

PDR1000

Digital Pressure Gauge

Users Manual

V. 20240131



Table of Contents

1. General Introduction	3
2. Abbreviations & Initials	4
3. Introduction	4
3.1 Specification	5
3.2 Order Information	6
3.3 Front / Back panel	6
4. Operation	9
4.1 Key Operation	9
4.1.1 Power On	9
4.1.2 PEAK	9
4.1.3 UNIT	9
4.1.4 ZERO	9
4.1.5 Back Light	10
4.2 Menu/Function Select	10
4.2.1 Alarm	10
4.2.2 Pressure Switch Test	12
4.2.3 Calibration	15
4.2.4 Baud Rate	16
4.2.5 RS232 Communication	17
4.2.6 Auto Power Off	19
4.2.7 Data Logger	20
4.2.8 Storage Data Clear	22
4.2.9 End	22
5. Maintenance Adjustments and Calibration	23
5.1 Zero Adjustment	23
5.2 Pressure Calibration	23
5.3 Analog Output Calibration	23
6. Troubleshooting	24
7. Appendix	25
7.1. Warranty Statement	25
7.2. Accessory	25
7.3. Table of pressure unit conversion	26

1. General Introduction

This manual is intended to provide the user with the basic information necessary to operate a PDR1000 (Digital Pressure Gauge). It also includes a great deal of additional information provided to allow you to optimize PDR1000 use and take full advantage of its many features and functions.

Manual Conventions



"Caution" is used in throughout the manual to identify conditions or actions that could cause harm to the PDR1000 or user of the PDR1000.



"Note" is used throughout the manual to identify operating and applications advice and additional explanations.



High pressure liquids and gases are potentially hazardous. Energy stored in these liquids and gases can be released unexpectedly and with extreme force. High pressure systems should be assembled and operated only by authorized personnel who have been instructed in proper safety practices.

2. Abbreviations & Initials

Units & Words	Keys	Units & Words	Keys
kPa	kilopascal	a	absolute
MPa	megapascal	g	gauge
hPa	hectopascal	PEAK	peak
mbar	millibar	Hi	high
bar	bar	Lo	low
psi	pounds per square inch	MAX	maximum
mmH ₂ O	millimeter of water	MIN	minimum
mmHg	millimeter of mercury	Hold	Hold
inH ₂ O	inch of water	mA	Milliampere
inHg	inch of mercury	Alarm	
atm	atmosphere	V	Voltage
kgf/cm ²	kilogram force per square centimeter	REM	serial interface communication standard

3. Introduction

The PDR1000 Series Reference Digital Pressure Gauges (the Product) are high accuracy digital pressure test gauges. PDR1000 has best performance that can measure precision pressure from -100 kPa to 500 MPa without a separate external power supply in anytime any place, including on-site and laboratory. Also PDR1000 equipped solid and stylish aluminum outer casing for durability.

PDK produced PDR1000 with PDK's unique pressure calibration and production technology that has best performance in its class. PDR1000 is digital pressure gauge for precise pressure measurement and test with Built-in various features.

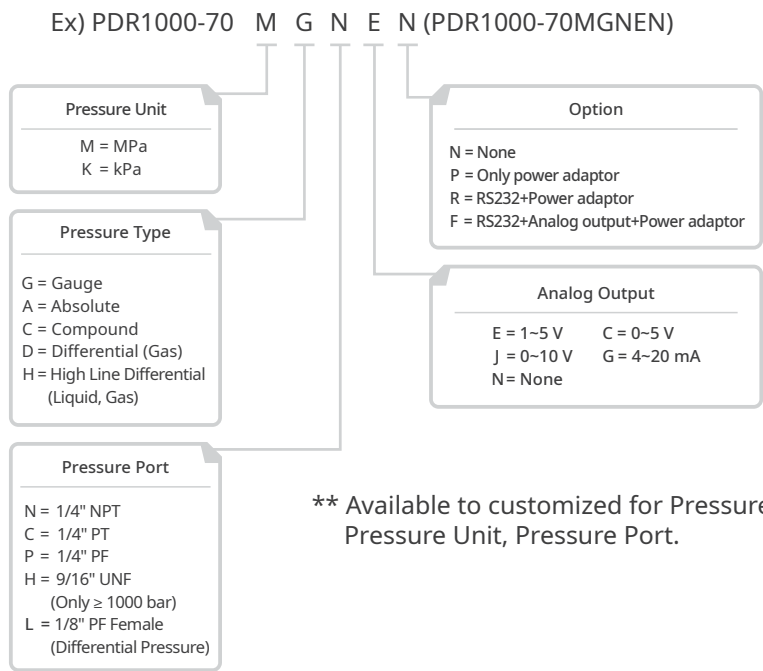
Simply use buttons on front panel to operate and select various functions and external power input section, analog output port (1 to 5 VDC), and communication port (RS232) and batteries change socket on rear panel.

