

MANUAL



Nagman®
HANDHELD PRESSURE CALIBRATORS
MPC SERIES

BRIEF PROFILE



An ISO 9001-2015 certified Instrumentation company (since 1972) serving Industries in India & Worldwide thro' the Manufacture & Supply of World-Class Calibration Instruments & Systems like Temperature, Pressure & Signal Calibrators, Black Body Calibration Sources, Pneumatic & Hydraulic Hand Pumps, Dead Weight & Comparison Testers, Calibration Test Benches, etc.

Dear User,

*Thank you for selecting **Nagman Handheld Pressure Calibrator – MPC Series** and becoming a proud owner of this Calibration Instrument.*

We have strived hard to ensure the accuracy of the contents of this manual. We would appreciate any suggestions/feedback to correct any errors noticed and to improve the quality of contents of this Manual

Specifications are subject to change owing to continuous development and we reserve rights to effect Changes / Modifications to this Manual.

Read the Instructions before starting to use the Product. Wishing you for a long association with us.

For any service related issues, please contact service@nagman.com

VERSION CONTROL

Version No.	Updated on	Updated by
V 1.1	01.09.2022	Nagman

CONTENTS

S.No.	Description	Page No.
1.	Introduction	5
2.	Specification.....	6
3.	Standard Delivery & Optional Accessories	7
4.	Parts Identification	8
5.	Connection Diagram	14
6.	Safety Instructions	15
7.	Operating Instructions	17
8.	Troubleshooting / Maintenance.....	23

1. INTRODUCTION

Nagman's Handheld Pressure Calibrators – MPC Series are Simple, easy to use, compact, lightweight & portable.

These Calibrators are designed for fast & traceable calibration and are supplied in ready to use condition.

It is important to choose the right media for your calibration task, so please make sure before calibration of an instrument that the pump media is compatible with the instrument.

Model	Description	Accuracy
MPC- P	Pneumatic Pressure Calibrator	$\pm 0.05\%$ F.S.
MPC- P+	Pneumatic Pressure Calibrator	$\pm 0.025\%$ F.S.
MPC- H	Hydraulic Pressure Calibrator	$\pm 0.05\%$ F.S.
MPC- H+	Hydraulic Pressure Calibrator	$\pm 0.025\%$ F.S.

2. SPECIFICATION

Ranges	Pneumatic : -0.9 to 2 / 10 / 20/ 35 / 40 / 60 bar Hydraulic : 0 to 100 / 200 / 400 / 700 / 1000 bar
Resolution	Minimum 5 digits F.S.
Accuracy	0.05% of F.S. / 0.025% of F.S.
Working Temperature with Temperature Compensation	0°C to 50°C / 32°F to 122°F
Overload Alarm	105% FS (Audio / Visual), indicated by visual and acoustic alarm, with the display showing "OVERLOAD"
Zero	Automatic by activation, if pressure is below 1% of full scale
Peak Detection	Freezes the Min & Max pressure in display
Input specifications	
mA	Range : 0 to 50 mA Resolution : 0.001 mA Accuracy : 0.025% of Full scale Connection : 4mm Test Sockets
Volt	Range : 0 to 30 Volt Resolution : 0.001 V Accuracy : 0.025% of Full scale Connection : 4mm Test Sockets
Switch test	Function : Open / Closed Meas. Current : Approx. 1 mA Connection : 4mm Test Sockets

Indicator Details

Ambient operating temperature range	15 – 40°C
Storage temperature	10 –50°C
Humidity range	40 – 75% RH
Display	7 Segment FSTN (Large) Display
A/D Converter	20 bit
Over range	If the input signal to the ADC exceeds the range the display will show the message “OVERRANGE”
Readout	Display up-date 2 times per second
Battery	7.4 V (Ni-MH)
Automatically switch off	If pressure is below 1% of Full scale and no key has been activated for 6 minutes the MPC switches off
Low Battery	Provided
Media Compatibility	All media compatible with 316 SS
Dimensions (H x W x D)	132 X 86 X 48 mm (Approx.- without rubber casing)
Weight	Approx. 600 gms
Connection	½” BSP (F)

