Sino Instruments
华 信 仪 表

User manual

Intelligent Pressure Calibrator

HS602

Claim

- The operating instructions are parts of the products and must be kept in the immediate vicinity of the instrument and readily accessible to skilled personnel at any time.
- Skilled personnel must have carefully read and understood the operating instructions prior to beginning any work.
- The manufacturer's liability is void in the case of any damage caused by using the product contrary to its intended use,non-compliance with these operating instructions,assignment of insufficiently qualified skilled personnel or unauthorised modifications to the instrument.
- HUAXIN reserve the rights to change the contents or form of these operating instructions at any time without prior notice having been given.

Safety information

Warning

In order to protect your ordering products,your own and others safety,Please read this manual carefully before your operation. And pls place this manual near the operation site for the operator reference.The consequence would be incurred by the non-observance are marked.

① Please don't disassemble & repair the equipment by yourself.

Disassembling the inner components may take toll or completely damage the equipment.Only the qualified technician could make a repairment. Any abnormal happened to the equipment,pls call our service staff to make a repairment under their instruction.

② Pay attention to the range

To avoid over pressure damges,don't apply pressure that exceeds the limits listed in the pressure specification table.

③ Don't beat and shock

This action might injure the product and influce the performance.

④ Pay attention to the medium of the item

That will damage the item by using the wrong medium.

⑤ Don't immersed in water or exposed to water or getting wet

That will damage the item,and even may cause the fire or an electric shock.

⑥ Only use the special adapter or battery

Other power supply will damage to the product, and even may cause the fire or an electric shock.

⑦ The calibration should be carried out under a standard calibration condition

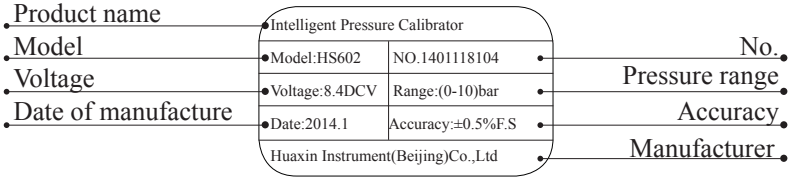
The calibration should be carried out under a standard calibration condition,such as the standard gauge must be accuracy 3 times of HS602,ambient temperature (20±2)℃ .

Symbols

Symbols used on the product and in the menu

Symbol	Meaning	Symbol	Meaning
	Indicates warning	CE	Conforms to European Union directives
	Indicates important information	Ex	Conforms to standard of PCEC

Labelling,Safety Marks



1.Summary

HS602 Intelligent pressure calibrator is a high-precision single-range digital pressure gauge with hart function. it is composed of high-precision measurement chips,DC24V power supply,rechargeable battery protection circuit,hart communication modules and intelligent digital pressure module and so on.

This unit can be used for real-time measurement of pressure value and the calibration of the pressure transmitters,differential pressure transmitters, pressure transducers and pressure gauges,etc.

Characteristics

- Pressure range up to 2500bar
- High accuracy up to 0.025%F.S
- Current measurement (0-25)mA
- Accuracy ±(0.02%RD+0.005%F.S)
- Voltage measurement (0-25)V
- Accuracy ±(0.02%RD+0.005%F.S)
- Pressure switch test
- HART Communication capability
- Advanced temperature compensating
- 24vdc power for Pressure transimtter testing
- Large,easy to read display with 6-digit resolution
- RS232 communication with PC
- With Max and mix values function
- Zero point,full scale calibration function
- Nine pressure units selectable
- Equipment with rugged ABS plastic
- Rechargeable lithium battery or charger
- Data storing function
- Large LCD with white backlight,dual readout
- Light weight,small size,easy operation