Combine pressure comparator or hand pump for using pressure calibrator in field and calibration lab for simple pressure measurement and calibration provides an excellent solution.

3.1 Specification

Pressure Range	-100 kPa to 150 MPa	0 to 250 MPa	0 to 500 MPa
Accuracy	Gauge : $\pm 0.025\%$ F.S Absolute / Compound : $\pm 0.05\%$ F.S	$\pm 0.05\%$ F.S	$\pm 0.1\%$ F.S
	** Included Nonlinearity, Hysteresis, Repeatability, errors for -10 ~ 50 °C Temperature range		
Over Pressure limit	Refer to pressure type and range in catalog.		
Bust Pressure	Refer to pressure type and range in catalog.		
Pressure Unit	kPa, MPa, kgf/cm ² , psi, mbar, bar, inHg, inH ₂ O, mmH ₂ O, mmHg, atm		
Workable Temperature Range	-20 ~ 70 °C		
Storage Temperature Range	-30 ~ 80 °C		
Temperature Compensation Range	-10 ~ 50 °C		
RS232 Communication	Provide Commands in manual, Available to use private communication cable (Option)		
Power Requirement	AA Alkaline battery 3ea, Hours of battery use approximately 1000 hours External power supply(Option, 12~24 VDC),		
Media of Use	Gas & Liquid (Only Gas available below 100 kPa)		
Display	5 Digits, Backlight On/Off, Auto Off		
Sampling rate	4 Hz (Can be set up to 50 Hz) , Accuracy guarantees are based on 4 Hz		
Analog Output	1~5 VDC (Must use external power supply), 0.1% Accuracy (Option : 4~20 mA , 0~5 VDC , 0~10 VDC)		
Pressure Port	1/4" NPT M, 1/4" PF (G), 1/4" PT (R), 9/16" UNF Cone Threaded (HF4/AF250C, 100 MPa / 150 MPa)		
Weight	530 g		
Size	Dia. 110 (W) mm x 38 (D) mm x 150 (H) mm Included Pressure Port		
Data Logging	1 time / 1, 3, 5, 30, 60 second, Store Max 3000 data		

3.2 Order Information



3.3 Front / Back Panel

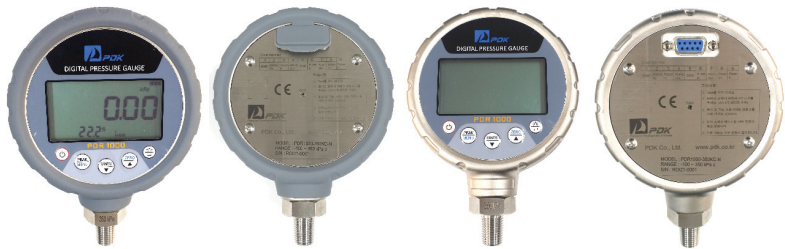


Photo 1. PDR1000 Front / Rear Panels Photo



Figure 1. Buttons

3.3.1 On / Off Key

PDR1000 Power On/Off key

3.3.2 PEAK/MENU Mode key

Peak shows maximum and minimum pressure value.

Menu makes selection and set for Alarm, Switch, CAL, Baud Rate, Auto Power Off, and Data Logger. Saved peak value will be clear when PDR1000 turns off.

3.3.3 UNITS / Analog out / Down Key

Change the pressure units and On/Off for Analog output.

In configure mode, push Down key to move backward through the menus.

(Analog output function is only available when external power supply used)

3.3.4 ZERO / Up Key

Zeroing pressure offset value.

Pressure Switch On/Off, Peak value will be clear when Peak mode.

In configure mode, push Up key to move forward through the menus.



3.3.5 Back Light / Enter Key

Backlight On/Off
Use Enter key to set up the Menu.

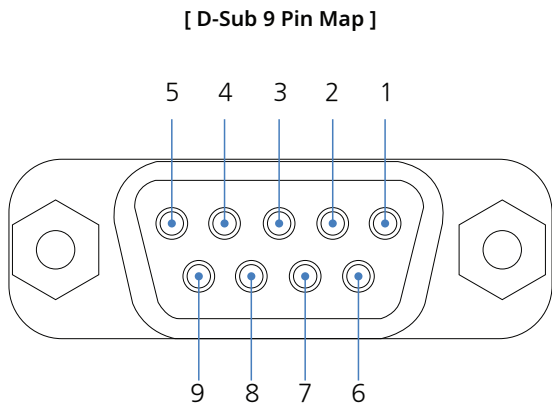


Figure 2. RS-232 Port

Pin No	Description	Note
1	GND	
2	RX	RS232
3	TX	
4	Analog Out+	Analog Output
5	GND	
6	Ext. Switch In	
7	Alarm Out	
8	Ext. Power +	External Power
9	Ext. Power -	

Table 1. Pin outs

4. Operation

4.1 Key Operation

4.1.1 Power On



: Push POWER key on front panel to power on.



