

"Edge Technology —
Giving You the Edge
Over Others."

Instrumentation | Flow meters, Level, Temp & Pressure Sensors

Medge Controls by Mega Switchgears

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Wireless Digital Pressure, Liquid Level and Temperature Transmitter (CAT1)



Product description

The MD-221W series is a smart, low-power transmitter designed for wireless measurement and monitoring of pressure, liquid level, and temperature.

It is powered by an industrial-grade MCU and high-accuracy sensors, combined with an IoT CAT1 module operating on India's 4G network, enabling direct wireless data transmission to the cloud.

It supports both: Scheduled(timed) reporting & Threshold alarm-based reporting

This ensures real-time detection of abnormal pressure and improves operational safety in pipelines and industrial systems.

Key Features:

- Explosion-proof industrial housing
- Diffused silicon diaphragm sensors with multi-point temperature compensation
- Stable and reliable data acquisition
- LCD digital display for local monitoring and calibration
- Reverse polarity protection, current limiting, lightning and impact resistance
- Compact and durable design with high cost-performance ratio
- Accurate, stable, and reliable performance

About CAT Technology

Serial No.	Rate Level	Maximum Bandwidth	Maximum Rate	Power Consumption	Application Scenario
1	Cat.M2 (NB-IoT)	200kHz	DL 200kbps/ UL 200kbps	< 5uA@PSM; < 2mA@Idle mode(DRX=1.28S); < 300mA@Tx(23dBm/15kHzST); < 50mA@Rx	Smart meter reading, asset tracking, smart city, smart agriculture, etc.
2	Cat.1	20MHz	DL 10Mbps/ UL 5Mbps	< 40uA@Poweroff ; < 1.5mA@sleep ; < 12mA@Idle;	Shared terminals, financial payment, smart POC, industrial control, etc.
3	Cat.4	20MHz	DL 150Mbps/ UL 50Mbps	< 80uA@Poweroff ; < 5mA@sleep ; < 60mA@Idle ;	Internet of Vehicles, Smart Grid, Video Surveillance, Industrial Routing, etc.

"Cat.X" refers to LTE UE-Category (User Equipment Category), classifying devices based on transmission capability. CAT1 balances low power use with wide 4G coverage, making it well suited for IoT deployments in India.

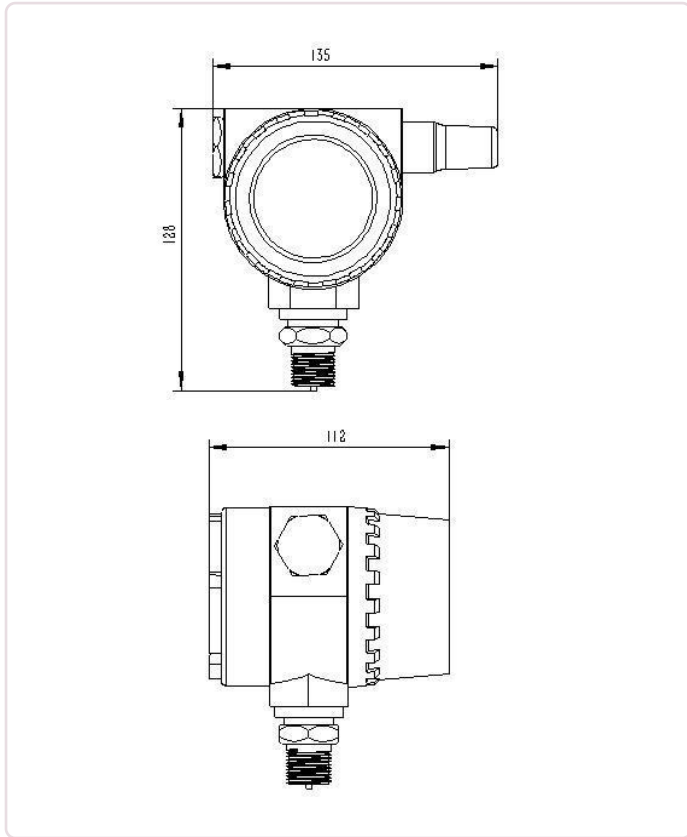
Functional Highlights:

- **Wide 4G network coverage**
- **Ultra-high resolution 5-digit LCD display** (42×30mm), supports real-time ambient temperature display
- **Antenna options:** external (for weak signal areas) or integrated
- Built-in **low-power circuit** with 9900mAh lithium battery
- Supports **scheduled and event-based reporting**
- Optional **GPS module** for precision location tracking
- **Configurable alarms:** upper/lower limits, dual upper & dual lower limit alarms, battery capacity alarms
- **Automatic network time sync**, auto-reconnect with **data cache and resend functions**
- Local operation via **infrared remote** (no button pressing needed)
- Remote parameter setting from server (no site-level configuration required)
- **Shockproof, moisture-proof**, suitable for field use
- Comprehensive **self-test and diagnostic functions**

Technical Specifications

Model:	MD-221W
Accuracy:	±0.5% standard (customizable to ±0.1% or ±0.25%)
Measurement Range:	Pressure: 0–60MPa up to 250MPa; Level: 0–500m; Temperature: –50°C to +600°C (Special ranges customizable)
Pressure Types:	Gauge / Absolute / Sealed
Power Supply:	3.6V Lithium battery (options: 9.9Ah, 19Ah)
Battery Life:	Depends on reporting interval
Display:	Ultra-low power LCD
Controls:	Buttons for settings, communication, unit switching
Weight:	~1.6kg (subject to actual product)
Material:	SS316L diaphragm (alternatives customizable)
Operating Temp:	–20°C to +70°C (customizable extremes)
Storage Temp:	–30°C to +80°C
Humidity:	0-95% RH
Stability:	±0.5% FS/year (up to ±0.05% FS/year available)
Electromagnetic Compatibility:	GB/T 17626.2/4-2006
Vibration Resistance:	≤3g (10Hz–150Hz, IEC60068-2-6-2007)
Communication Protocols:	TCP, UDP, MQTT
Transmission Distance:	Dependent on 4G base station coverage
Installation Thread:	M20×1.5 (customizable G1/2, G1/4, 1/4NPT)
Shell Color:	Default military green (1000+ custom colors available)

Dimension



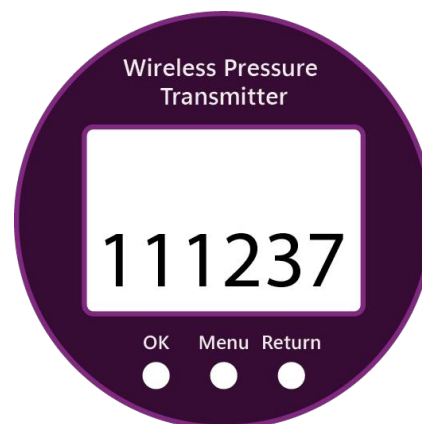
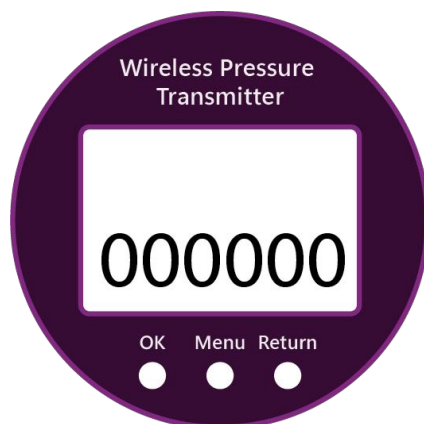
Display & Local Operation

Normal mode: press the middle button to query

Display No.	Content
0	Pressure MPa
1	Pressure kPa
2	Meter
3	Current date
4	Current time
5	Table number Middle 6 bytes, high bit 6105 is not displayed by default, representing the manufacturer Eg. 011905, the high position of the table number is: 6105011905
6	Table number lower 4 digits; Eg. the 0001
7	Version number

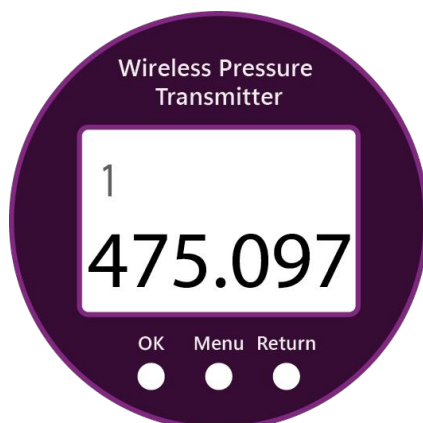
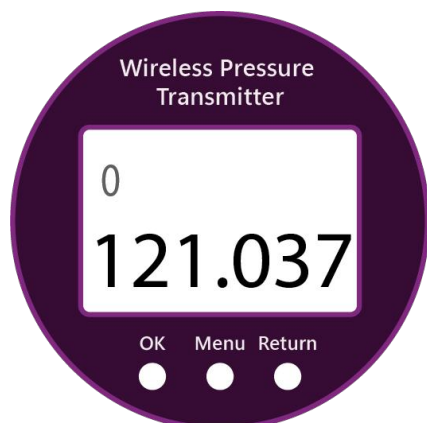
Manual Key Modification Mode