2.Technical Specification

- **Model**
  HS602 Intelligent Pressure Calibrator
- **Accuracy**
  ±0.025% F.S, ±0.05% F.S
- **Electric signal**
  Current measurement:(0-25)mA
  Accuracy:±(0.02%RD+ 0.005%F.S)
  Voltage measurement:(0-25)V
  Accuracy:±(0.02%RD+ 0.005%F.S)
  DC output:DC24V(≤30mA)
  Accuracy:±1%F.S
- **Gauge types**
  Gauge pressure
  Compound pressure
  Absolute pressure
  Differential pressure
- **Work medium**
  Oil, water&noncorrosive gases
- **Over pressure alarm**
  120%Full Scale
- **Display**
  Description:6 digits big LCD with blacklight
  Display rate:Less than 0.025% of full scale is 150ms,more than 0.025% of full scale is 1s
  Numeral display height:16.5mm (0.65")
- **Pressure unit**
  psi,bar, mbar,kgf/cm^2,Pa,kPa, MPa,mmH_2O,mmHg
- **Temperature**
  Compensated temperature:
  -10°C to 50°C
  Operating temperature:
  -10°C to 50°C
  Humidity:<95%
  Storing temperature:-20°C to 70°C
- **Pressure connection**
  1/4NPT male,M20×1.5 male
  Other connections customized
- **Power**
  Battery:One piece 7.4Vdc rechargeable lithium battery&charger
  Battery life:80 hours
- **Housing**
  Case material:Plastic
  Wetted parts:316 stainless steel
  Dimension:Φ95mmx49mm
  Total height:166(mm)
  Weight:0.75kg
- **Data storing**
  Storage capacity:calibration record of 30pcs gauge under test
- **Communication**
  RS232
- **Certificate**
  CE . . . . . CE
  EX . . . . . Ex
  ISO 17025 lab calibration certificate(optional)

Gauge pressure

No.	Range (bar)	Accuracy (% FS)	Media	Pressure Type
HS602-1	(-1-0)	0.025,0.05	G	G
HS602-2	(0-0.4)	0.025,0.05	G	G
HS602-3	(0-0.6)	0.025,0.05	G	G
HS602-4	(0-0.7)	0.025,0.05	G	G,A
HS602-5	(0-1)	0.025,0.05	G	G,A
HS602-6	(0-1.6)	0.025,0.05	G,L	G,A
HS602-7	(0-2)	0.025,0.05	G,L	G,A
HS602-8	(0-2.5)	0.025,0.05	G,L	G,A
HS602-9	(0-3.5)	0.025,0.05	G,L	G,A
HS602-10	(0-4)	0.025,0.05	G,L	G,A
HS602-11	(0-6)	0.025,0.05	G,L	G,A
HS602-12	(0-7)	0.025,0.05	G,L	G,A
HS602-13	(0-10)	0.025,0.05	G,L	G,A
HS602-14	(0-16)	0.025,0.05	G,L	G,A
HS602-15	(0-20)	0.025,0.05	G,L	G,A
HS602-16	(0-25)	0.025,0.05	G,L	G,A
HS602-17	(0-35)	0.025,0.05	G,L	G,A
HS602-18	(0-40)	0.025,0.05	G,L	G
HS602-19	(0-60)	0.025,0.05	G,L	G
HS602-20	(0-70)	0.025,0.05	G,L	G
HS602-21	(0-100)	0.025,0.05	G,L	G
HS602-22	(0-160)	0.025,0.05	G,L	G
HS602-23	(0-200)	0.025,0.05	G,L	G
HS602-24	(0-250)	0.025,0.05	G,L	G
HS602-25	(0-350)	0.025,0.05	G,L	G
HS602-26	(0-400)	0.025,0.05	G,L	G
HS602-27	(0-600)	0.025,0.05	G,L	G
HS602-28	(0-700)	0.025,0.05	G,L	G
HS602-29	(0-1000)	0.025,0.05	G,L	G
HS602-30	(0-1600)	0.1,0.2	G,L	G
HS602-31	(0-2500)	0.1,0.2	G,L	G