Screen at no pressurize or Zero set.

4.1.2 PEAK / MENU



: Peak shows maximum and minimum pressurized value on PDR1000.

Push PEAK/MENU key indicates **Hi** for maximum pressurized value.

Push PEAK/MENU key again, indicates **Lo** for minimum pressurized value.

Push PEAK/MENU key again, return to the current pressure value.

4.1.3 UNITS



: This function can change engineering units on PDR1000.

When push UNIT key engineering units will change as following steps.

MPa → mbar → bar → inH₂O → mmH₂O → inHg → mmHg → kgf/cm² → atm
→ psi → kPa → MPa

To set Analog Out function, push UNIT key for 2 seconds.

(It only operates when external power supply connected)

4.1.4 ZERO



: This function is zeroing the PDR1000.

For Gauge mode push ZERO key for 2 seconds under normal atmosphere condition. For the

Absolute mode, make vacuum state (under 1×10^{-2} torr) then ZERO key for 2 seconds to zeros the display. Zero key can clear the Peak Hi Low values when Peak mode. Also it can select the set up when Pressure Switch mode.

4.1.5 Back Light / Enter

 : Push to turn on the backlight. Push again to turn off the backlight.

Push Enter key for 2 seconds to start or stop for Data Logger function.
To set Data Logger function, turn on the Data Logger function on configuration menu.

4.2 Menu/Function Select

Push PEAK/MENU key for 2 seconds to go to setup and configuration menus.
Push power key to go to End Menu or Push PEAK/MENU key to set other function settings after Menu function sets.
Analog out, Alarm : These function must need external power supply to operate.

4.2.1 Alarm

Alarm function must need external power supply. (Figure 3 reference)

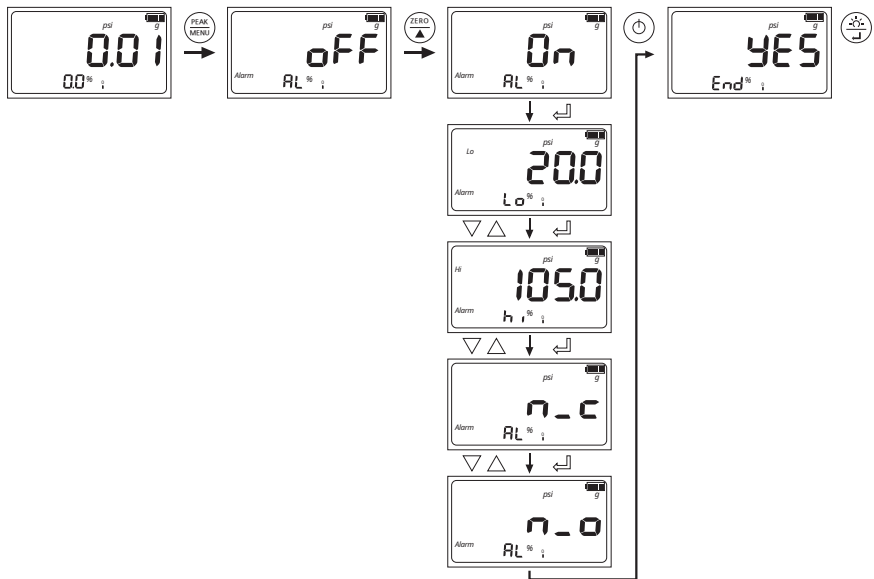
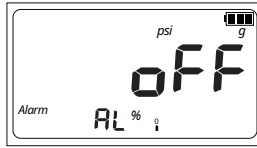
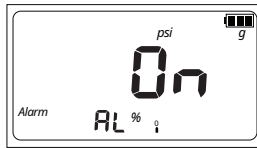


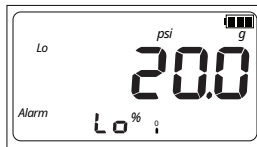
Figure 3. Alarm Setup flowchart



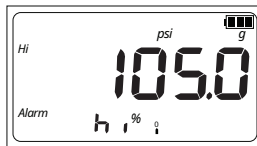
First screen of Alarm function page. Press UP key to turn Alarm On.



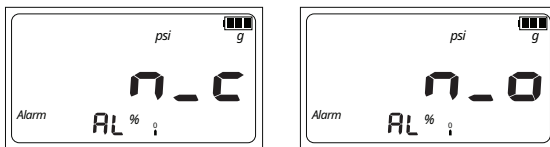
Alarm On screen on above. Press Enter key to save Alarm On status then Alarm Low value setup screen shows with blink.