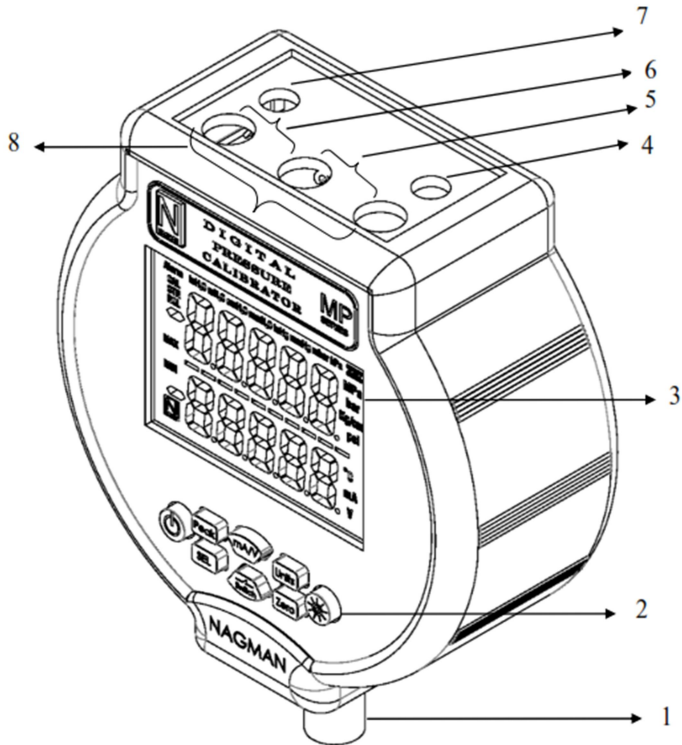
3. STANDARD DELIVERY & OPTIONAL ACCESSORIES

Description	Models ->	MPC P	MPC P+	MPC H	MPC H+
Accuracy (% of Full Scale)		0.05	0.025	0.05	0.025
Display Resolution - Minimum Digits		5	5	5	5
Pressure Indicator with Hand Pump		✓	✓	✓	✓
Test Leads & Seals Kit		✓	✓	✓	✓
Hose with End Fittings		✓	✓	✓	✓
Quick Connector		✓	✓	✓	✓
Carrying Case		✓	✓	✓	✓
Traceable Calibration Certificate		✓	✓	✓	✓
Instruction Manual		✓	✓	✓	✓
Set of Adaptors		✓	✓	✓	✓
Rechargeable Battery		✓	✓	✓	✓
External Charger		✓	✓	✓	✓
USB Interface		✓	✓	✓	✓
'Calpress' Calibration Software with Cable		★	✓	★	✓
Calibration Certificates in Accordance with our Scope as granted by NABL per ISO/IEC 17025:2017 Standards		★	✓	★	✓
Low Battery Indication		✓	✓	✓	✓
Auto Power Off		✓	✓	✓	✓
Switch Test capability & Zero Offset facility		✓	✓	✓	✓
Selectable Engineering Pressure Units		✓	✓	✓	✓
DC Current Measurement		✓	✓	✓	✓
DC Voltage Measurement		✓	✓	✓	✓
Loop Supply		✓	✓	✓	✓

✓ *Standard Delivery*

★ *Optional Item*

4. PARTS IDENTIFICATION



1. Pressure Inlet
2. Push Button keys
3. Display
4. Charger
5. Voltage (V) input terminals
6. Current (mA) input terminals
7. USB Interface
8. Switch Test

Function of Keys

Keypad & Display:

Keypad:

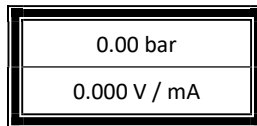


ON/OFF:

Switch ON or OFF the MP+ by activating the



After loading for 10 seconds the display will change to readout for Pressure and transmitter Input



ZERO :

Press the ZERO key for automatic zero adjustment. The Zero adjustment also includes an internal hardware calibration.

Unit:

There are 12 standard pressure units in MP Calibrator. The following table explains the units and its resolution.

Pressure / Engineering Units – Resolution - **Pneumatic :**

Range (bar)	inH ₂ O	mH ₂ O	cmH ₂ O	mmH ₂ O	inHg	mmHg
2	0.01	0.001	0.1	1	0.01	0.1
10	0.1	0.01	1	--	0.01	0.1
20	0.1	0.01	1	--	0.01	1
35	1	0.01	1	--	0.1	1
40	1	0.01	1	--	0.1	1
60	1	0.01	1	--	0.1	1

Range (bar)	Mbar	kPa	Mpa	Bar	2 Kg/cm	psi
2	0.1	0.01	--	0.0001	0.0001	0.001
10	1	0.1	0.0001	0.001	0.001	0.01
20	1	0.1	0.0001	0.001	0.001	0.01
35	1	0.1	0.0001	0.001	0.001	0.01
40	1	0.1	0.0001	0.001	0.001	0.01
60	1	0.1	0.0001	0.001	0.001	0.01

