
Tasira
Instruments & Services

METRAVI | DIGITAL PRESSURE METER | PM-01

INTRODUCTION

The device measures Gauge/Differential Pressure from 0 to 5 psi, it features 11 selectable units of measure: inH_20, psi , bar , mbar, kPa , inHg , mmHg, $OZin^2$,ftH_20 , cmH_2O, $kgcm^2$. Additional features include Data Hold. Auto Power Off disabled , and a RS-232 for capturing reading to a PC using optional software.

SPECIFICATIONS

Function	Range	Resolution	Function	Range	Resolution
inH_20	138.3	0.1	$ozin^2$	80.00	0.01
psi	5.000	0.001	ftH_2O	11.53	0.01
mbar	344.7	0.1	cmH_2O	351.5	0.1
kPa	34.47	0.01	$kgcm^2$	0.351	0.001
inHg	1.018	0.001	bar	0.344	0.001
mmHg	258.5	0.1			

Display : Dual LCD

Accuracy : ± 0.3%FSO

Repeatability : ± 0.2% (Max.+/ -0.5% FSO)

Linearity/Hysteresis : ± 0.29% FSO

Pressure Range : ± 5 psi

Maximum Pressure : 20psi

Response Time : 0.5 Seconds typical

Low Battery Indicator : Yes

Over range Indicator : Err.1

Under range Indicator : Err.2

Operating Conditions : 0 to 50ºC

Storage Conditions : -10 to 60ºC

Power Supply : 1 × 9V Battery or external 9VDC

Optional RS232 software (Disk & PC cable)

Serial format : Baud rate: 9600 Baud, 8 Data Bits.

*Technical Specifications & Appearance are subject to change without prior notice

METRAVI | DIGITAL PROCESS METER (DMM + CALIBRATOR) | PM-29

GENERAL SPECIFICATIONS

Power supply	:	6V batteries (4×1.5 V alkaline AAA batteries or 4×1.5 V Ni-MH AAA batteries)
Maximum Voltage	:	600Vp (Maximum Voltage between all input jacks and earth ground) 30V DC (Maximum Voltage between all output jacks and earth ground)
Operating temperature	:	0ºC - 50ºC
Operating relative humidity	:	≤ 80% RH
Storage temperature	:	-10ºC -55ºC
Storage humidity	:	≤ 90%RH
Size	:	205 ×95× 42 mm (plus protector)
Weight	:	about 500g (plus protector)
Accessories	:	a copy of users manual, a set of industrial test lead (with alligator clips) and two 63mA/250 fast-blow fuses
Options	:	battery charger(VCCHG)
Safety	:	complied with IEC61010 terms (Safety Standard issued by International Electro- technical Commission)

TECHNICAL SPECIFICATIONS

All the specifications apply to +18ºC to + 28ºC, 10% to 70%RH unless stated otherwise.

All specifications assume a 5- minute warm-up period.

Standard specifications is valid for one year.

DC Voltage Measurement

Range (DCV)	Resolution	Accuracy ± (% of reading + counts)
4.000V	0.001V	0.2% + 4
40.00V	0.01V	0.2% + 4
400.0V	0.1V	0.2% + 4

Measuring Impedance	:	10MΩ (nominal) <100pF
Common moderejection ratio	:	50Hz or 60Hz > 100dB
Normal mode rejection ratio	:	50Hz or 60Hz > 45dB
Over voltage protection	:	600Vp

DC mV Measurement

Range (DC mV)	Resolution	Accuracy ± (% of reading + counts)
40.00mV	0.01V	0.5% + 6
400.0mV	0.1V	0.2% + 4