Alarm Low value setup screen on above. Digits on above screen is percentage value of PDR1000 Full Scale. Push ZERO key and UNITS key to change percentage value. After push Enter key to save Alarm Low value, Alarm Hi value setup screen shows with blink.

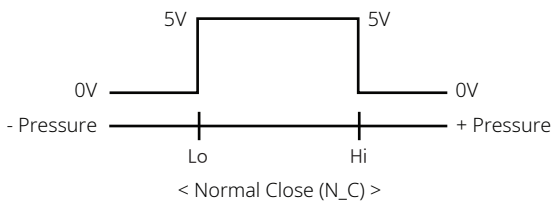
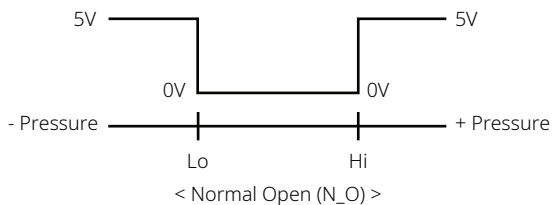


Alarm Hi value setup screen on above. Digits on above screen is percentage value of PDR1000 Full Scale. Push ZERO key and UNITS key to change percentage value. After push Enter key to save Alarm Hi value, Electric Contact Alarm Signal setup screen shows with blinking.



Electric Contact Alarm Signal setup screen on above. Push ZERO key to select Normal Close or Normal Open status set. Push Enter key to save Electric Contact Alarm Signal setup.

< Electric Contact Alarm Signal operation mode >



4.2.2 Pressure Switch Test

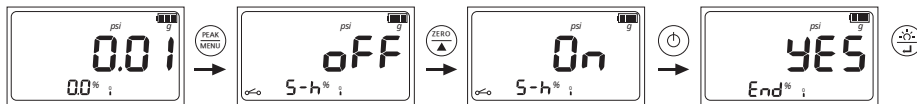
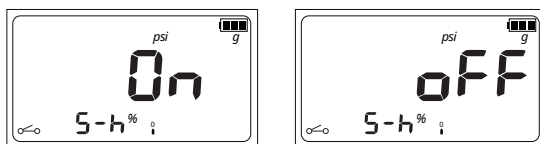


Figure 4. Switch test Setup flowchart

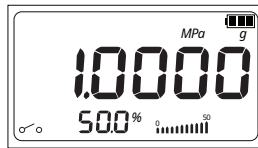


Pressure Switch Test function is that receive and indicate Electric contact signal (On/Off) from Pressure Switch.

Push PEAK/MENU key for 2 seconds to go to Menu function then select Switch Menu screen. Push ZERO key to set Switch On or Off. Push Enter key to save Switch status then escape the Switch Menu.

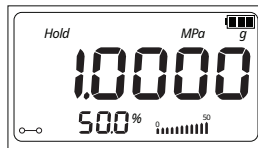
< Operation Mode >

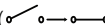
1) Operation for External Pressure Switch Off to On



Pressure Switch function “ON” screen on above.

If PDR1000 received external electric contact signal (Switch turns Off to On)



Switch icon will change from open to close () then pressure value will be hold status with “Hold” icon blinking. Even supply pressure changed, Pressure value will keep hold until push ZERO key. Pressure changes can check via percentage section on the bottom side of screen.

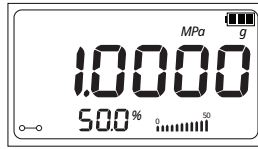
This case is that external electric contact open to close – in other words switch status changed from Off to On.

2) Operation for External Pressure Switch On to Off

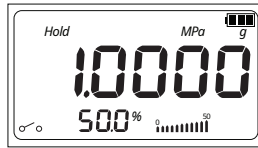
The other case is switch turns from On to Off.

If it connect with Switch “On” status, it will be “1)” operation because initial status of Switch function is open icon as ().

If push ZERO key, it will be same screen as on below screen.



If PDR1000 received external electric contact signal (Switch turns On to Off), Switch icon will change from close to open (— — — — —) then pressure value will be hold status with "Hold" icon blinking.



Even supply pressure changed, Pressure value will keep hold until push ZERO key. Pressure changes can be checked via percentage section on the bottom side of screen.

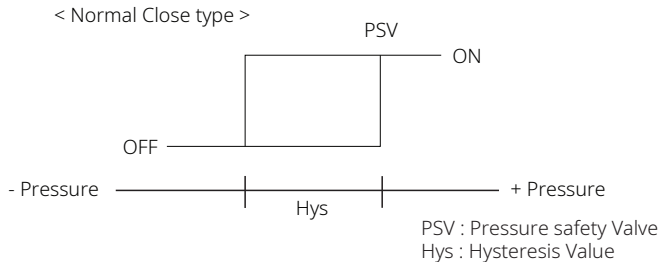
<Hysteresis function>

Apply Switch function operation with Switch "On" status then connect External Pressure Switch to PDR1000.