Pressure / Engineering Units – Resolution – **Hydraulic :**

Range (bar)	inH ₂ O	mH ₂ O	cmH ₂ O	mmH ₂ O	inHg	mmHg
70	1	0.01	1	--	0.1	1
250	--	0.1	--	--	0.1	--
350	--	0.1	--	--	1	--
700	--	0.1	--	--	1	--
1000	--	1	--	--	1	--

Range (bar)	mbar	kPa	Mpa	Bar	2 Kg/cm	psi
70	1	0.1	0.001	0.01	0.01	0.1
250	--	1	0.001	0.01	0.01	0.1
350	--	1	0.001	0.01	0.01	0.1
700	--	1	0.001	0.01	0.01	1
1000	--	--	0.01	0.1	0.1	1

To get the particular unit Press UNIT key in the keypad until the particular unit shown in the display.

SEL:

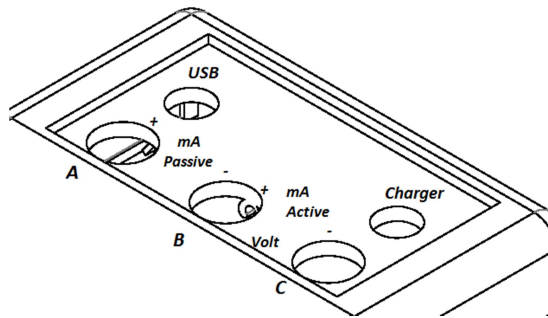
In single mode of module, "SEL" is not used. In Dual module it is used to select the particular mode.

mA/Volt:

- MP can measure the input signal from current or voltage transmitter and generates 24v DC to power the transmitters
- Range for the Current Transmitter is 4 to 20mA.
- mA Measurement ranges are 50 mA (Active Loop) & 25 mA (Passive Loop)
- Range for the Voltage Transmitter is 0 to 10vDC.



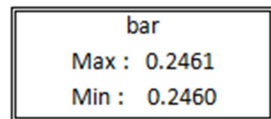
Do not connect Unit Tester Test with Potential above 10V to the input terminals.



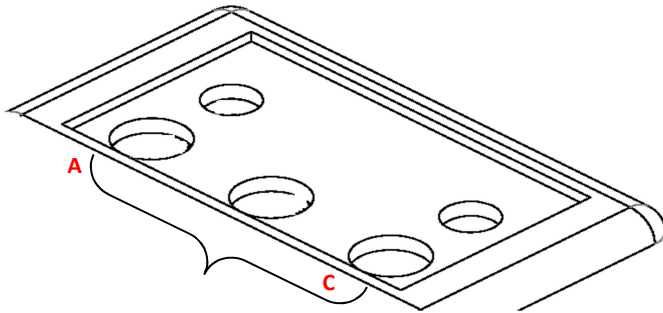
Mean Peak ON/OFF:

On pressing the key, Display shows the minimum and maximum pressure measured during the pressure measurement.

Eg. :



Switch Test :



When the switch test terminals are NC (Normally Closed), display shows "CLOSE"

Bar
1.365
CLOSE

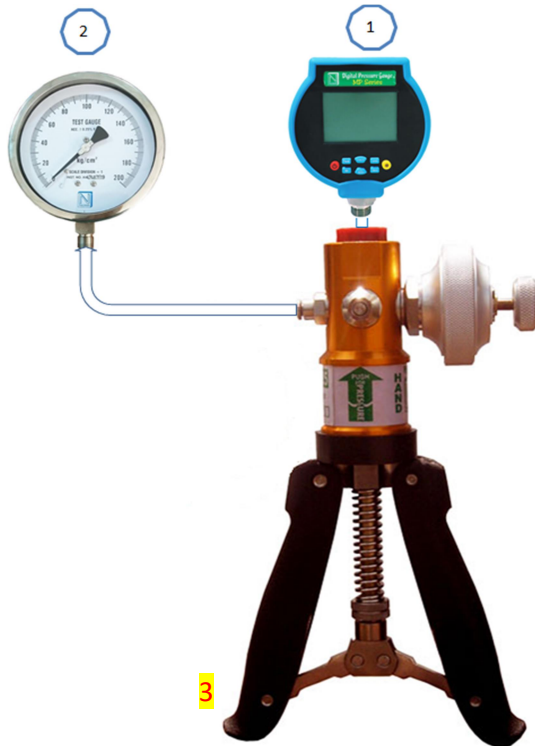
When the switch test terminals are NO (normally Open), display shows "OPEN"

Bar
0.2461
CLOSE

Power Supply :

- Rechargeable battery NI-MH – 7.4 volts
- The NI-MH rechargeable batteries last for long time operation and do not need maintenance.
- If the battery voltage drops, Recharging requires through charger port.