Measuring Impedance	:	10MΩ (nominal)
Over voltage protection	:	600Vp

Temperature Measurement

Range (type)	Set range	Resolution	Accuracy ± (% of reading + counts)
R	-40 ~ 1760ºC	1ºC	0.5%+3 (≤ 100ºC) 0.5% + 2 (> 100ºC)
S	-20 ~ 1760ºC	1ºC	0.5% + 3 (≤ 100ºC) 0.5% + 2 (> 100ºC)
B	400 ~ 1800ºC	1ºC	0.5% + 3 (≤ 600ºC) 0.5% + 2 (> 600ºC)
E	-200 ~ 500ºC	1ºC	0.5% + 2 (≤ -100ºC) 0.5% + 1 (> -100ºC)
K	-200 ~ 950ºC	1ºC	0.5% + 2 (≤ - 100ºC) 0.5% + 1 (> -100ºC)
J	-200 ~ 700ºC	1ºC	0.5% + 2 (≤ - 100ºC) 0.5% + 1 (> - 100ºC)
T	-200 ~ 400ºC	1ºC	0.5% + 2 (≤ - 100ºC) 0.5% + 1 (> - 100ºC)
N	-200 ~ 1000ºC	1ºC	0.5% + 2 (≤ - 100ºC) 0.5% + 1 (> - 100ºC)

By using ITS-90 temperature scale

Note: The accuracy does not include the error of internal temperature compensation caused by a sensor. The range of the internal temperature compensation sensor is ± 2ºC.

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TECHNICAL SPECIFICATIONS

AC Voltage Measurement

Range (AC V)	Resolution	Accuracy ± (% of reading + counts) 40 ~ 400Hz
400.0mV	0.1mV	1.0% + 4
4.000V	0.001V	0.5% + 4
40.00V	0.01V	0.5% + 4
400.0V	0.1V	0.5% + 4

Specification are valid from 5% to 100% of amplitude range
400mV is only confined to manual range

AC conversion : Average value
Measuring Impedance : 10MΩ (nominal), <100pF
Common mode rejection ratio : 50Hz or 60Hz > 100dB
Over voltage protection : 600Vp-p

DC Current Measurement

Range (DC mA)	Resolution	Accuracy ± (% of reading + counts)
40.00mA	0.01mA	0.2% + 4
400.0mA	0.1mA	0.2% + 4

Overload protection : 0.5A, 250V fast-blow fuse
Measuring Impedance : 1Ω

AC Current Measurement

Range (AC mA)	Resolution	Accuracy ± (% of reading + counts) 40 ~ 400Hz
40.00mA	0.01mA	0.5% + 4
400.0mA	0.1mA	0.5% + 4

Specifications are valid from 5% to 100% of amplitude range
Overload protection : 0.5A, 250V fast-blow fuse
Measuring Impedance : 1Ω

Resistance Measurement

Range	Resolution	Accuracy ± (% of reading + counts)
400.0Ω	0.1Ω	0.2% + 4
4.000kΩ	0.001kΩ	0.2% + 4
40.00kΩ	0.01kΩ	0.2% + 4
400.0kΩ	0.1kΩ	0.2% + 4
4.000MΩ	0.001MΩ	0.5% + 4
40.00MΩ	0.01MΩ	1.0% + 4

Open circuit voltage : 0.4V
Test lead resistance is excluded in the accuracy
Over voltage protection : 600Vp-p

RTD Measurement

Range (type)	Input Range	Resolution	Accuracy ± (% of reading + counts)
Pt 100	-200 ~ 700°C	1°C	0.5% + 2
Cu50	-50 ~ 150°C	1°C	0.5% + 4

By using Pt100-385 temperature scale
Measurement current 1mA
Note: attached lead resistance is excluded

Frequency Measurement

Range	Resolution	Accuracy ± (% of reading + counts)
50.00Hz	0.01Hz	0.1% + 3
500.0Hz	0.1Hz	0.1% + 3
5.000KHz	1Hz	0.1% + 3
50.00KHz	0.01KHz	0.1% + 3
100.0KHz	0.1KHz	0.1% + 3

Display updates 3 times/second (at > 10Hz)

Diode Test and Continuity Test

Diode test indication

Displays voltage drop across device, open circuit voltage: 1.1v-1.6v: short circuit current : <0.2mA (typical value), Accuracy ± (2% reading + 1 count)

Continuity test indication:

Continuous audible tone for test resistance : < 50Ω
Open circuit voltage : < 0.45V
Short circuit current : 130μ A typical
Overload protection : 600V (peak)

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TECHNICAL SPECIFICATIONS

Basic Technical Specification of Output

(applicable to temperature range from 18 to 28°C, 10% to 70% RH, within one year after calibration).

