Additel 680 DIGITAL PRESSURE GAUGE

ADT 680 Digital Pressure Gauge

—————— User's Manual

[Version No.：1512V12]

$C\epsilon$

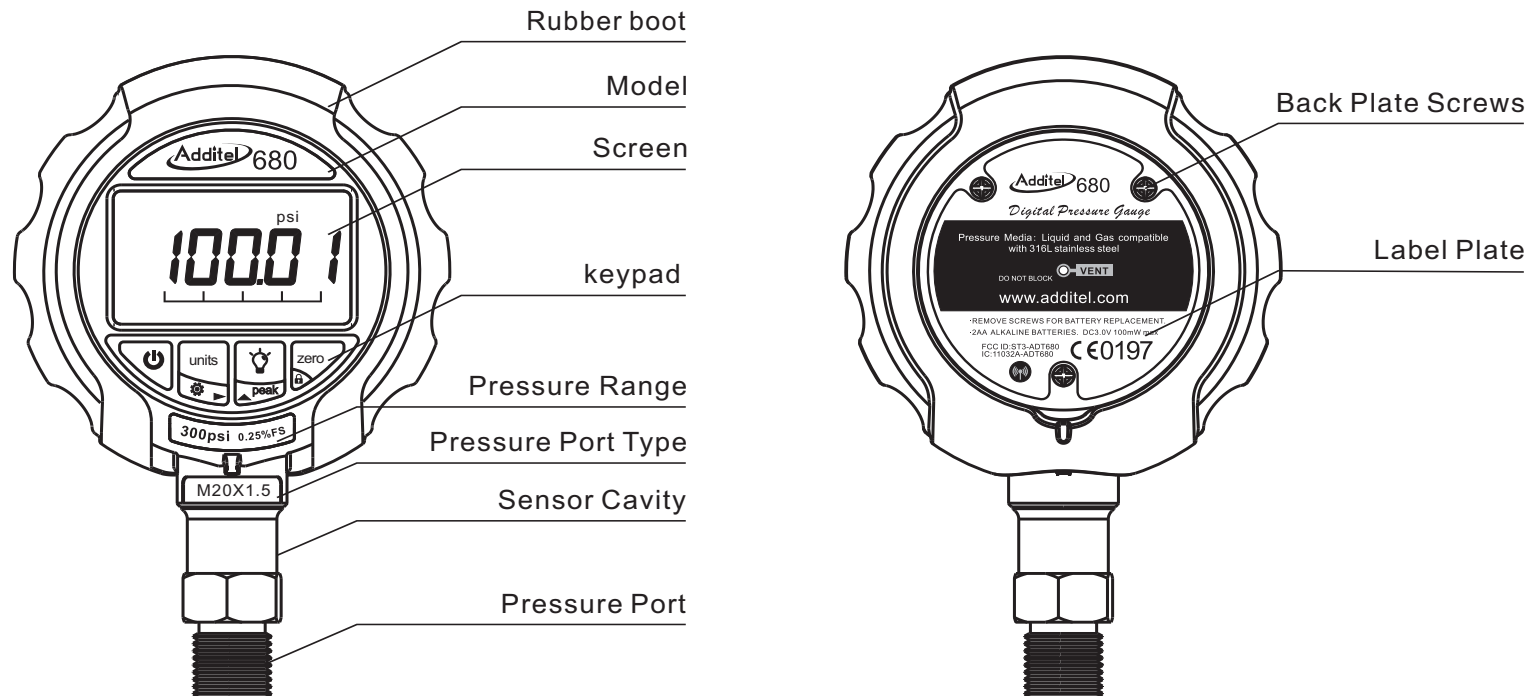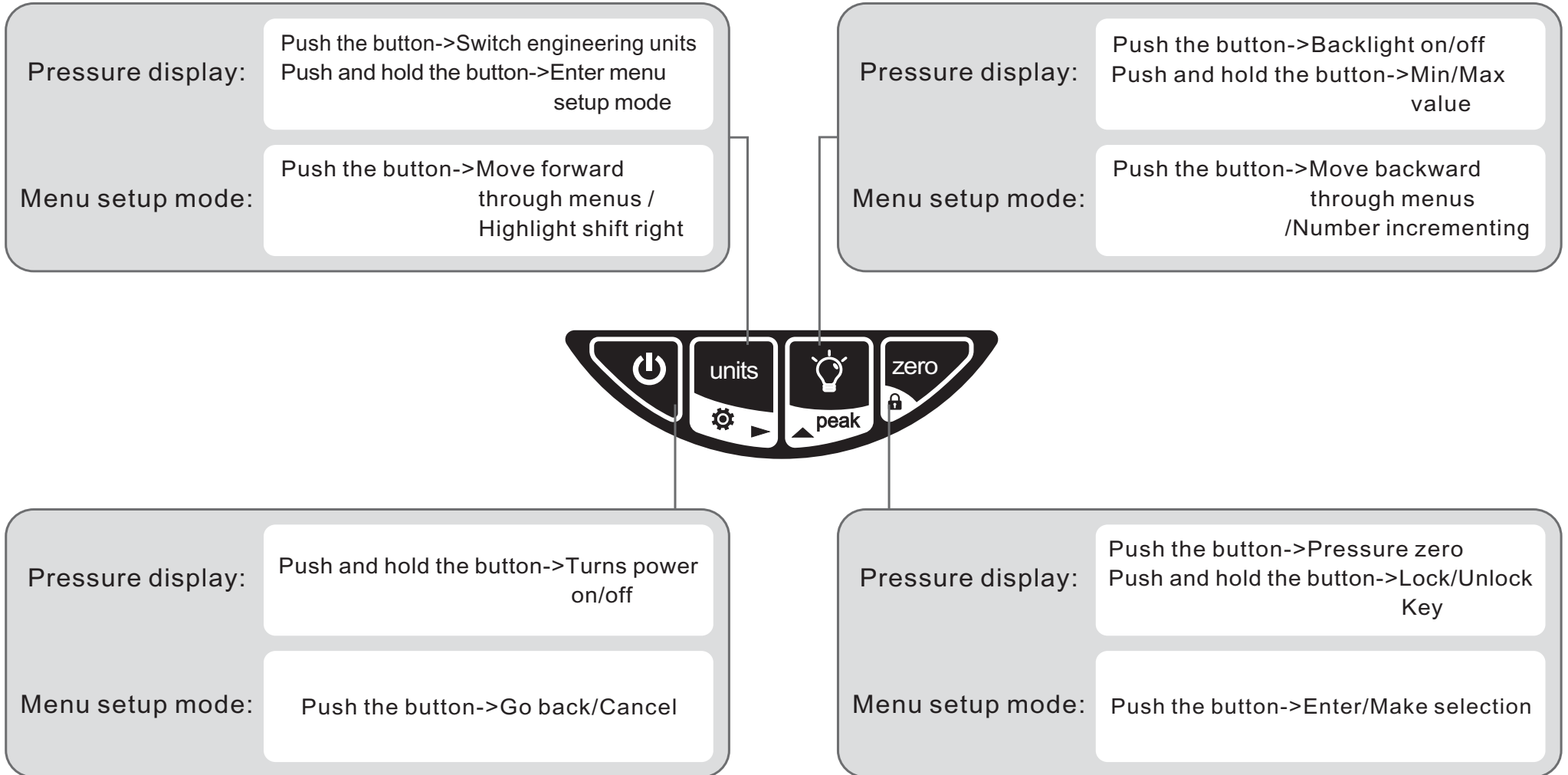# Additel Corporation