5. CONNECTION DIAGRAM



1. Master / Reference Measurement
2. Unit Under Test
3. Hand Pump

Note : Accessories viz. Gauge shown in photo are not part of standard supply.

6. SAFETY INSTRUCTIONS

S. No.	Symbol	Description
1		Read the user manual before operating the instrument.
2		Warning - conditions that may pose hazards to the user.
3		Caution-conditions that may damage the instrument.
4		Special Information



The following guidelines should always be observed when storing and transporting the calibrator. This will ensure that the instrument and the pump remain in good working condition.

Before switch off the calibrator release the pressure applied. Switch off the calibrator using the On/OFF Key. Turning off the calibrator during calibration process will not damage either the instrument or the pump.

The following routine must be observed before **the pump is** removed and the instrument switched off:

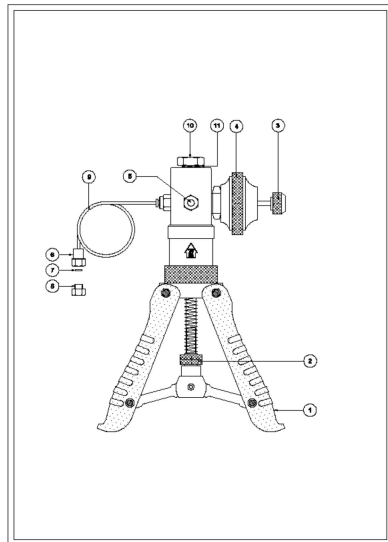
- The instrument under test must always be removed from the calibrator after use. There is risk that the instrument may become damage when we apply the pressure.
- The pump must be removed to avoid damage to the instrument if the calibrator is to be transported to long distances

7. OPERATING INSTRUCTIONS

Pneumatic Operated :

Use of calibrator with hand held pneumatic pressure pump

Ranges : -0.9 to 2 bar 25 bar 40 bar / 60 bar



Identification of Parts:

- 1) Pump Handles
- 2) Knurling thumb nut.
- 3) Pressure release valve.
- 4) Fine adjustment valve.
- 5) Pressure / Vacuum selector
- 6) quick-fit' connectors. 1/4" BSP (F) (swivel adaptor)
- 7) Nylon Washer 1/4"
- 8) Plastic Plug.
- 9) Flexible hose to item under test.
- 10) Pressure port – 3/8" BSP female connection to connect master instruments
- 11) Nylon Washer 3/8"

- Connect the Master / Test instrument using the appropriate adapter and seals to the pressure port at the end of the flexible hose (6) or directly to the body (10) using appropriate adaptor.
- Open the fine adjustment valve (4) in anticlockwise direction until red mark appears.
- Ensure the Pressure release valve (3) needle tightened in clock wise direction.
- Pressure/vacuum calibration can be selected by Pressure/Vacuum selector (5).
- Generate pressure/vacuum by squeezing handles (1) together. Ensure that the handles are fully squeezed together on each stroke to achieve maximum pressure/Vacuum output.
- The output pressure/vacuum can be adjusted with the fine adjustment valve (4) for a precise pressure/vacuum adjustment.
- After the calibration, completely release the pressure/vacuum by twist off the vent-valve (Release Valve) gradually in anticlockwise direction.
- Take out the master and the test instrument from the pump.

Media	Air
Compatibility	SS 316, Aluminium, brass and Lexan
Stabilization Time	1 Minute
Leakage Allowed	0.0024 bar / Minute for 2 bar 0.026 bar / Minute for 25 bar 0.048 bar / Minute for 40 bar 0.072 bar / Minute for 60 bar

Hydraulic Operated :

