeatability	±0.1°C	±0.1%RH	/
Hysteresis	/	±1.0%RH	/
Long term drift	<0.02°C/Year	<0.25%RH/Year	<0.5%FS/Year
Response time	<90s (in slow air)	<40s (25°C, in slow air)	0.5~30s
Temp drift	/	/	<0.05%FS/°C(zero) <0.08%FS/°C(span)
Temp. comp.	/	/	0~50°C
Medium Temp.	/	/	0~60°C
Work Temp.	/	/	10xFS(over load) 15xFS(burst)

Analog inputs: max. 3x(4~20mA/0~10V); over voltage and reverse polarity protection; accuracy< 0.1%FS; load resistance < 250Ω(4~20mA) or >100KΩ(0~10V); range: default 0~50°C /0~100%RH/0~60Pa, available range -50~100°C /0~100%RH /-100~100Pa

Analog outputs: max. 3x(0~10V); over voltage and reverse polarity protection; accuracy as low as 0.2%FS; load resistance >2KΩ; range: same as analog inputs

Keys: set/reset alarm, DP re-zero, calibration, set display mode, etc.

Communication: 1 USB for parameter checking and setting, 1 RS485/Modbus RTU, R/W enable, 9600 baud rate

Terminals: max Ø1.5mm²

Work Environment: 0~50°C, 0~95%RH (no cond.)

Storage Environment: -10~70°C

Process connection: Built-in T/RH sensor: a waterproof, air breathable filter and sensing cap on front panel. Built-in diff. pressure sensor: 2 conical nozzles, Ø 5 mm tube connection on back, or 1 pressure sampling screw on front panel.

Approval: CE

Models

Model	MFDP						Multi-function Display Unit
Temp. Hum. Input		0					N/A
		1					Analog signals (2 channels)
		2					Built-in T/Rh sensor, accuracy 0.4C/3%
		3					Built-in T/Rh sensor, accuracy 0.3C/2%
		8					RS485-Modbus RTU
Diff. Press. Input		0					N/A
		1					Analog signal(1 channel)
		2					Built-in DP sensor, accuracy 1%
		3					Built-in DP sensor, accuracy 0.5%
		8					RS485-Modbus RTU
Output		0					N/A
		1					0~10Vx1 (diff. pressure)
		2					0~10Vx2 (T/Rh)
		3					0~10Vx3 (T/Rh+DP)
		8					RS485-Modbus RTU
Keys				0			N/A
				1			3 keys
Panel Port					0		N/A
					1		1 pressure sampling screw on front panel
Panel Types						M	MINI type
						H	Horizontal type
						V	Vertical type
Screw Hole						0	N/A
						1	4 holes at corners, with SS screws

Note:

1. When selecting RS485, only the selected channel has the corresponding function, and the other channels do not have.
2. When the built-in temperature / humidity sensor is selected, the front panel has a corresponding sampling cap.
3. The total number of output channels should NOT be more than input.
4. MINI model does not have any built-in sensors, and can not have diff. pressure port on front panel.

display styles. One is Parallel display, shown as fig. 1/2/3. Another is Alternate display, shown as fig 3. It means multi parameters will alternately display in the screen, with single line for each page. In this way, the biggest characters are obtained.

1. Display mode1: three channels are parallel displayed, shown as Figure 1, showing temperature, humidity and diff. pressure.
2. Display mode 2: the two channels are parallel displayed, shown as Figure 2, showing temperature and humidity.
3. Display mode 3: only one channel is displayed, shown as Figure 3, only showing diff. pressure.



Fig 1



Fig 2



Fig 3

Setting

1. Pressure zero reset button is used to reset the zero drift of the built-in DP sensor, as in Figure 4. User can connect the “+” and “-” ports first, then press the button for 3 seconds to finish the operation.
2. RS485 terminal resistance (120Ω) is selected by the dial switch, as Figure 5. When bit "2"dial switch is ON, the terminal resistance is 120Ω. Otherwise there is no any terminal resistance.
3. Computer program can set all parameters. Computer can be connected to the product through USB, shown as Fig 4 and 6. The interface is as fig. 7. Click "Help" can get the help. The software for configuring can be downloaded from TERENCE's official website: www.teren.com.cn, with path: resources download → tools and software.