CONTENTS

1 Introduction

The ADT680 digital pressure gauge is a rugged wireless data logging pressure gauge that can log in real time, or data which can be stored and downloaded later via wireless communication. The compact industrial design and advanced technology makes the ADT680 as an ideal pressure measurement tool. The ADT680 combines a variety of accuracy levels with a robust IP67 water-and-dust proof casing. It can be used either as a pressure reference or an applications where high accuracy measurement is required.
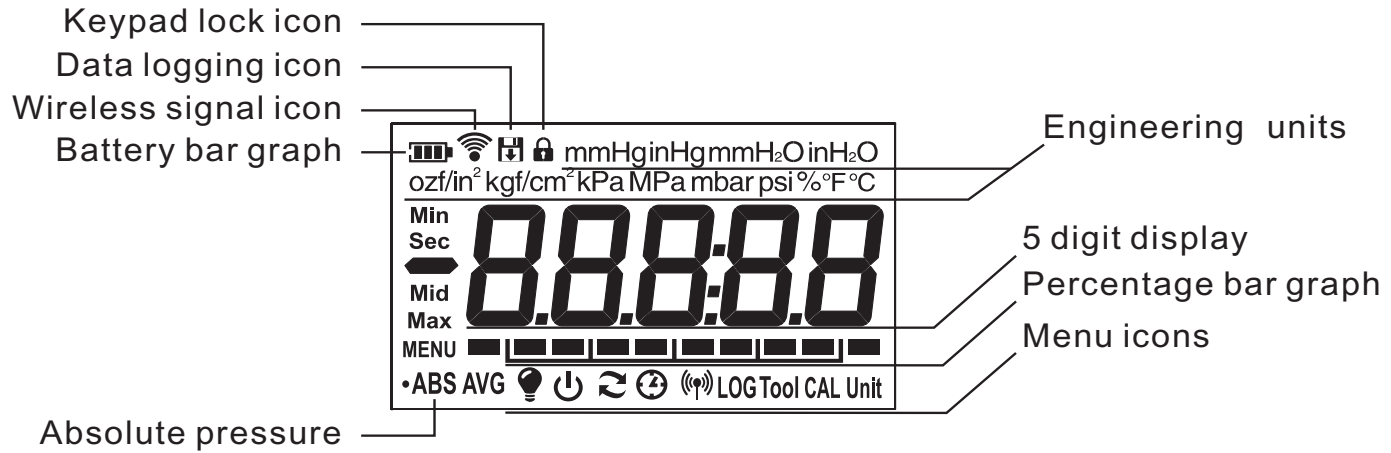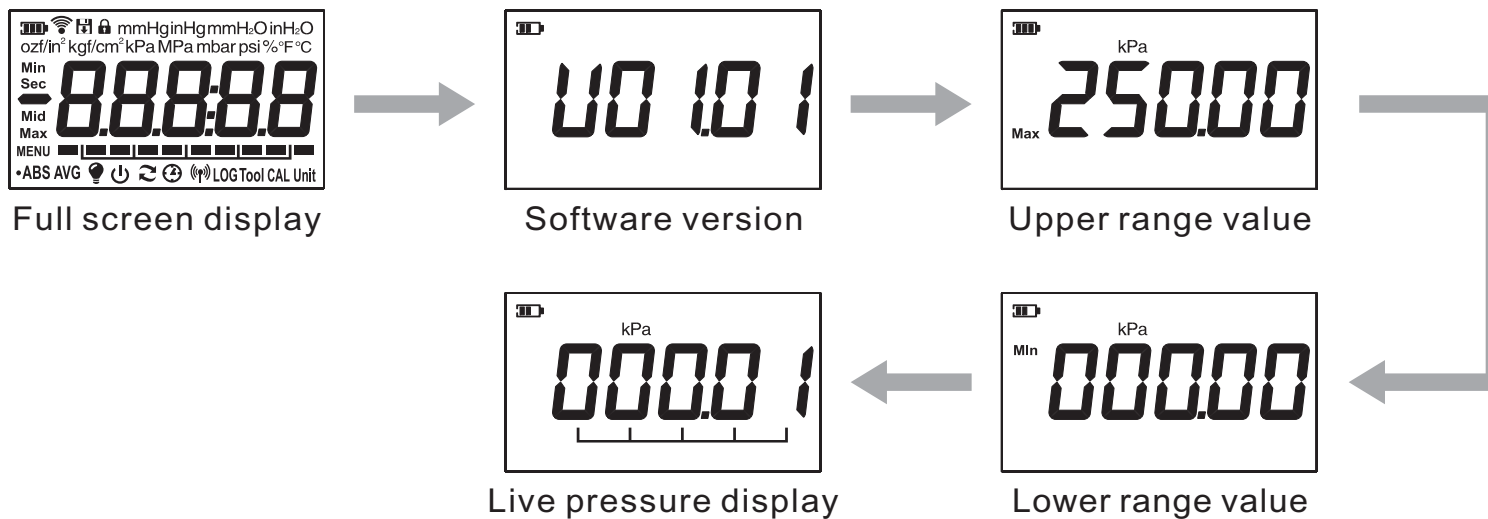
2 Basic structure

Rubber boot
Model
Screen
keypad
Pressure Range
Pressure Port Type
Sensor Cavity
Pressure Port

Back Plate Screws
Label Plate

3 keypad

Pressure display: Push the button->Switch engineering units
Push and hold the button->Enter menu setup mode

Menu setup mode: Push the button->Move forward through menus / Highlight shift right

Pressure display: Push the button->Backlight on/off
Push and hold the button->Min/Max value

Menu setup mode: Push the button->Move backward through menus /Number incrementing

units
peak
zero

Pressure display: Push and hold the button->Turns power on/off

Menu setup mode: Push the button->Go back/Cancel

Pressure display: Push the button->Pressure zero
Push and hold the button->Lock/Unlock Key

Menu setup mode: Push the button->Enter/Make selection

4 Display

Keypad lock icon

Data logging icon

Wireless signal icon

Battery bar graph

Engineering units

5 digit display

Percentage bar graph

Menu icons

Absolute pressure

mmHg inHg mmH$_2$O inH$_2$O ozf/in^2 kgf/cm^2 kPa MPa mbar psi % °F °C

Min Sec Mid Max MENU • ABS AVG LOG Tool CAL Unit

5 Start-up screen

Full screen display

Software version

U0 1.0 1

Upper range value

kPa
Max **250.00**

Live pressure display

kPa
000.0 1

Lower range value

kPa
MIn **000.00**

6 Menu setup and configuration

6.1 Menu structure

MENU ▮ ▮ ▮ ▮ ▮ ▯ ▯ ▯ ▯ ▯

AVG 💡 ⏻ ⇄ ⏱ ((•)) LOG Tool CAL Unit

RTC
- Year
- Month:day
- Hour:min
- Second

Rate
- 0.1
- 0.3 ⎤ Pressure reading interval
- 1.0 ⎦ (unit:second)
- 15

Auto off
- 15
- 30
- 45 ⎤ Delay time before auto off
- 60 ⎦ (unit:minute)
- 90
- 120
- OFF — Gauge does not auto off