Function	Range	Set Range	Resolution	Accuracy	Remark
OHM	400.0Ω	0 to 400.0Ω	0.1Ω	0.5 + 4	1mA exciting current without accessory lead resistance
DC mV	100.0mV	-10.00mV to 10.00mV	0.01mV	0.5 + 4	Max. output current 5mA
DC V	5.0000V	-0.5000V to 5.5000V	0.1mV	0.2 + 4	Max. output current 5mA
FREQ	100.0Hz	1.0Hz to 110.0Hz	0.1Hz	0.2 + 2	Square-wave 50%
	1.000KHz	0.100KHz to 1.100KHz	10.0KHz	0.2 + 2	duty cycle ratio
	10.0KHz	1.0KHz to 11.0KHz	0.1KHz	0.2 + 4	5V p-p
XMT	-20.000mA	0 to -22.000mA	0.001mA	0.2 + 4	External power supply: 28V Max. load: 1kΩ at 20mA
DC mA	20.000mA	0 to 22.000mA	0.001mA	0.2 + 4	Internal power supply: 15V Max. load: 500Ω at 20mA
RTD	Pt100	-200.0 to 850.0°C	0.1°C	0.5 + 6	By using Pt 100-385 temperature
	Cu50	-50.0 to 150.0°C			Without accessory lead resistance
	R	-50 to 1760°C	1°C	0.5% + 3 (≤ 100) 0.5% + 2 (> 100)	By using ITS-90 temperature Note: The accuracy does not include the error of internal temperature compensation caused by a sensor
TC	S	-20 to 1760°C	0.1°C	0.5% + 20 (≤ -100) 0.5% + 10 (> - 100)	
	K	-200.0 to 1370.0°C			
	E	-200.0 to 1000.0°C			
	J	-200.0 to 200.0°C			
	T	-200.0 to 400.0°C			
	N	-200.0 to 1300.0°C			
	B	-40 to 1760°C	1°C	0.5% + 3 (≤ 600) 0.5% + 2 (>600)	

Maximum voltage applied between any output jack and earch ground : 30V DC

Fuse protection for output jacks: 63mA, 250V fast-blow fuse.

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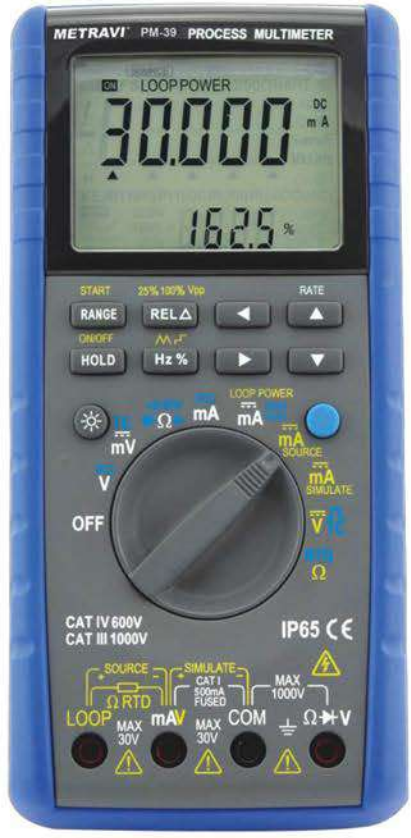
METRAVI®

DIGITAL PROCESS METER with HART LOOP RESISTANCE

PM-39

INTRODUCTION



This meter is an industrial, battery-powered instrument for field maintenance, an integration of a digital multi-meter and process signal sources.

It conforms to safety standards of 600V CAT.IV and 1000V CAT.III defined in IEC 61010-1Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use.

It is designed with a dual-color plastic enclosure of IP65, for application in harsh environment.