Use of calibrator with hand held hydraulic pressure pump

Range: 0 to 100 bar / 200 bar / 400 bar / 700 bar/ 1000 bar

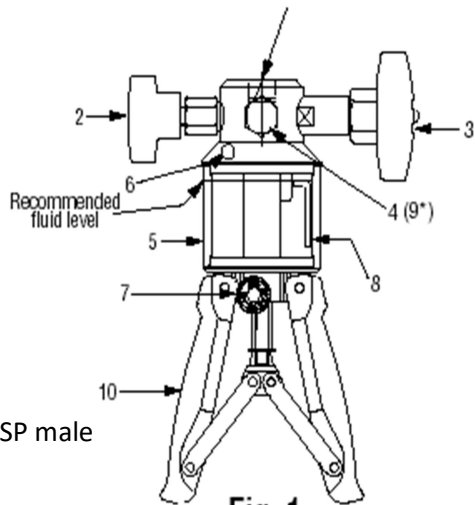


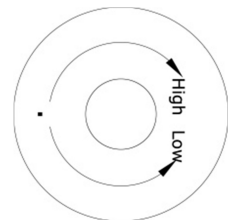
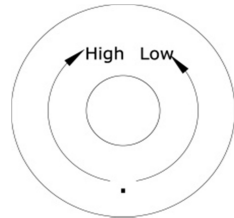
Fig. 1

Identification of Parts :

1. Connection for 1/4" BSP male adapter to master instrument. Eg. Digital/Analog Indicators.
2. Pressure release valve.
3. Fine control.
4. Front port: 1/4" BSP female.
5. Reservoir.
6. Reservoir filling plug / safety valve
7. Low / High pressure selector.
8. Fluid inlet tube.
9. Rear port: 1/4" BSP female reserved for valve pressure relief. (Do not open)
10. Pump Handles.

Operation Instructions:

- Remove reservoir filling plug (6) and fill reservoir (5) with the oil/water up to the marked level and replace plug.
- Turn Pressure Release Valve (2) to 2 or 3 turns in clockwise direction.
- Turn Fine Control (3) to 'mid-position' in anti-clockwise direction.
- Fully Squeeze handles (10) in and turn Low/High pressure selector (7) to Low position. The following figure shows the selector in Low position
- Connect the master instrument to pump through connection (1) using the appropriate seals and adaptors.
- Connect the test instrument to flexible hose/gauge adapter and attach to pump through the quick-fit connection (4).
- Turn pressure release valve fully in anti-clockwise direction.
- Squeeze the handles to generate approximate pressure.
- Stop squeezing the handles when the pressure reaches 150-200bar.
- Fully Squeeze handles 'in' and turn Low/High pressure selector (7) to High position. The following figure shows the selector in High position



- Generate pressure from 200 to 400 bar. (In HHP 1000, Generate pressure from 200-600 bar in High position)
- Generate the remaining pressure using fine control by turning it in clock-wise direction.
- Release the pressure using the fine control by turning it in ant-clockwise direction and then use the pressure release valve by turning one turn in clockwise direction.
-

Media	Oil (Option – Water)
Compatibility	SS 316, Aluminium, brass and Lexan
Stabilization Time	5 to 10 Minutes
Leakage Allowed	0.2 bar / Minute for 100 bar 0.5 bar / Minute for 200 bar 0.9 bar / Minute for 400 bar 1.8 bar / Minute for 700 bar & 1000 bar

Before using the pump :

- Check all system fittings and connections are tight and leak free
- Connect the Master gauge using the appropriate adapter and sealing to the pressure port at the end of the flexible hoses
- Screw the fine adjustment valve fully and then twists off 4- 6 turns.
- Screw the pressure release valve by fully tightening, to ensure good seal.
- Operate handle until the pressure is close to that finally required.

Wind the fine adjustment valve, is to increase or decrease the pressure until required pressure is reached

8. TROUBLESHOOTING / MAINTENANCE

MP pressure calibrators are manufactured for rugged field use and will normally cause no problems for user.

Due to many years of experience we hereby reveal a typical question and answers.

Failure	Cause	Action
The pressure is not stabilizing	The system may be leaking	Check all connections
	The compression of media includes air	You may have to adjust the pressure for few times, before the pressure is stable enough for calibration.
	Due to the pressure hose expansion	---
	Adiabatic and thermodynamic effects are present within all pressure systems.	The effect will disappear rapidly.

After Adjusting the Pressure, allow 5-10 minutes to pressure stabilization.

When you operate with High pressure the sensitivity of the system is high with regard to temperature movements.

Returning Instrument for Service

When returning the instrument to the manufacturer for service, please provide complete information about the problems faced for clear analysis of the problem. The calibrator should be returned in the original packing.

Nagman's liability ceases if :

- Parts are replaced / repaired using spare parts which are not identical to those recommended by the manufacturer.
- Non-original parts are used in any way when operating the instrument.

Nagman's liability is restricted to errors that originated from the factory.

For more details, write to :

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