Backlight time
- 15
- 30 ⎤ Backlight auto off time
- 45 ⎦ (unit:second)
- 60
- ON — Backlight does not auto off

Average measure
- 03
- 04 ⎤ Average filter
- ⋮ ⎦
- 10
- 1ORD — Low pass first order filter
  (only active for 0.1 readings/second)
- OFF — No filter

MENU

AVG LOG Tool CAL Unit

Extended units
- inH₂O(20℃)
- inH₂O(60℉)
- mmH₂O(20℃)
- mmH₂O(15℃)
- ftH₂O(60℉)
- ftH₂O(4℉)
- Set factor for custom units(Refer to specification)

Calibration

1.cal	Calibration(See calibration section on page 8)
	View overpressure records (Refer to specification)
2.c-00	Cancel/recover calibration data
3.clr	Cancel pressure zero
4.abs	Tare setting(Refer to specification) - Gauge
	Absolute pressure zeroing- Absolute
5.dp-0/1	Overpressure status: 1 means YES, 0 means NO.

Utilities

1.bat	Battery voltage
2.temp	Environment temperature(support ℃、℉)
3.leak	Pressure leak test
4.fact	Restore factory settings, password is "218"
5.az-1	Auto zero

Data logging

1.cap	Memory capacity status
2.send	Upload data
3.del	Delete all data, password is "218"
4.gap	Logging Interval (0001s-9999s)
5.ct-0/1	Keep the logging status after restart (1 means YES, 0 means NO)
6.off	Start/Stop logging

Wireless

1.off	Wireless on/off
2.chan	Wireless channel (CH-01~15)
3.addr	Device address (001~112)
4.ct-0/1	Keep the wireless status after restart (1 means YES, 0 means NO)

6.2 Menu operation

6.2.1 Enter /Return

Push and hold [units] button in the pressure display mode to enter menu setup mode.

Push [power] button in menu setup mode to return to previous menu.

Example:

Pressure display

Menu1
(Average measure)

kPa
000.01

[units] Push and hold →

05
MENU
AVG

Push

6.2.2 Switch menu item

Push [units] and [peak] button to move forward or backward through the menus:

MENU
AVG ☀ ⏻ ⇄ ⏱ ((•)) LOG Tool CAL Unit

Example:

Move menu1(Average measure) forward to menu2(Backlight setup)

MENU ▬▬▬▬▬▬▬▬▬▬▬▬
AVG

MENU ▬▬▬▬▬▬▬▬▬▬▬▬

Move menu1(Average measure) backward to menu10(Extended units)

MENU ▬▬▬▬▬▬▬▬▬▬
AVG

MENU ▬▬▬▬▬▬▬▬▬▬▬▬
Unit

6.2.3 Submenu setup

Push to access submenu setup, push or to view options, then push to select

an option, or push to recover former option.

Example:

Average measure

zero

zero
save

cancel

03
04
05
06
07
08
09
10
1ORD
OFF

The current option will blink

peak   units

6.2.4 Number inputting introduction

- units ☼ ►   Highlight shift right
- ☼ peak   If number incrementing exceeds the maximum display, it will return to 0
- zero 🔒   Confirm the inputted number
- ⏻   (ESC)Cancel the inputted number

If need to input minus sign "-", push and hold units ☼ ► button.

7 Calibration

It is recommended that the ADT680 be calibrated annually in a lab traceable to national standards. We recommend finding a lab that can offer uncertainties 4 times better than the accuracy of the gauge being tested. We also recommend that, in order to achieve the best calibration results and prior to calibrate the ADT680, it should be pressurized to full scale and back to zero three times.

7.1 Calibration conditions

Note: Please make sure during calibration the following conditions are met.

(1) Environment:Temperature: 20℃ ±2℃; Relative humidity: (45-75) %;

       Atmosphere pressure: (86~106) kPa.

(2) Equipment: Standard pressure source and indicator have a test uncertainty ratio (TUR) of 4:1 or better.

7.2 Calibration Points

(1) Single scale gauge: We recommend at least two pressure calibration points should be used when calibrating the 680 gauge. Usually at 0 and 100% of full scale(Vacuum gauge should use vacuum point).

(2) Compound pressure gauge: We recommend at least a three points calibration. Usually points will include low end vacuum point, 0 and 100% of full scale.

The calibration points can be changed to meet your requirements, only if it meets the following conditions:

(1) The first point should be smaller than the second point.

(2) The second point should be smaller than the third point.

7.3 Calibration Process

For a calibration example we will use a (0~100) kPa gauge.

(1) Access the calibration menu in Menu setup mode(refer to Menus operation section), Figure 1 will display on the screen. Next push [zero] button to enter Menu setup, Figure 2 will be displayed. Input password"218"(refer to Number inputting introduction section) as in Figure 3,and push [zero] button to continue, Figure 4 will be shown.
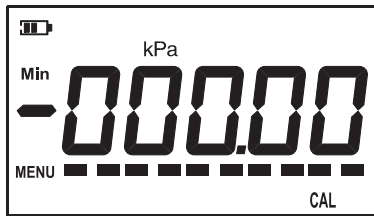
CAL.0	P-000	P-218	L CAL
Figure1	Figure2	Figure3	Figure4

(2) Select **L CAL** and push [zero] , the screen will display the lower range of this gauge as shown in Figure 5. The first digit will blink which allows the user to configure the calibration point by inputting the desired pressure value. If no adjustment is needed, just push [zero] to continue;
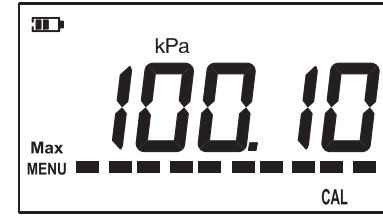
Flashing,input new calibration point
Figure5
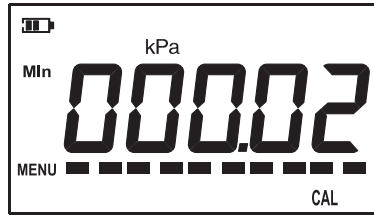
The actual pressure measurement value
Figure6
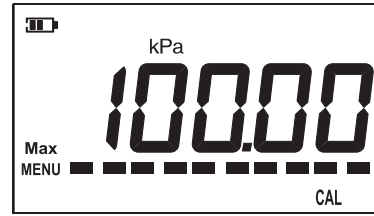
Flashing,input new calibration point
Figure7

The actual pressure measurement value
Figure8

(3)   To calibrate the lower range point: Use the pressure source to control the lower range pressure, for this example 0 kPa is the lower point. After the reading is stable, push [zero] to confirm, then the screen will prompt the user for the next calibration point, which in this example is 100kPa (the upper range), as shown in Figure 7. User can also change this calibration point by inputting the desired value. If there is no need to adjust, push [zero] to continue.