1. Long press the menu button to enter; the screen displays 000000; enter the password 111237 as shown below:



Note: The confirmation key can be shifted; the return key can modify the number; the menu key can confirm.

2. Press the menu key to turn to page 0-1. Modify the IP address as shown below:



Note: The confirmation key can be shifted; the return key can modify the number; the menu key can confirm.

Special note: The button can only modify the IP address with pure numbers. For example: 121.037.475.097

3. Press the menu key to turn to page 2; port modification, as shown below:



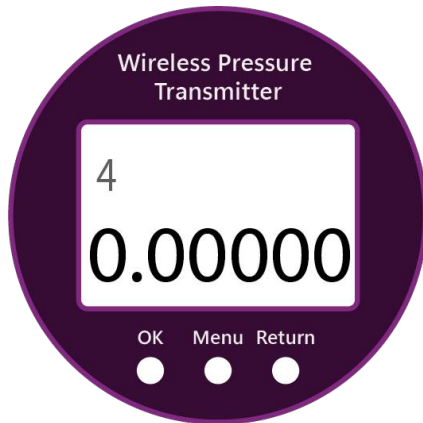
Note: The confirmation key can be shifted; the return key can modify the number; the menu key can confirm.

4. Press the menu key to turn to page 3. Modify the reporting interval. As shown below:



Note: Confirm key can be shifted; Return key can be used to modify numbers. Menu key can be used to confirm. Unit: Minutes

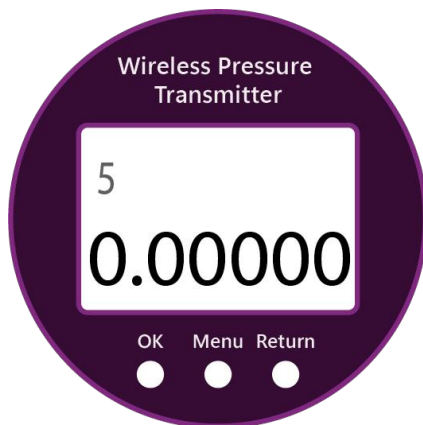
5. Press the menu key to turn to page 4, the upper pressure limit alarm. As shown below:



Note: The confirmation key can be shifted; the return key modifies the number, and the menu key confirms.

Unit: The parameter is range, and the parameter of liquid level transmitter is KPa.

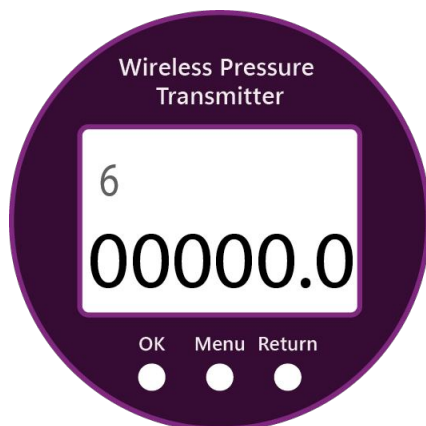
6. Press the menu key to turn to page 5. The lower pressure limit alarm is as shown below:



Note: The confirmation key can be shifted; the return key can modify the number; the menu key can confirm.

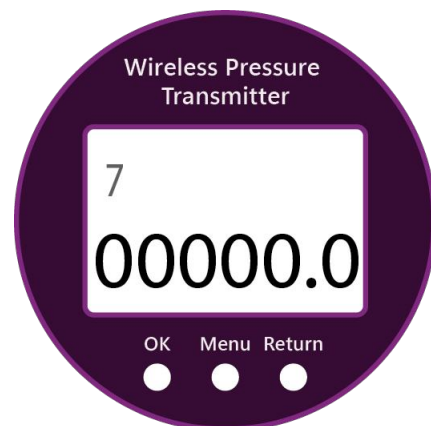
Unit: The parameter is the range. The parameter of the level transmitter is KPa.