It has the following functions:

- **Measurement Functions:**

  Measurement of AC Voltage, DC Voltage, Ohm, Capacitance, DC Current, AC Current, On-Off, Diodes, Frequency, Thermocouples, Thermal Resistance;

  Data display and Retention;

  Measurement of relative values

- **Output Functions:**

  Output of DC voltage, Resistance, Frequency, Thermocouples, Thermal Resistance, and DC Current (constant output, manual stepping and SIMULATE);

- **Loop Inspection:** Supply power to 24V circuits and meanwhile measure current; with built - in 250Ω HART loop resistance.

TECHNICAL SPECIFICATION

SAFETY AND COMPLIANCES

Overload protection	V ~ COM terminal: AC1000V/10 seconds
	mAV terminal: 500mA/250V quick-acting fuse
Regulatory compliance	IEC61010-1 (CAT. 600V, CAT.1000V, pollution level)
Electromagnetic compatibility	Consistent with Group 1 and Class B of IEC61326-1
Surge protection	8kV(As per IEC61010.1-2001)
Authentication mark	CE
Quality standard	It is developed, designed and produced according to ISO 9001.

GENERAL CHARACTERISTICS

Display	Digit: 4-digit display (for current measurement and output: 5-digit display)
Display refreshing	Fast (F): 20 times/second; slow (S): 5 times/second
Temperature and humidity range for work	0 ~ 40 ºC, relative humidity ≤85% (without moisture condensation)
Temperature and humidity range for storage	-20 ºC ~ 60 ºC, relative humidity below 90% (without moisture condensation)
Temperature and humidity range for guaranteed precision	23 ± 5ºC, relative humidity below 75% (without moisture condensation)
Temperature factor	0.1× basic precision / °C (temperature range: <18°C or >28°C)
Application environment	Indoors, outdoors (non-watertight), altitude of 0 ~ 2000m
Indication of outrange	OL
On-Off / open-circuit test	Buzzer beeps indicate the resistance reading is lower than the threshold, or an open circuit
Battery type	Four 1.5V (LR6) alkaline batteries
Service life of batteries	When alkaline batteries are used, For measurement of all parameters: about 100 hours For DC current output (SIMULATE): about 50 hours For DC current output (SOURCE) 20mA (load of 1000Ω): about 2.5 hours
Low battery indication	It is indicated with a battery mark.
Automatic shutdown	The meter is automatically shut down after about 5 minutes of no operation. The time can be adjusted.
Warm-up time	10 minutes
Close meter calibration	No need for internal adjustment
Battery cover	For battery replacement, without influencing meter calibration
Size	206 (L)×97 (W)×60 (D)mm
Weight	About 500g
Calibrating period	1year

Detailed precision indexes

Precision is affirmed within one year after calibration, with working temperature of 23 ± 5ºC and relative humidity of 75%.

A precision range can be marked as:± ([reading%] + count) (Note: “count” means increased or decreased number at the lowest significance digit)

Detailed precision indexes for measurement

Function	Range	Measuring scope	Resolution	Precision
DC voltage DCV	50mV	-55.00mV ~ 55.00mV	0.01mV	0.1%+4
	500mV	-550.0mV ~ 550.0mV	0.1mV	0.1%+4
	5V	-5.500V ~ 5.500V	0.001V	0.1%+4
	50V	-55.00V ~ 55.00V	0.01V	0.1%+4
	500V	-550.0V ~ 550.0V	0.1V	0.1%+4
	1000V	-1000V ~ 1000V	1V	0.1%+4
AC voltage ACV	5V	0 ~ 5.500V	0.001V	0.5%+4(<400Hz) 5%+4(>400Hz)
	50V	0 ~ 55.00V	0.01V	0.5%+4
	500V	0 ~ 550.0V	0.1V	0.5%+4
	1000V	0V ~ 750V	1V	0.5%+4
OHM (Ω)	500Ω	0 ~ 550.0Ω	0.1Ω	0.1%+4
	5KΩ	0 ~ 5.500KΩ	0.001KΩ	0.1%+4
	50KΩ	0 ~ 55.00KΩ	0.01KΩ	0.1%+4
	500KΩ	0 ~ 550.0KΩ	0.1KΩ	0.5%+4
	5MΩ	0 ~ 5.500 MΩ	0.001MΩ	1%+4
	50MΩ	0 ~ 55.00 MΩ	0.01MΩ	1%+4
DC current DCI	50mA	-55.000mA ~ 55.000mA	0.001mA	0.1%+5
	500mA	-500.00mA ~ 500.00mA	0.01mA	0.1%+5
AC current ACI	50mA	0000mA ~ 55.000mA	0.001mA	0.5%+10
	500mA	0.00mA ~ 500.00mA	0.01mA	0.5%+10
Frequency FREQ	10Hz	0 ~ 9.9999Hz	0.0001Hz	0.02%+4
	100Hz	0 ~ 99.999Hz	0.001Hz	0.02%+4
	1000Hz	0 ~ 999.99Hz	0.01Hz	0.02%+4
	10kHz	0 ~ 9.9999kHz	0.0001kHz	0.02%+4
	100kHz	0 ~ 99.999kHz	0.001kHz	0.02%+4
	DUTY	10% ~ 90%	0.1%	1%
Diode	2V		0.001V	1%+10
On-off test	500Ω		0.1Ω	≤50ΩBB