(4) To calibrate upper range point: Use the pressure source to control the upper range pressure, 100 kPa. After the reading is stable push [zero] to confirm, then the screen should be shown as in Figure 9, which means the calibration procedure is completed.

Remark: **To calibrate a compound pressure gauge**, **use almost the same procedures as the above**. **There is one more point need**. **When checking zero**, **the icon Mid will be displayed on the screen**.

7.4 Cancel Calibration

Access the second function $2C - 11$ of the calibration menu, as shown in Figure 9. Then push the button [zero], the screen should be shown as Figure10, which means the calibration has been canceled.

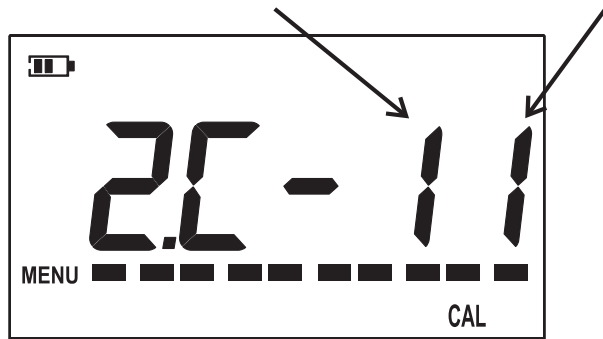Means have been calibrated   Means calibration take effect

Figure9

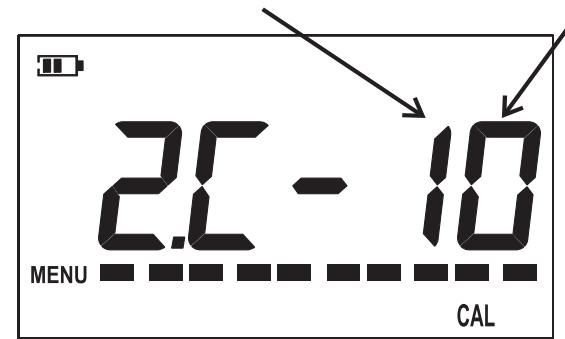Means have been calibrated   Means calibration has been canceled

Figure10

8 Troubleshooting

ERR1 displayed: Beyond zeroing range of 2%FS

ERR2 displayed: Sensor data out of limit, contact Additel Corporation

ERR3 displayed: Sensor damaged, contact Additel Corporation

9 Specifications

Pressure Ranges

Gauge Pressure

P/N	Pressure range (psi)[1]	Pressure range (bar)	Media[2]	Accuracy (%FS)	Burst Pressure
V15	-15	-1.0	G, L	0.05 (0.1, 0.25)	3X
GP15	15	1.0	G, L	0.05 (0.1, 0.25)	3X
GP30	30	2.0	G, L	0.05 (0.1, 0.25)	3X
GP100	100	7.0	G, L	0.05 (0.1, 0.25)	3X
GP300	300	20	G, L	0.05 (0.1, 0.25)	3X
GP500	500	35	G, L	0.05 (0.1, 0.25)	3X
GP1K	1,000	70	G, L	0.05 (0.1, 0.25)	3X
GP3K	3,000	200	G, L	0.05 (0.1, 0.25)	3X
GP5K	5,000	350	G, L	0.05 (0.1, 0.25)	3X
GP10K	10,000	700	G, L	0.05 (0.1, 0.25)	2X
GP15K	15,000	1,000	G, L	0.05 (0.1, 0.25)	2X
GP25K	20,000	1,600	G, L	0.1(0.25)	1.5X
GP30K	30,000	2,000	G, L	0.1(0.25)	1.5X
GP36K	36,000	2,500	G, L	0.1(0.25)	1.5X

Compound Pressure

P/N	Pressure range (psi)[1]	Pressure range (bar)	Media[2]	Accuracy (%FS)	Burst Pressure
CP15	15	1	G	0.05 (0.1, 0.25)	3X
CP30	-15 to 30	-1 to 2	G	0.05 (0.1, 0.25)	3X

Note: [1].Sealed gauge pressure for above 1,000 psi

[2].G=Gas,L=Liquid(please specify media type when placing order)

Performance	
Recommended calibration period	One year
Update rate	10/Sec、3/Sec (default)、1/Sec、1/15Sec
Operating temperature	-10℃~50℃ Guaranteed accuracy
Overload pressure	1.2X
Power Supply	
Battery	2 x AA alkaline (LR6) batteries Recommend: Duracell MX1500 、EnergizerE91、Panasonic LR6、GP 15AU
Battery life	10/Sec:1,500 Hours、3/Sec:3,000 Hours、1/Sec:6,000 Hours、1/15Sec:12,000 Hours
Rated Power	
Rated	3.0 VDC Imax=30 mA Pmax =90 mW
Material	
Wetting parts	Wetted surface: All wetted surfaces are 316L stainless steel with welded design for gauges ≤10,000 psi (no O-ring, thread tape, epoxy, or sealant on any part of the sensor assembly), and copper O-ring design for gauges > 10,000 psi.
Case	PC+ABS
Protecting cover	Silicone Rubber

Display	
LCD specification	FSTN-LCD,Visual scope 36 x 61 mm; Full 5 digit,15.2 mm High; 7-segment analog bargraph scaled to 0~100% of FS
Backlight	White
Wireless Communication(optional)	
Wireless frequency	2.4G ISM Bands, 20 meter range
Number of channels	15
Software	Additel/Land software available for free download at www.additel.com. Additel/Log II Wireless available for purchase.
Storage	
Storage capacity	140,000 records, recorded contents include time, pressure and temperature
Storage interval	1~9999Sec, user selectable
Certificates	
Certificates	CE R&TTE、FCC ID、IC ID
Protection level	IP67
Vibration	5g (20~2,000Hz)
Shock resistance	100g/11ms

Others	
Dimensions	Φ100 mm x 40 mm, total height: 157 mm (4" x 1.6" x 6.2")
Weight	500 g (1.1 lbs)
Fitting	1/4 NPT, 1/2 NPT, 1/4BSP, M20 1.5, autoclave (male or female)or custom-made
Additional functions	
Auto off	Disabled、 15、 30、 45、 60、 90、 120 minutes , user selectable.
Filtering	Averaging (3 to 10 samples) or low-pass first-order filter.
Engineering units	Pa, kPa, mPa, bar, mbar, psi, kgf/cm^2, mmH$_2$O, mmHg, inH$_2$O, inHg, ozf/in^2, %, ℃, ℉ Extend units: inH$_2$O(20℃), inH$_2$O(60℉), mmH$_2$O(20℃), mmH$_2$O(15℃), ftH$_2$O(60℉), ftH$_2$O(4℃) This allows users to set a multiplier factor to be multiplied by the kPa measured pressure. For example: 2 kPa=0.02 bar (2*0.01) , factor : 0.01 , a 2 kPa pressure will display as 0.02. (ADT680 can be set by the factory or via the Land/Wireless software))
Backlight duration	Disable auto off,15,30,45,60 seconds , user selectable
Max/Min data capture	Capture the Max and Min data during pressure measurement
Key lockout	To avoid mis-operations. When the gauge is in auto-storing status, buttons will be locked automatically.
Overpressure alarm	Display will flash over 120%FS
Battery voltage measurement	To measure and display the battery voltage. When the battery voltage is too low, gauge will be power-off automatically.