7. Press the menu key to turn to page 6. Temperature upper limit alarm, as shown below:



Note: The confirmation key can be shifted; the return key can be used to modify the number; the menu key can be used to confirm. Unit: °C.

8. Press the menu key to turn to page 7. The temperature lower limit alarm is as shown below:



Note: The confirmation key can be used for shifting; the return key can be used to modify numbers; the menu key can be used for confirmation. Unit: °C.

The above parameters are modified. Long press the menu key to exit.

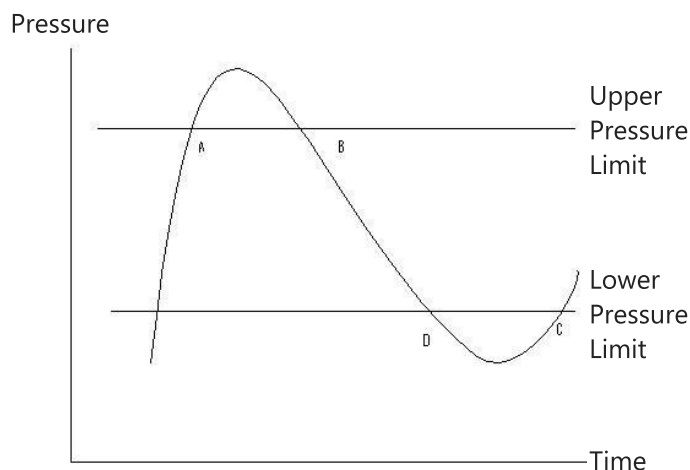
Note: Please modify as required. Do not modify other parameters at will.

Manual Reporting Mode

Reporting mode: Press and hold the left button for 4 seconds to enter reporting.

1. Activation: Press the left button to enter the activation state, and the display will show 00--03A; the 3 in front of A represents the trigger reporting type.
2. Search network: Display signal quality 16-r31, which means the signal quality is 31.
3. Register on 4G network, and display -4G.
4. Send: -4GS
5. Receive: -4Gr
6. Success/Failure SUC/FAL

Example: Processing of alarm thresholds



A is the upper limit abnormal alarm: if the pressure is higher than point A for 2 minutes, the data will be reported. If it is higher than point A for a long time, the data will be reported only once.

B is the upper limit recovery data: if the pressure drops back to point B, the data will be reported.

D is the lower limit abnormal alarm: if the pressure is lower than point D for 2 minutes, the data will be reported. If it is lower than point D for a long time, the data will be reported only once.

C is the lower limit recovery data: if the pressure rises back to point C, the data will be reported.

Note: Our factory supports 2-point alarm for pressure adjustment, which is convenient for customers to expand

Product model and name:

Name	Serial Model No.	Communication Mode
Wireless pressure transmitter	MD-221WA1	CAT-1 4G communication
Wireless liquid level transmitter	MD-221WA1-	CAT-1 4G communication
Wireless temperature transmitter	MD-221WA2	CAT-1 4G communication
Wireless temperature & pressure transmitter	MD-221WA3	CAT-1 4G communication

The above parameters are modified. Long press the menu key to exit.
Note: Please modify as required. Do not modify other parameters at will.

1. Instrument to server protocol

Content	Data Identification	Data Type	Instruction	Remarks
Frame head	\$*****\$	Company Name	Can set corporate logo	Can set corporate logo
Instrument type	TYPE	Character string	Represents equipment type: pressure, liquid level, temperature, temperature and pressure integrated	4GloT_P, 4GloT_T, 4GloT_PT
Instrument No.	ID	Character string	Such as: transmitter number	61052408260005
GPS, positioning longitude	LNG	Floating number	WGS_84 coordinate	0.0 Longitude (Custom-open)
GPS, positioning latitude	LAT	Floating number	WGS_84 coordinate	0.0 Latitude (Custom-open)
The Internet of Things card code	ICCID	Character string	SIM Card No.	89860818102370340174
Battery voltage	VBATT	Floating number		3.6V battery
Communication signal status	CSQ	Integer number (0-31)	0-31, the larger the value, the better the signal.	If the signal is less than 15, it will not work properly.
Pressure full range	PFS	Floating number		2.5000 MPA (unit: KPa MPa) varies according to the order demand
Current pressure	PRES	Floating number	0.0000	Pressure temperature: 0.6000 MPA (full range with the same pressure)
The current temperature	TEMP	Floating number	Centigrade degree °C	27.3°C
Upper pressure limit alarm value	ALPH	Integer (Decimal, four places)	0.0000mpa	The alarm unit is the same as the pressure and full range unit