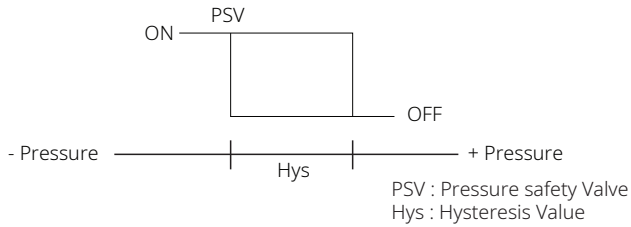
If pressure value reach the Pressure Switch set value, display pressure value will be hold then copy down the held pressure value.

Push ZERO key to release the held pressure value then depressurize, Electronic contact on Pressure Switch will reverse and locked up the display value.

Pressure Switch Hysteresis value is difference between when pressurize then electronic contact changed and when depressurize then electronic contact changed.



< Normal Open type >



 **(Caution) Do not pressurize quickly during Pressure Switch Test.**

4.2.3 Calibration

Push PEAK/MENU key for 2 seconds to go to setup menu then push PEAK/MENU key 2 times to go to Calibration menu.



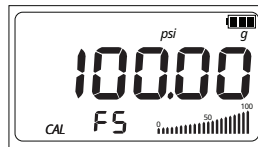
Figure 5. Calibration flowchart

Calibration function can adjust Zero and Full Scale value.



Zero Adjustment – Push ENTER key once to adjust the Zero value. If Zero set finished, display shows corrected Zero.

Zero adjustment should be adjusted within $\pm 10\%$ of full scale.



This function is Full Scale pressure value adjustment.

Push ENTER key once to adjust the Full Scale value. After Full Scale adjustment finished,

display shows current adjusted pressure value. Full Scale adjustment should be adjusted within $\pm 10\%$ of full scale value and displayed full scale value adjust with Pressure controller/calibrator or Piston gauge.

4.2.4 Baud Rate

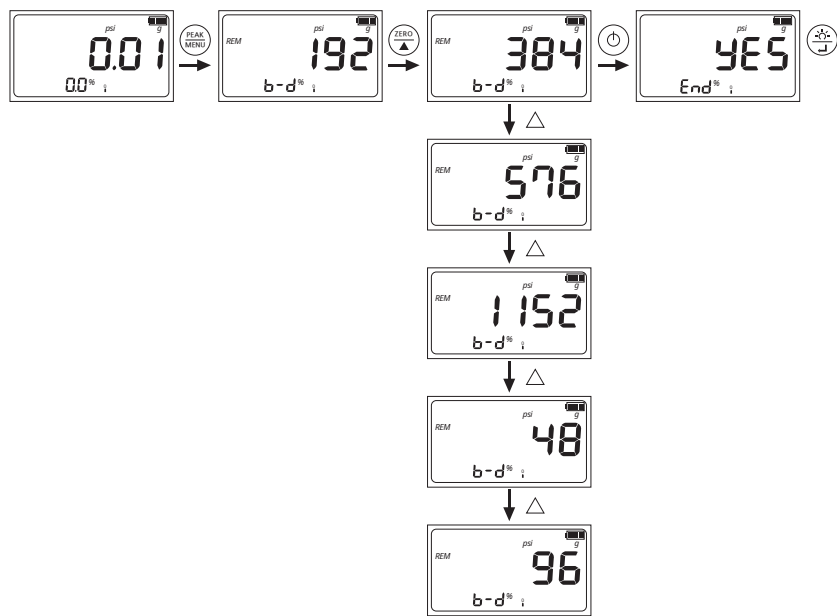
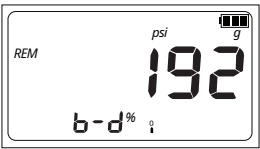


Figure 6. Baud Rate setup flowchart

This function can set Baud Rate for RS232 Communication.



Push PEAK/MENU key for 2 seconds to select Menu function. Push again PEAK/MENU key to select Baud Rate function then push ZERO key to choose Baud Rate.