Additional functions	
Overpressure records	View the 5 most recent over pressure records by inputting pass word "888" in the Calibration menu, when screen is shown as Figure 2, Page10.
Leakage test	Detect pressure leakage over a period of time. The gauge will auto-record beginning pressure value, ending pressure value and leakage ΔP.
Factory reset	Reset all the settings back to factory default settings, except for the calibration parameter.
Automatic zeroing	Once automatic zeroing function is activated, the measured value is less than 0.01% of full scale, and this situation maintains more than10 seconds, the gauge will automatically zero.
Tare/Offset reading	This function can be used to subtract a constant value from the measured pressure. For example: If the tare or offset point is set to 50 psi, and the measured pressure is 80 psi, then 30 psi will be displayed.

10 Warning

● Remaining battery life is displayed, if the gauge automatically power off, please replace a new battery
● To prevent a dangerous pressure release, isolate and bleed the system before disconnecting a pressure connection.
● Do not change the any of the components or inside structure of this gauge;
● To prevent damage, do not use ADT680 for long periods of time in an over pressure condition;

11 FCC Declaration of Conformity

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation

FCC & IC Radiation Exposure Statement: this equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment and meets the exemption from the routine evaluation limits in section 2.5 of RSS 102.

This device complies with Industry Canada license-exempt RSS standard(s).Operation is subject to the following two conditions:

(1) this device may not cause interference, and

(2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

(1) l'appareil ne doit pas produire de brouillage, et

(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy. If not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

 —Reorient or relocate the receiving antenna.

 —Increase the separation between the equipment and receiver.

 —Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

 —Consult the dealer or an experienced radio/TV technician for help.

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:
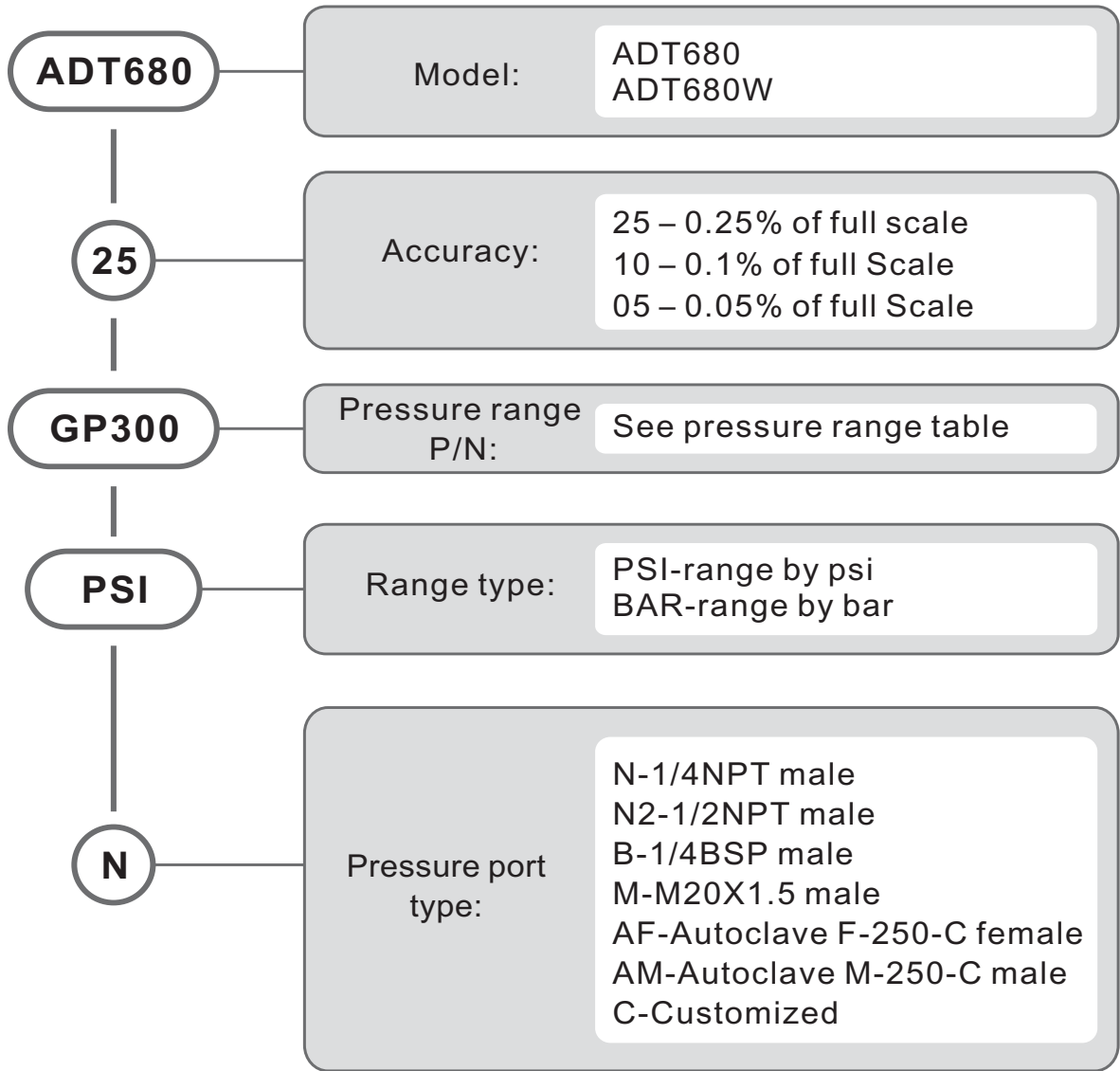
(1) This device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