Detailed precision indexes for measurement (*Contd.*)

Thermocouple TC	R	-40°C ~ 1760°C	1°C	0.5%+3°C (≤100) °C 0.5%+2°C(>100) °C
	S	-200°C ~ 1760°C		
	B	400°C ~ 1800°C		
	K	-200°C ~ 1350°C		0.5%+2°C (≤-100) °C 0.5%+1°C (>-100) °C
	E	-200°C ~ 700°C		
	J	-200°C ~ 950°C		
	T	-200°C ~ 400°C		
	N	-200°C ~ 1300°C		
Thermal resistance RTD	Cu50	-50°C ~ 150°C	1°C	0.5%+3°C
	Pt100	-200°C ~ 850°C		
Capacitance CAP	10nF	0 ~ 11.00nF	0.01nF	5%+50
	100nF	0 ~ 110.0nF	0.1nF	5%+5
	1000nF	0 ~ 1100nF	1nF	5%+5
	10μF	0 ~ 11.00μF	0.01uF	5%+5
	100μF	0 ~ 110.0μF	0.1uF	5%+5
	1000μF	0 ~ 1100μF	1uF	5%+5
	10mF	0 ~ 11.00mF	0.01mF	5%+50
	100mF	0 ~ 110.0mF	0.1mF	5%+50

1. AC measurement: True RMS, 20Hz ~ 1kHz, range of 10% ~ 110%;
2. The thermocouple measurement adopts the thermometric scale of ITS-90. The precision doesn't include errors in cold-end compensation, or influences of thermo-electrical potential.
3. The thermal resistance measurementadopts the thermometric scale of Pt100-385. The precision doesn't include errors due to lead resistance.
4. During frequency measurement, for signals with frequency lower than 3Hz, relevant readings will be zero.