4.2.5 RS232 Communication

<RS232 Communication Set>

Baud Rate : 19200	Data Bit Length : 8 bit
Stop Bit : 1 bit	Parity : None
Data flow control : N/A	Data Code : ASCII code

<Description>

BL : Blank	C1 : Command1
C2 : Command2	LF : Line Feed
CR : Carriage Return	STX : Start of text
D1 : Data	EOT : End of text

1. Data Request Configuration

5 Byte	1 Byte	3 Byte	1 Byte	4~6 Byte	1 Byte
ID	BL	C1	BL	C2	LF

2. Data Response Configuration

1 Byte	5 Byte		1 Byte	1 Byte	1 Byte
STX	ID	D1	CR	LF	EOT
ID will shows as [xxx], D1 has up to 25 Bytes of output data.					

3. Data Indication

5 Byte	1 Byte	3 Byte	1 Byte	4 Byte	1 Byte
ID	BL	C1	BL	C2	CR
[001]		GET		INFO	CR

< Response Example >

[001] ID NO : [001]
Model Name : Jain- 2 KD
Serial_No. : 2020G01-0001
Sensor Range : -2.0 ~ 2.0 K{ETX}

4. Continuous sample Pressure value, Temperature value

5 Byte	1 Byte	3 Byte	1 Byte	6 Byte	1 Byte
ID	BL	C1	BL	C2	CR
[001]		GET		MDAUTO	CR

< Response Example >
 [001] P = -0.00136, T = 24.95
 [001] P = -0.00136, T = 24.95
 [001] P = -0.00132, T = 24.95
 [001] P = -0.00126, T = 24.95

5. Sample one Pressure value, one Temperature value

5 Byte	1 Byte	3 Byte	1 Byte	6 Byte	1 Byte
ID	BL	C1	BL	C2	CR
[001]		GET		MDMANU	CR

< Response Example >
 [001] GET MANU
 [001] P = -0.00136, T = 0.00,
 [001] GET MANU
 [001] P = -0.00122, T = 0.00,
 [001] GET MANU
 [001] P = -0.00115, T = 0.00,

6. Data Logger function

5 Byte	1 Byte	3 Byte	1 Byte	6 Byte	1 Byte
ID	BL	C1	BL	C2	CR
[001]		GET		LOGALL	CR

4.2.6 Auto Power Off

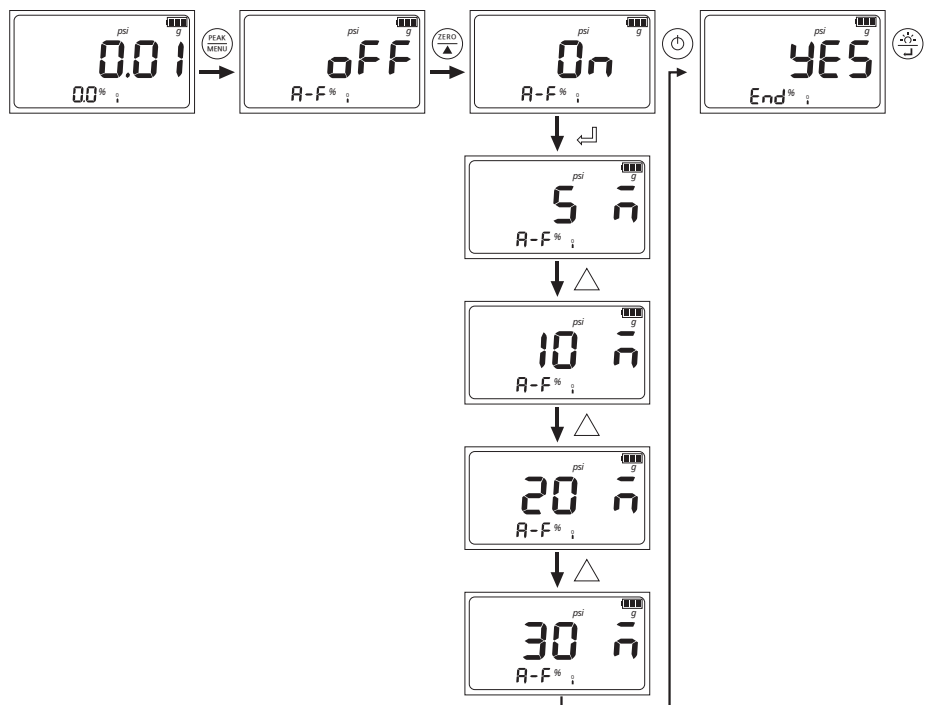


Figure 7. Auto Power Off setup flowchart

Auto Power Off function can set Auto Off. This function can use after Auto Power Off function on. Choose one of 5 min, 10 min, 20 min, and 30 minutes.

Push PEAK/MENU key for 2 seconds to select Menu function then push PEAK/MENU key to choose Auto Power Off function. Push ZERO key to set the necessary interval. Default Auto Power Off time set is 10 minutes.