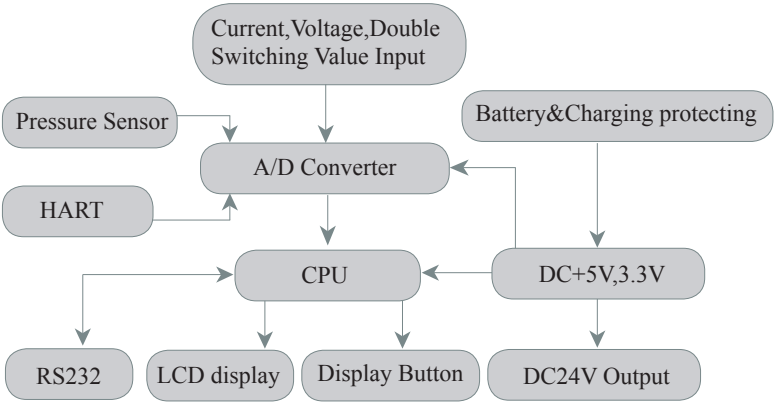
Compound pressure

No.	Range	Accuracy	Media	Pressure Type
HS602-32	(-0.025-0.025)	0.05	G	D,G
HS602-33	(-0.05-0.05)	0.025,0.05	G	D,G
HS602-34	(-0.1-0.1)	0.025,0.05	G	D,G
HS602-35	(-0.25-0.25)	0.025,0.05	G	D,G
HS602-36	(-1-1)	0.025,0.05	G	D,G
HS602-37	(-1-6)	0.025,0.05	G,L	G
HS602-38	(-1-10)	0.025,0.05	G,L	G
HS602-39	(-1-25)	0.025,0.05	G,L	G

Remark:G=Gauge pressure A=Absolute pressure D=Differential pressure

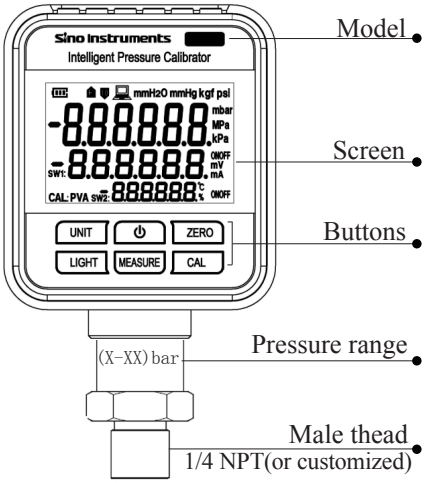
3.Working Principle

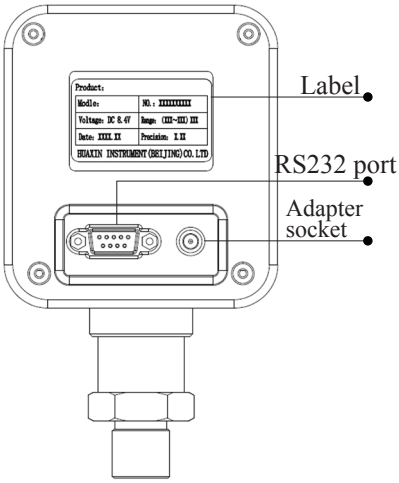
The tested pressure signal acts on the pressure sensor,the signal of pressure sensor change into electrical signal.the current and voltage measurement signal will be led into via the terminal on the panel,after the A/D conversion and the sampling-processing by microprocessor,the final result would be displayed on the LCD screen.

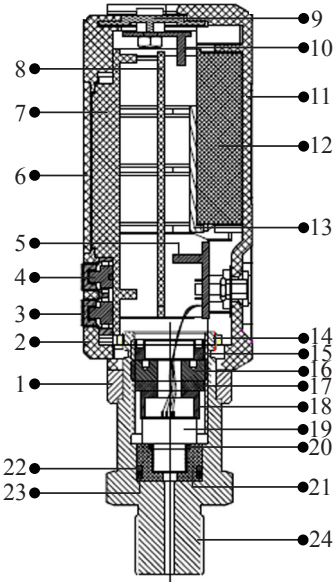


4.Install Operation

4.1 Basic structure







1.Back cover insert	13.Cover battery plate
2.Front cover	14.Lock nut
3.Key-press panel	15.Press cover
4.Button switch	16.Hole press cover
5.Power strip	17.Support pad for sensor
6.Front view window	18.Reinforcing pad for sensor
7.LCD	19.Sensor
8.PCB	20.O-ring 9×1.8
9.Plugging terminal panel	21.High pressure sealing
10.Terminal board	22.Check ring 19
11.Back cover	23.O-ring 16×1.8
12.Li-ion battery pack	24.Sensor connector

4.2 Button&terminal Introduction

LIGHT Light up the display screen.