Content	Data Identification	Data Type	Instruction	Remarks
Lower pressure limit alarm value	ALPL	Integer (Decimal, four places)	0.0000mpa	
Upper temp limit alarm value	ALTH	Integer (Decimal, one decimal place)	0.0	
Lower limit of temp alarm value	ALTL	Integer (Decimal, one decimal place)	0.0	
Alarm enable bit status	ALEN	Integer	0: prohibit all alarms, 1: enable all alarms	0=off, 1=on
Store the data interval time	SINRV	Integer	Unit: minutes	0.0 Longitude (Custom-open)
Enable reporting of historical data	RHDEN	Integer		0.0 Latitude (Custom-open)
Data point 1	D01	Integer	1.5000_15.2	89860818102370340174
Data point 2	D02	Integer		Pressure _ temperature
-	-	-		Unit with the current
Data point 48	D48	Integer		
Last storage time	LastTime	Character string	Last storage time (Eg., 20240530121530)	
Equipment time	TIME	Character string	Format: YYYYMMDDHHMMSS	Eg.: 20240812150905
Report the event	EVENT	Integer	Events that trigger reporting 0-manual, 1-upper limit alarm trigger, 2-upper limit alarm release, 3-lower limit alarm trigger, 4-lower limit alarm release, 5-timing report, 6-interval report, 7-deblunt alarm, 8-upper limit alarm, 9-lower limit alarm	
End of data collection	END	NO	End of acquisition data identification	END

Note: The flag and content are separated by a colon, and each field is separated by a semicolon.

2. The server sends the instrument and protocol

Content	Data Identification	Data Type	Instruction	Remarks
Frame head	\$*****\$	Enterprise exclusive logo	Company Name	Required
Instrument number	ID	Character string	Equipment number	Required
Server time	TIME	Character string	Form: YYYYMMDDHHMMSS	Required
Report interval	INR	Integer	Unit: minutes, minimum 5 (5 minutes) maximum 1440 minutes (24 hours)	Need to modify
Upload the server address	RSA	Character string	Remote server IP or domain name Not required/Optional	Need to be modified No more than 25 characters
Server terminal	PORT	Integer	Remote server port number Optional	Need to be modified
Upper pressure limit alarm value	ALPH	Integer	Decimal, four decimal places Not required/Optional	1.5mpa sends 15000, sends 0, turns off the upper limit alarm function
Lower pressure limit alarm value	ALPL	Integer	Decimal, four decimal places	0.5mpa sends 5000, sends 0, turns off the lower limit alarm function
Upper temperature limit alarm setting	ALTH	Integer	Decimal, one decimal place	80°C sends 800 Send 0, turn off the temperature Upper limit alarm function
Lower limit temperature alarm setting	ATL	Integer	Decimal, one decimal place	10°C sends 100 Send 0, turn off the temperature Upper limit alarm function
Alarm enable bit status	ALEN	Integer		0: prohibit all alarms 1: enable all alarms
End of data collection	END			End mark is required

Example:

- To modify the reporting interval to 60 minutes the command is:
\$MEDGECON\$;ID:61052408260005;TIME:20200525123935;INR:60;END;
- To modify the reported IP address (219.145.20.3:8888) the command is:
\$MEDGECON\$;ID:61052408260005;TIME:20200525123935;RSA:219.145.20.3;PORT:8888;END;

3. After the terminal successfully receives the command sent by the server, the feedback result to the server is as follows: \$MEDGECON\$;ID:61052408260005;RCVD:0;END;

The server sends a modified IP address or interval, and the ID number must be consistent.

RCVD: Indicates the number of bytes received.

4. Instructions for use:

- The user can configure the IP address, port number, and reporting interval manually or via infrared. Once set, the instrument automatically reports data to the server according to the configured interval.
 - Alternatively, the server-to-terminal protocol allows remote configuration of the IP address, port, and interval. If these parameters are not defined, the instrument can still send data using default settings.
-