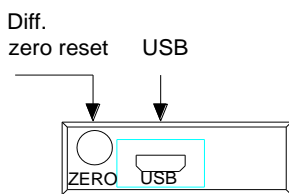


Fig 4

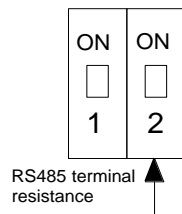


Fig 5

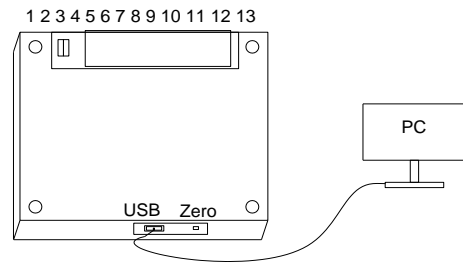


Fig 6

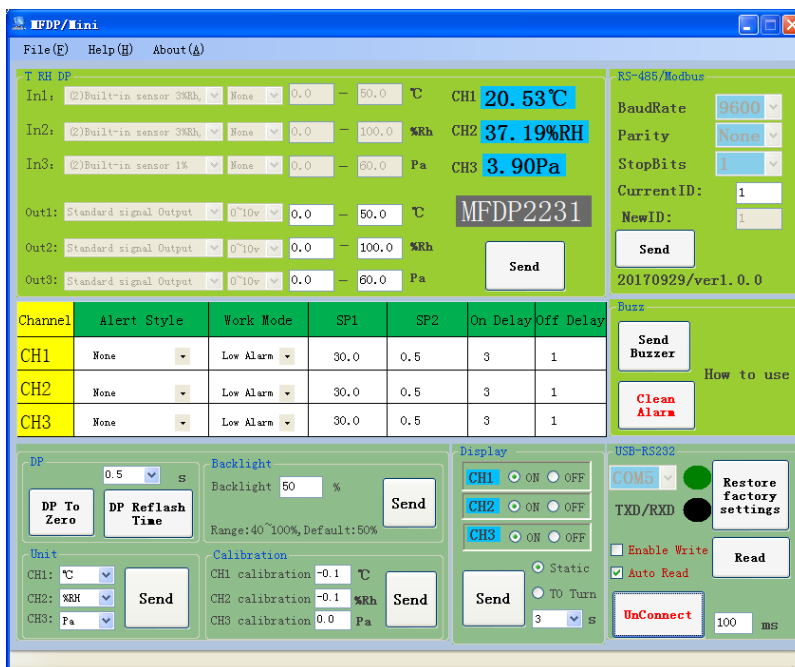


Fig 7

Communication

1. 1 x RS485
 Basic communication settings: 9600, 8, N, 1
 Communication address: 1
 Communication protocol: MODBUS-RTU
 The communication interface can be used for networking with other devices, or for setting the parameters of the product. Refer to 《MFDP Modbus instructions》 for details.

Register Table

Address	R、W	Data	Definition	comment
40001, 0000	R	Signed	Product code	MFDP product code
40002, 0001	R	Signed	Temperature Data	Temp. = Data / 100
40003, 0002	R	Signed	Humidity Data	Hum. = Data / 100
40004, 0003	R	Signed	Pressure Data	Pressure = Data / coefficient
40005, 0004	R	Signed	Pressure coefficient	e.g. 1,10,100,1000,10000
40006, 0005	R/W	Signed	Temperature unit	0: °C, 1: °F
40007, 0006	R	Signed	Humidity unit	0:%RH
40008, 0007	R/W	Signed	Pressure unit	1:Pa, 2:kPa, 3:mbar, 4:mmwc, 5:inwc
.....				
40014, 00013	R/W	Signed	Slave address	Default 1
.....				
40016, 00015	R/W	Signed	Function register	write 40016=21845 to reset to factory default setting

Note: (1) 40001 is PLC mode ADDRESS (BASE 1); 00000 is PROTOCOL ADDRESS (BASE 0).

(2) Function register 40016: Use the 06 function code to write password (21845) to the register 40016 to return to the factory set.

2. 1 x USB-RS232

Basic communication settings: 9600, 8, N, 1.

Communication address: 1.

Communication protocol: MODBUS-RTU.

Used for equipment debugging, diagnosis, or modification of the parameters of the product.

Warranty

- It has limited warranty for eighteen (18) months after the production date.

MFDP key function description and operation guide

1. Button definition:



“SET”: Set/Confirm/Save; “SEL”: Bit Select/Decrease; “ADJ”: Adjust/Increase

2. Main display window

Display the current measurement value, press "◇" to enter the menu window.

3. Menu window

The following seven different icons are displayed. Press "▷", "△" to select different icons, and press "◇" to enter the parameter window.