12 Battery installation
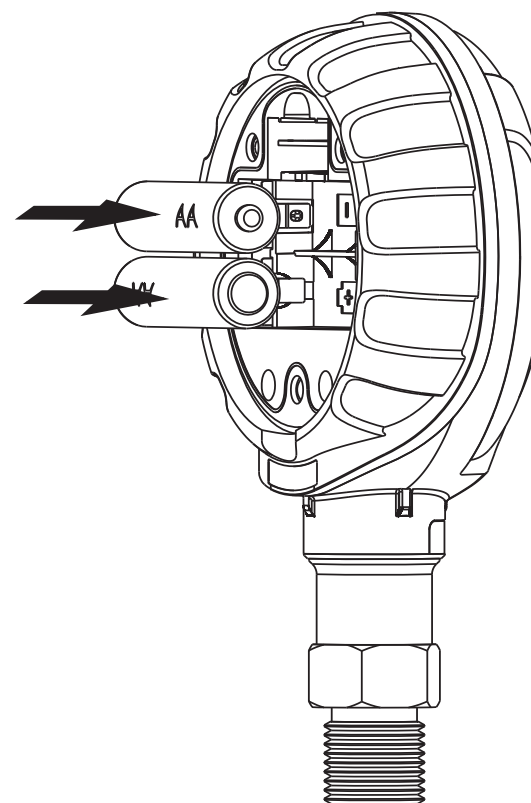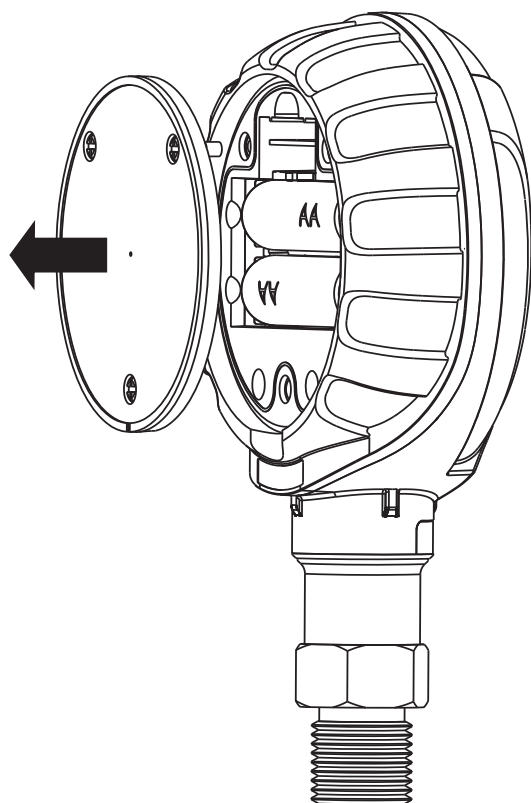
13 Ordering information

Model Number

ADT680	Model:	ADT680 ADT680W

25	Accuracy:	25 – 0.25% of full scale 10 – 0.1% of full Scale 05 – 0.05% of full Scale

GP300	Pressure range P/N:	See pressure range table

PSI	Range type:	PSI-range by psi BAR-range by bar

N	Pressure port type:	N-1/4NPT male N2-1/2NPT male B-1/4BSP male M-M20X1.5 male AF-Autoclave F-250-C female AM-Autoclave M-250-C male C-Customized

NOTE:
ADT680W with wireless and data logging

Accessories(included)

AA alkaline(LR6)battery(2 pc)

Manual

NIST traceable calibration certificate
Model 9253 Rubber protective boot
Additel/Land Wireless software for 680W
(free download at www.additel.com)

Optional Accessories

Model number	Description
9503	Additel/Log II Wireless real time data logging and graphical software for 680W
9030	Spare wireless master device (USB dongle) for ADT 680W gauge.

14 Appendix I–Wireless

Additel 9030 is a wireless dongle for wireless communication (ZIGBEE) of the 2.4G wireless Digital Pressure Gauge. It's used for data transfer from the digital pressure gauge and computer. Additel 9030 is a USB device and is very convenient for data transfer.
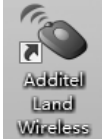
Additel 9030

Wireless software introduction

Step 1: Download the software from www.additel.com, go to "products" then to "Software". The name is "Additel / Land Wireless" .

Step 2: Items below should be displayed after open it.

| DotNetFX40 | update | WindowsInstaller3_1 |
| Additel Land Wireless Windows Installe... | setup Setup | WMDDriver.INF |

Step 3: Next click on **setup** to install the software, after installation, the icon will

displayed on the computer desktop.

Step 4: Configure the wireless communication channel parameter of gauge(s), we take 1 as

sample in this manual. Open wireless function of gauge(s), and do the following

operations.

Figure1

Figure2
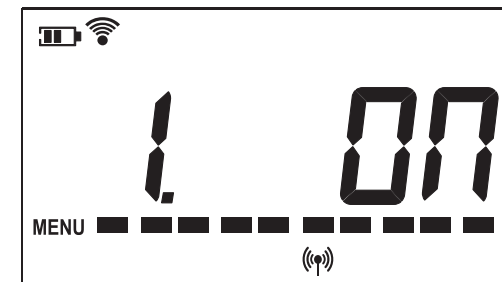
Figure3

Step 5: Click to start up this software, the interface shows below.

Functions of this software:

1 Multi–gauge communication. The software can communicate with multiple gauges
   at the same time, as long as the channel parameter is same with Master–Device