4.2.7 Data Logger

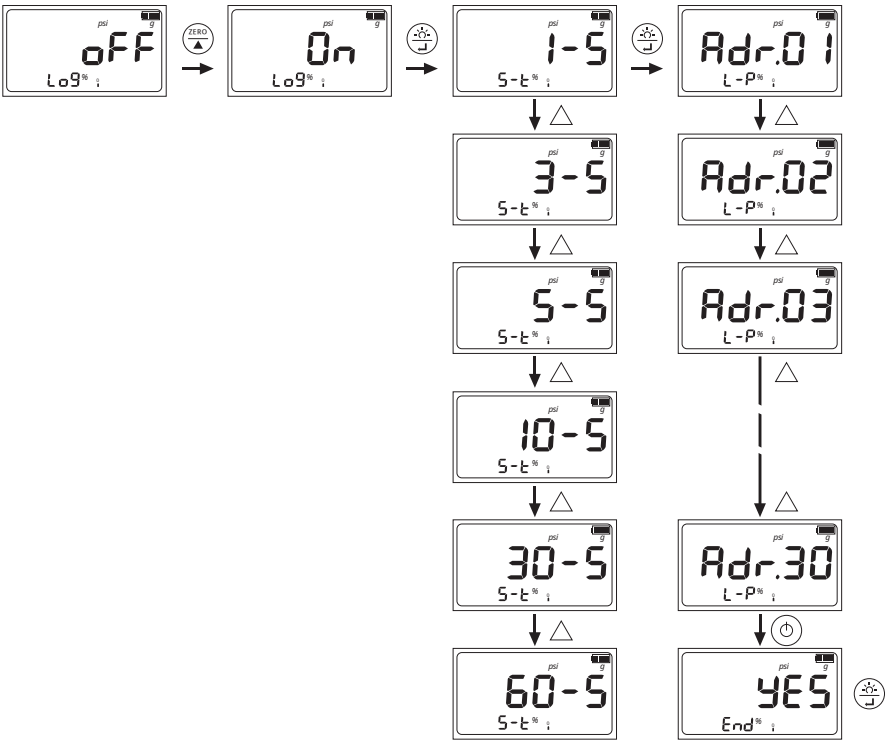
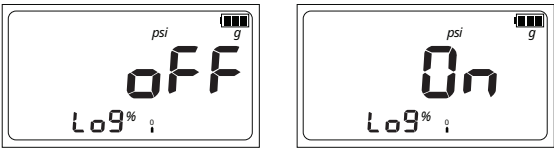
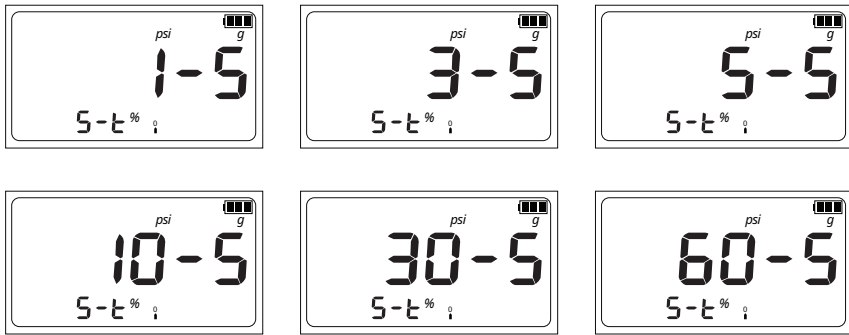


Figure 8. Data logger setup flowchart

Push PEAK/MENU key for 2 seconds to select Menu function.
Push PEAK/MENU key to select Data Logger function.
Push ZERO key to set Data Logger function.



Push ENTER key to save Data Logger status.
Push ENTER key to go to next Menu when Data Logger off, push ENTER key to set Data Logger function save and time mode when Data Logger On.



Push ZERO key to save Data Logger Data save time.

Select Data save time and push ENTER key to save then go to Data save page.



Figure 9. Data storage address set up

Long push ZERO key to select start page when Data Logger function data save. It can choose page 1 to page 30. Choose and select Data save page then push ENTER key to save.

To set rest of Menu function, push PEAK/MENU key again to set other various functions. Data Logger function can save 100 sample data per page.

Data saved value are average and max.

Push PEAK/MENU key a few times to select End Menu or push POWER key to select End Menu. After Menu sets then use Logger function, push ENTER key to 2 seconds then display shows "Log" with blinking.

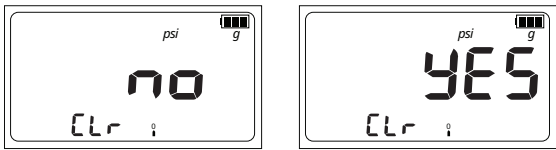
At this moment, unable to use RS232 Communication because PDR1000 is saving pressure value at the same time.

Push ENTER key for 2 seconds to stop Data Logger function.

Available to check the data via RS232 Communication.

4.2.8 Storage Data Clear

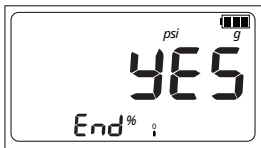
Push PEAK/MENU key for 2 seconds to select Menu.
Push PEAK/MENU key to select Data Clear function. Push ZERO to Data clear or not.