Detailed precision indexes for output

Function	Range	Output setting scope	Resolution	Precision	Remark
DC voltage DCV	100mV	-10.00 ~ 110.00mV	10μV	0.2%+4	Maximum output current 0.5mA
	1000mV	-100.0 ~ 1100.0mV	100μV	0.2%+4	Maximum output current 2mA
	10V	-1.000 ~ 11.000V	1mV	0.2%+4	Maximum output current 5mA
DC current DCI	30mA	0.000 ~ 33.000mA	0.001mA	0.2%+4	20mA, maximum load1KΩ 30mA, maximum load600Ω
Simulated transmitter SIMULATE	-30mA	0.000 ~ -33.000mA	0.001mA		
Loop power LOOP	24V			±10%	Maximum output current 35mA
OHM	400Ω	0.0Ω ~ 400.0Ω	0.1Ω	0.2%+4	Excitation current: ±0.5 ~ 3mA When excitation current is ±0.1 ~ 0.5mA, an additional error of 0.1Ω should be taken into account. The precision doesn't include lead resistance.
Thermocouple TC	R	0°C ~ 1767°C	1°C	0.2%+3°C (≤100) 0.2%+2°C (>-100)	With the thermometric scale of ITS-90; The precision doesn't include errors in cold-end compensation
	S	0°C ~ 1767°C			
	B	600°C ~ 1820°C			
	K	-200.0°C ~ 1372.0°C	0.1°C	0.2%+2°C (≤-100) 0.2%+1°C (>-100)	
	E	-200.0°C ~ 1000.0°C			
	J	-200.0°C ~ 1200.0°C			
	T	-250.0°C ~ 400.0°C			
	N	-200.0°C ~ 1300.0°C			
Thermal resistance RTD	PT100	-0200.0 ~ 0850.0	0.1°C	0.2%+0.6°C	With the thermometric scale of Pt100-385; With excitation current of ±1mA The precision doesn't include lead resistance.
	Cu50	-050.0 ~ 150.0			
Frequency FREQ	100Hz	1.0Hz ~ 110.0Hz	0.1Hz	0.2%+2	Rectangular wave, duty cycle of 50% 1 ~ 11Vp-p
	1KHz	0.100KHz ~ 1.100KHz	1Hz	0.2%+2	
	10KHz	1.0KHz ~ 11.0KHz	0.1KHz	0.2%+2	

1.Load characteristics: inductive loads ≥0.01uF.

Input characteristics

Function position	Input impedance (nominal value)					
V	10MΩ, <100pF					
mV	>2.5GΩ					
mA	1Ω					
	Common-mode rejection ratio			Series-mode rejection ratio		
DCV, DCmV	80dB (dc to 50Hz / 60Hz/1KΩ)			40dB (50Hz / 60Hz)		
ACV, ACmV	60dB (dc to 50Hz / 60Hz/1KΩ)					
	Open-circuit voltage			Full-scale voltage		
Ohm	2.5V			2.2V		
Diode	< 3.5V			2.2V		
On-off	< 1V			500mV		
	Typical short-circuit current					
Ohm	500Ω	5KΩ	50KΩ	500KΩ	5MΩ	50MΩ
	0.8mA	0.2mA	20μA	2μA	0.2μA	< 0.1μA
Diode	0.2mA (typical value)					

ACCESSORIES

Standard accessories:

- One pair of testing wires (including analligator clip)
- One operating manual
- Four 1.5V alkaline cells (LR6)
- One 500mA/250V quick-acting fuse
- One soft portable bag

Optional accessories:

- One power adapter

METRAVI® | Process Clamp Meter | 771+

INTRODUCTION

The Milliamp Process Clamp Meter is a hand-held battery-operated clamp meter that measures 4-20 mA DC without breaking the electrical circuit. Unlike conventional clamp meters, the Meter features a remote jaw that is connected to the main body via extension cable.

FEATURES

- DC mA measurement (4-20mA) using a remotely connected clamp via extension cable
- Electronic zero
- Percentage span (0-100%)
- Hold
- Display backlight
- Auto power off
- Measurement spotlight LED

Percentage Span : The Percentage Span feature displays the span for 4 to 20 mA loops.

Electric Current	Percentage Span
2mA	-12.5%
3.2mA	-5.0%
3.6mA	-2.5%
4mA	0%
8mA	25%
12mA	50%
16mA	75%
20mA	100%

SPECIFICATIONS

Current Ranges	0mA... ±20.99mA	±21.0mA... ±99.9mA
Resolution	0.01mA	0.1mA
Accuracy	0.3% realding ±8 digits	1% reading ±8 digits
Clamp Jaw Dia	4.5mm	
Maximum Reading	±99.9mA	
Influence of Earth's Field	<0.25mA	
Battery	2 AA 1.5V Alkaline	
Working Hours	40 Hours	
Operating Temperature	-10 to 50°C	
Storage Temperature	-15 to 60°C	
Operating Humidity	<90% at <30°C / <75% at 30 to 50°C	
Operating Altitude	0 to 2000m	
IP Rating	IP 40	
Measurement Category	IEC 61010-1, 61010-2-032, CAT II 300V	
Agency Approvlas	CE	

Tasira
Instruments & Services

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