2 Real–time viewing of gauge measurement; the time interval can be set from 1~999 seconds

3 Sync the time of PC and gauge(s)

4 Export logged data of gauges to an EXCEL file

5 Support communication commands to communicate with gauge(s) directly

Step 6: Click ▷ button, channel setting will display.
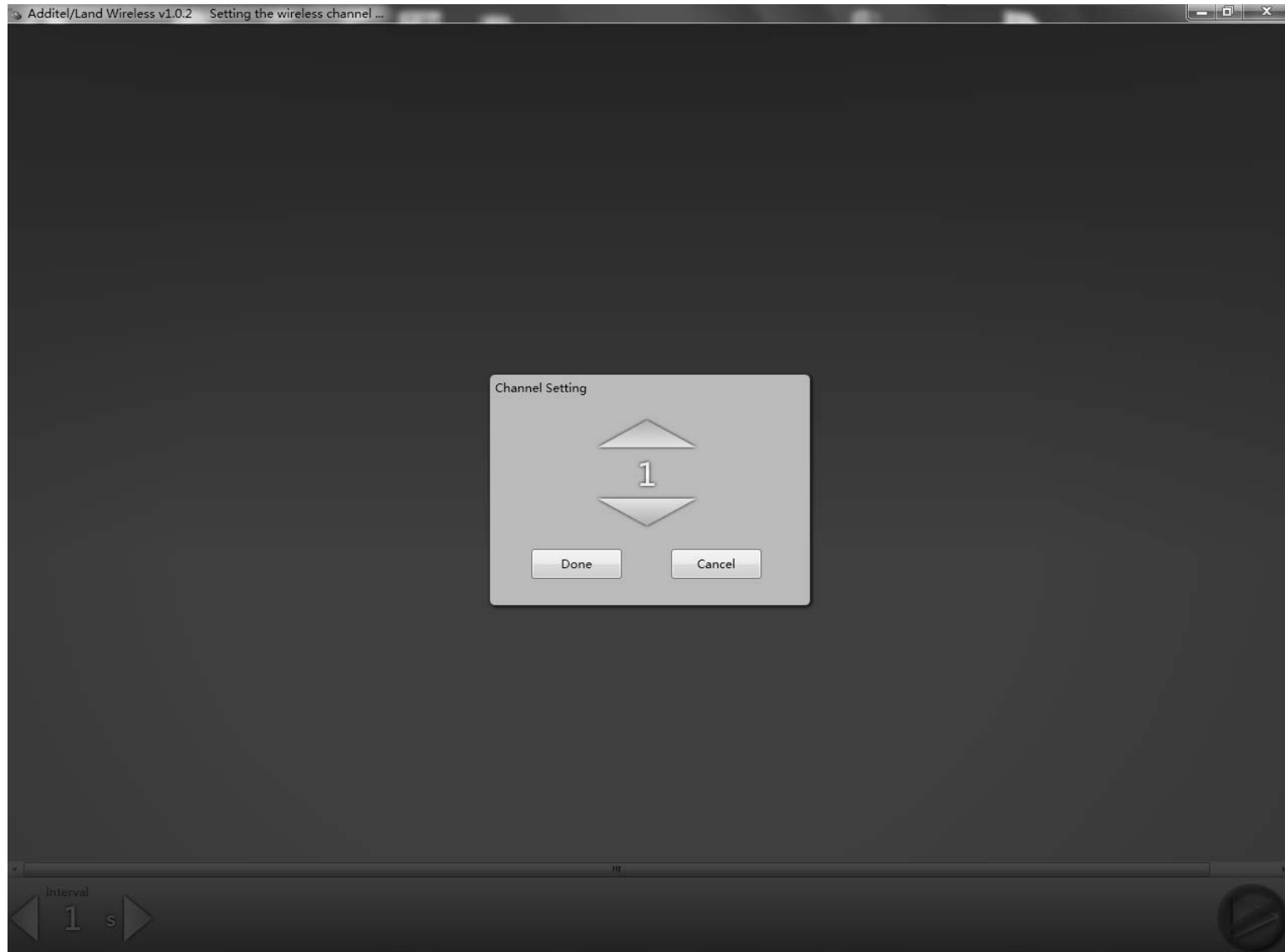
Set a channel number, channel 1 is used as an example in this manual, please make sure the channel number of gauge(s) is same with the software(please refer ADT680 Manual, Menu structure section), then click "DONE". The software will scan and connect the available gauge(s). If the connections are successful, the picture will shown as below;
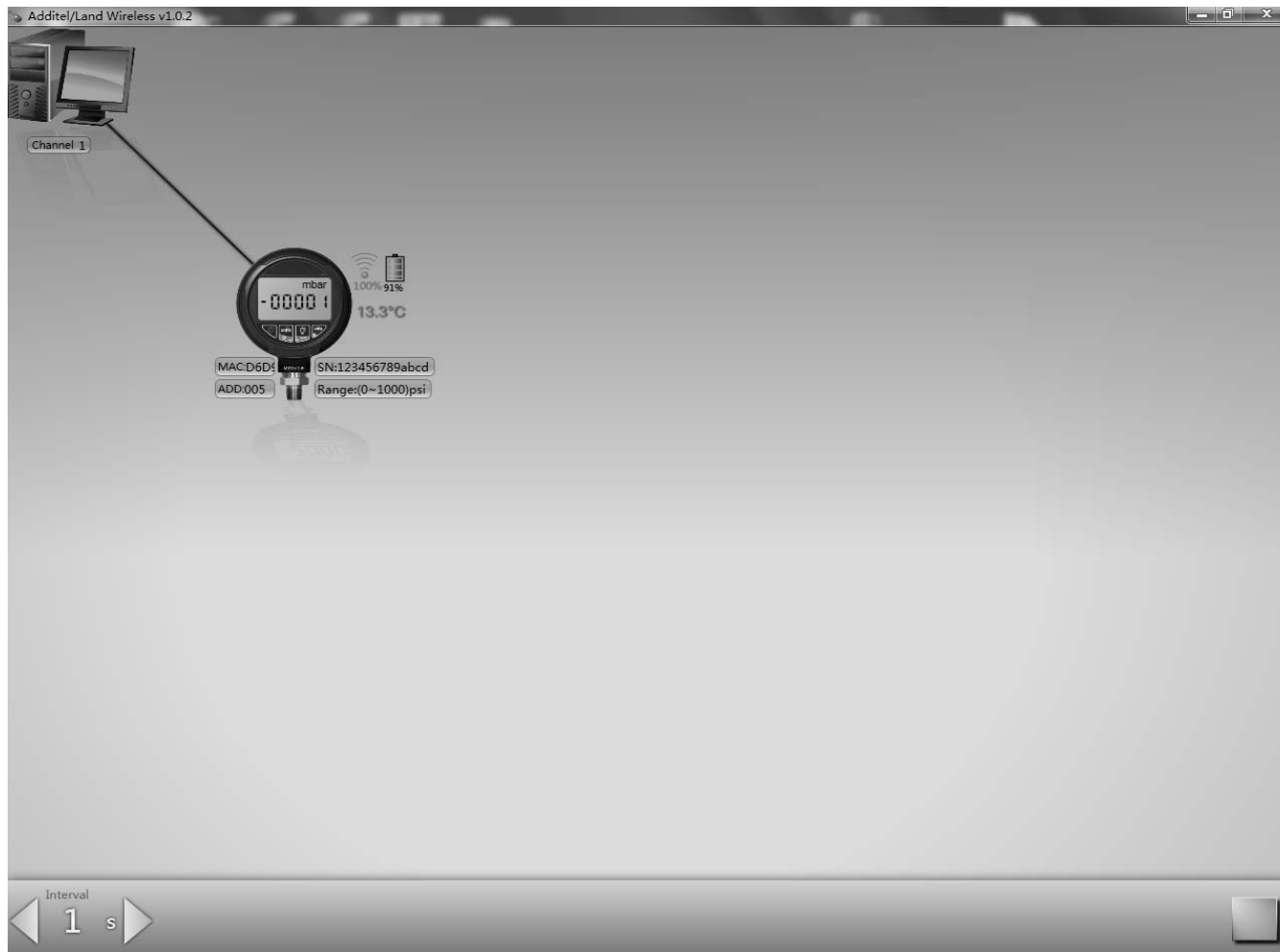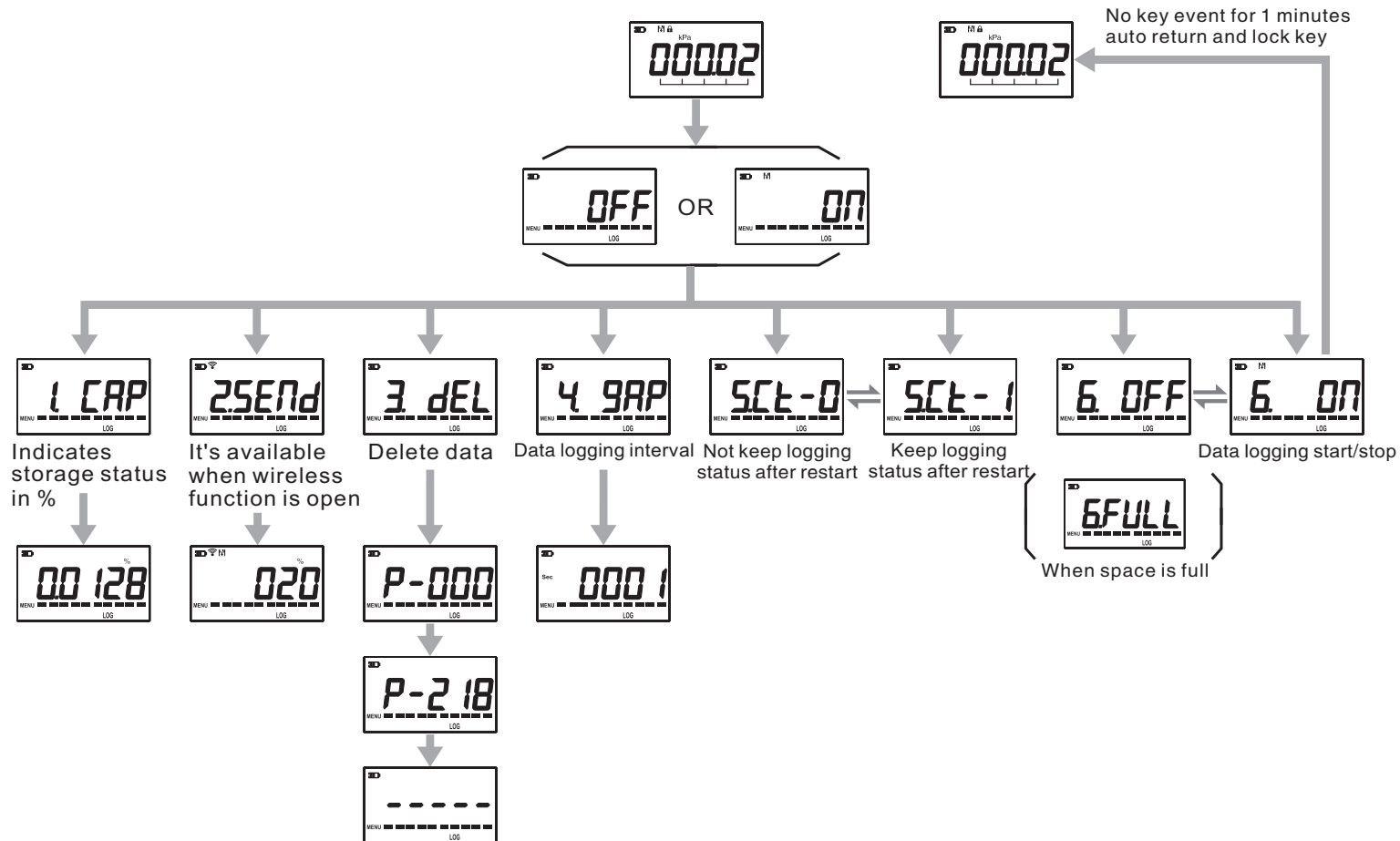
Step 7: Users can configure the data collection interval time by inputting the desired interval in seconds, for example, inputting the number will set the collection interval to 1 second. Users can export data and synchronize the time by right-clicking on the gauge.