Icon	Name	Function
	Buzzer alarm setting	After entering, set the alarm parameters as follows: 1 alarm mode, 2 working mode, 3 set point 1, 4 set point 2, 5 ON delay, 6 OFF delay.
	Clear alarm	After entering, the alarm will be cleared and the buzzer and display flash will be cleared.
	Built-in Diff. pressure sensor zero reset	After entering, if the product has a built-in pressure sensor, select "YES" to reset the zero pressure, or select "NO" to do nothing. If the product does not include a built-in pressure sensor, the function is NOT available.
	Display setting	After entering, set the channel 1, 2, 3 display on and off, channel 1, 2, 3 units, set the display mode and backlight brightness.
	Calibration setting	After entering, can operate 1, 2, 3 channels values single-point calibration. PV shows the current value, unit displays the unit.
	Restore factory settings	After entering, select "YES" to restore the factory settings, or select "NO" to keep current settings.
	Return main display Window	Press "◇" to return main display window.

4. Parameter display window

When the parameter is flashing, press "◇", the displaying color will turn to green to indicate that it can be modified. Modify the parameter value with "▷" and "△", then confirm with "◇".

When the parameter flashes, move to the next or previous parameter with "▷" and "△".

If there is no any key operation in 30s, it will automatically return to the main display window, the parameters will not be saved.



When this icon flashes, press "◇" to confirm, then the parameters will be saved.



When this icon flashes, press "◇" to confirm, then the parameters will NOT be saved.

4.1 Buzzer alarm setting

CHAN	Style	Mode	SP1	SP2	ON Delay	OFF Delay
CH1	Parameter 1	Parameter 2	Parameter 3	Parameter 4	Parameter 5	Parameter 6
CH2	Parameter 7	Parameter 8	Parameter 9	Parameter 10	Parameter 11	Parameter 12
CH3	Parameter 13	Parameter 14	Parameter 15	Parameter 16	Parameter 17	Parameter 18

Parameter 1,7,13: Indicates the alarm style, optional parameters: None, blink, Buzz, audible and visual alarm (Both).

Parameter 2,8,14: Indicates the working mode, optional parameters: none alarm, low alarm, high alarm, in range alarm, out range alarm.

Parameter 3,9,15: set point / low limit(SP1).

Parameter 4,10,16: dead band /high limit(SP2).

Parameter 5,11,17: on Delay, unit second.

Parameter 6,12,18: off Delay, unit second.

Parameters and descriptions

Mode	Mode Description	Para. #3/9/15	Para. #4/10/16	Para. #5/11/17	Para. #6/12/18	Definition
0	Cancel alarm function	N/A	N/A	N/A	N/A	Relay OFF
1	Alarm actuate when input is lower than set point	Set point	Dead band	Actuate delay	Restore delay	
2	Alarm actuate when input is higher than set point	Set point	Dead band	Actuate delay	Restore delay	
3	Alarm actuate between high and low limits	Low limit	High limit	Actuate delay	Restore delay	
4	Alarm actuate outside high and low limits	Low limit	High limit	Actuate delay	Restore delay	

4.2 Clear alarm

Press "◇", then pop-up "Clear Alarm Success" to show that the alarm is clear successfully.

4.3 Reset zero pressure of built-in pressure sensor

Press "◇", if the product has a built-in pressure sensor, select "YES" with "▷" and "△" to reset the zero pressure. or select "NO" to do nothing. If the product does not include a built-in pressure sensor, the operation is not allowed.

4.4 Display setting

Name	CH1	CH2	CH3
Switch	Parameter 1	Parameter 2	Parameter 3
Unit	Parameter 4	Parameter 5	Parameter 6
Mode	Parameter 7		
Bright	Parameter 8		

Parameter 1,2,3: Optional parameters: ON, OFF.

Parameter 4: Optional parameters: °C, °F.

Parameter 5: Optional parameters: %RH.

Parameter 6: Optional parameters: "Pa", "kPa", "In WC", "mbar", "mm WC".

Parameter 7: Optional parameters: parallel (simultaneously display) or alternate display.

Parameter 8: Optional parameters: 40-100% backlight brightness. More brightness may cause more power consumption, more heat, finally bring temperature increase and decrease the performance of electrical components.

4.5 Calibration setting

CHAN	Adj	PV	Unit
CH1	Parameter 1	Parameter 4	Parameter 7
CH2	Parameter 2	Parameter 5	Parameter 8
CH3	Parameter 3	Parameter 6	Parameter 9

Parameter 1,2,3: 1,2,3 channels single-point calibration value, can be modified.

Parameter 4,5,6: 1,2,3 channels current value, cannot be modified.

Parameter 7,8,9: 1,2,3 channels current unit, cannot be modified here. If need to modify, refer to 4.4.

4.6 Restore factory settings

By pressing "◇" and selecting "YES" via "▷", "△", the factory settings will be restored. Select "NO" will not restore the factory settings.

4.7 Return main display Window

By pressing "◇", return to the main display window.



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