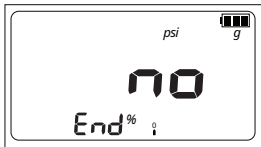
This function is erase saved data on EPROM.

4.2.8 End

This function is save all of Menu.



This is last function to activate and store for each configured setting.
Push ENTER key to save all of function.



If user do not want to save functions of menu or change and back to menu, push ZERO key and select No at the End Menu then push ENTER key to back to Menu.

5. Maintenance Adjustments and Calibration

5.1 Zero Adjustment

Using PDR1000 for a long time, it occurs Zero point change because of yearly variation for pressure sensor and PCB components or other environmental condition.

If user wants to set Zero, use Calibration Zero function on CAL Function.

5.2 Pressure Calibration

PDR1000 is reference pressure measuring gauge.

It needs calibration by authorized organization every year if user wants to maintain PDR1000 guaranteed accuracy.

Change the slope value with calibration function to changed pressure correction for PDR1000.

5.3 Analog Output Calibration

D-SUB terminal on back side of PDR1000 has various analog output for 0 ~ Full Scale pressure value. If output became incorrect because of long time use, calibration output via RS232 communication program is possible.

6. Troubleshooting

SYMPTOM	PROBABLE CAUSE	SOLUTION
Will not power up	Low Battery	Change Battery
	Poor Power Board	Contact to PDK
	Poor Main Board	Contact to PDK
	Poor Display Board	Contact to PDK
Pressure value goes down	Poor pressure tube	Change tube, leak check
	Poor Sensor	Contact to PDK
Poor pressure measure	Peak	Check Peak
	Poor Main Board	Contact to PDK
	Poor Sensor Board	Contact to PDK
	Poor Sensor	Contact to PDK
	Poor external equipment	
Key does not work	Poor Membrane Switch	Contact to PDK
	Poor Main Board	Contact to PDK
	Poor Key Cable	Contact to PDK
	Poor external equipment	Contact to PDK
LCD does not show	Poor LCD Module	Contact to PDK
	Poor LCD Cable	Contact to PDK
	Poor external equipment	Contact to PDK



PDR1000 is reference pressure gauge with high technology.

PDK does not recommend to user open the case to solve the PDR1000 problem.

PDK does not guarantee when PDR1000 got damage with user open the case in PDR1000.

PDK recommends contacting/send PDR1000 to PDK for suitable and stable troubleshooting.

Also recommends using PDR1000 in normal stable condition specified by the manual.

7. Appendix

7.1 Warranty Statement

PDR1000 warranty period of quality is 3 years. PDK guarantee all of case of failure symptom except user's fault within 3 years. Even when warranty is expired, PDK will help our customer with minimum repair fee.

PDK Service Center (e-mail : pdk@pdk.co.kr)

	Address	Contact
PDK Co., Ltd.	10-6, Expo-ro 339beon-gil, Yuseong-gu, Daejeon, Korea 34122	Tel +82-42-862-6880 Fax +82-42-862-6881

7.2 Accessory

User Manual 1 pcs

7.3 Table of pressure unit conversion

unit	atm	MPa	hPa	bar	psi	kgf/cm ²	mmHg	mmH ₂ O
atm	1	0.101 325	1 013.250	1.013 250	14.695 94	1.0332 27	760.000 0	10 332.27
MPa	9.869 239	1	10 000.00	10.000 00	145.037 7	10.197 16	7 500.622	101 971.6
hPa	0.000 987	0.000 100	1	0.0010 00	0.014 504	0.001 020	0.750 062	10.197 16
Bar	0.986 923	0.100 000	1 000.000	1	14.503 77	1.019 716	750.062 2	10 197.16
psi	0.068 046	0.006 895	68.947 57	0.068 948	1	0.070 307	51.714 97	703.069 6
kgf/cm ²	0.967 841	0.098 067	980.665 0	0.980 665	14.223 34	1	735.559 7	10 000.00
mmHg	0.001 316	0.133 322	1.333 223	0.001 333	0.019 337	0.001 360	1	13.595 09
mmH ₂ O	9.678 42E-05	9.806 65E-06	0.098 067	9.806 65E-05	0.001 422	0.000 100	51.714 97	1

- 📄 1 MPa = 1 000 kPa = 10 000 hPa
- 1 bar = 1 000 mbar
- 1 inHg = 25.4 mmHg (Torr)
- 1 inH₂O = 2.54 cmH₂O = 25.4 mmH₂O
- 1 mmH₂O of 4°C = 1 ÷ 0.998 23 mmH₂O of 20 °C
= 1.001 771 mmH₂O of 20 °C

- 📄 Density of water is 1.000 00 at 4°C, at 20°C is 0.998 23.