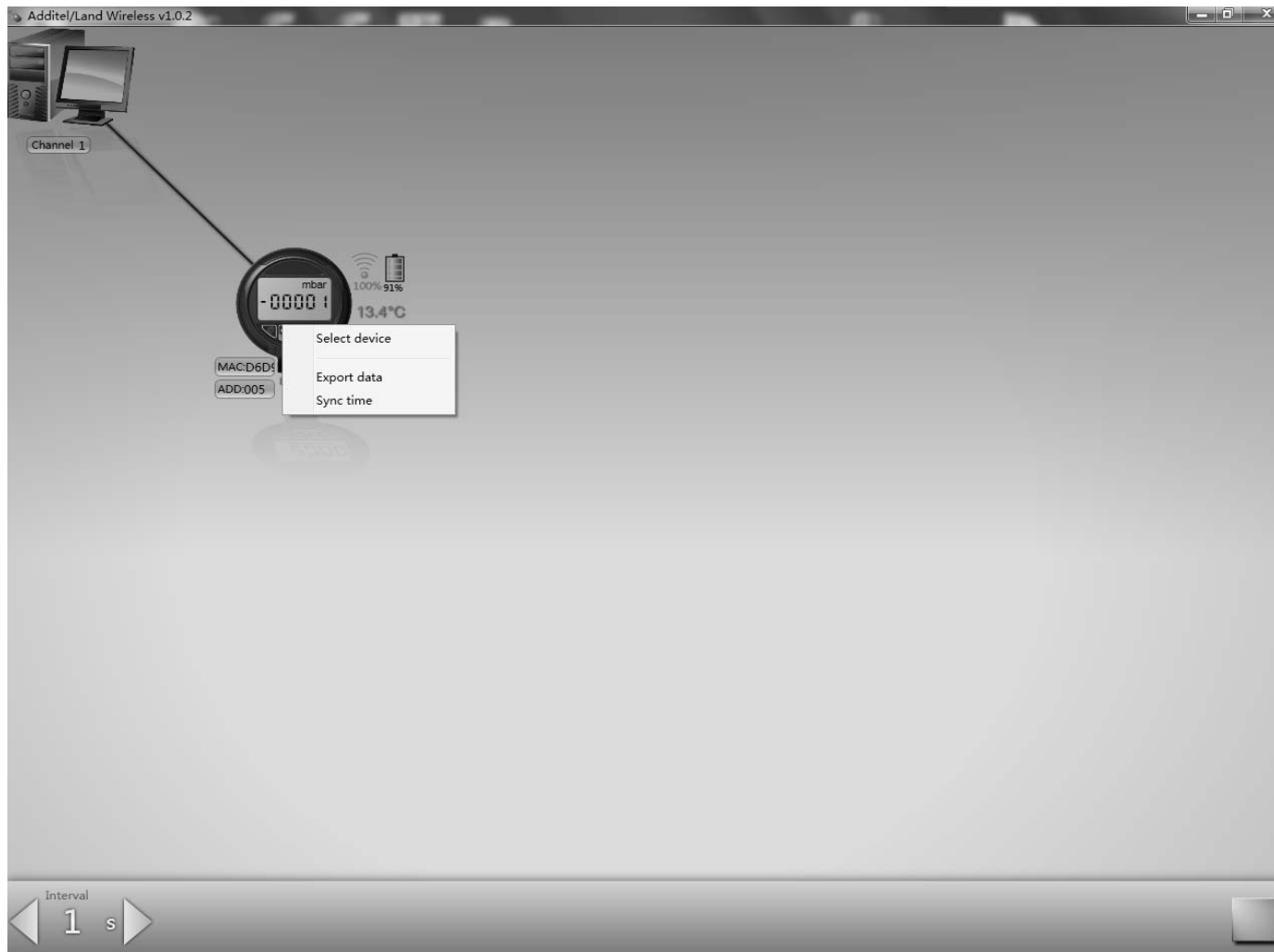
15 Appendix II– Data logging

Data logging introduction

(1) Push and hold [units] button to access to menu setup mode and move to log function.
(2) If the data logging is ongoing, the gauge screen will show "ON" and the 💾 icon, otherwise "OFF" will be shown.
(3) Data logging menu structure as shown in the figure below

No key event for 1 minutes auto return and lock key

OFF OR ON

| 1.CAP | 2.SENd | 3.dEL | 4.9AP | SCt-O | SCt-1 | 6.OFF | 6.ON |

Indicates storage status in %

It's available when wireless function is open

Delete data

Data logging interval

Not keep logging status after restart

Keep logging status after restart

Data logging start/stop

0.0128 | 020 | P-000 | 0001

P-218

6FULL

When space is full