UNIT Starting unit is kPa, press this key to switch unit circularly among mmHg、mmH_2O、bar、mbar、psi、kgf/cm^2、MPa and Pa.

ZERO Press this key to clear current value as zero drift value.then this gauge would be already in a clearing zero status when you start it up again.

CAL Press this key for zero point and full scale calibration and linear revision to insure the accuracy.(ⓘ Do not use the key if there is no necessary calibration equipments available)

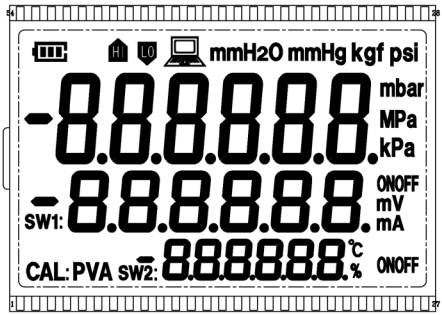
MEASURE Starting function is measurement for press,current, temperature. press this key to switch circularly and then choose the measuring function your demand.

Connection terminals:

Including terminals for current measurement,voltage measurement, DC24V output, pressure switch value measurement and a public terminal. Connect terminals as below;

SW1:Measuring Pressure switch.
SW2:Measuring Pressure switch.
GND:This is a public terminal.
V:(0 ～ 25)V,Accuracy:±(0.02%RD+0.005%FS).
mA:(0 ～ 25)mA,Accuracy:±(0.02%RD+0.005%FS).
24V:DC24V output(≤30mA) accuracy:±1%FS.
RS232 communication port.
DC8.4V Charging inputDC8.4V.

4.3 Display



The HS602 screen definitions:

- PC icon:the mark of PC connection
- Battery icon:indicates state of charge. Only be seen when there is low power
- Pressure display:displays measuring pressure value
- Pressure units:displays selected pressure units
- Electricity reading:displays measuring electricity value,sw1 value,and menu
- Electricity units:displays measuring current/voltage units
- Menu reading:displays measuring sw2 value and menu
- HART HI:shows the communication status

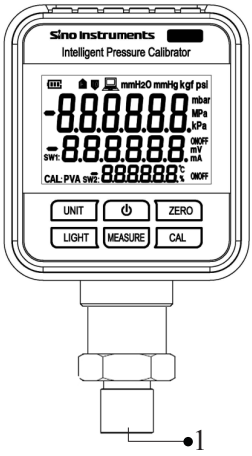
4.4 Installation method

① Connect gauge under test and HS602 on the pressure comparator.

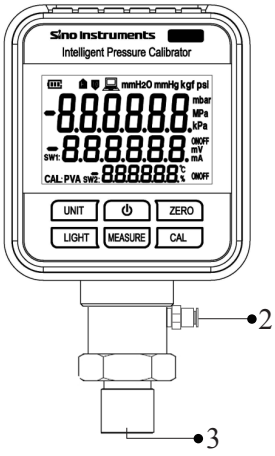
② According to calibration regulation, make HS602 as standard gauge to finish the whole calibration process.

4.5 The gauge type

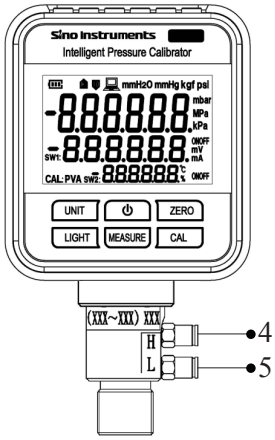
No.1:Gauge pressure



No.2:Gauge pressure
Rang: ≤ ±100kPa



No.3:Differential pressure



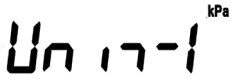
① Connecting pressure generator
② Open to air
③ Connecting pressure generator
④ High pressure
⑤ Low pressure

4.6 Changing the original pressure unit

(1) In Measuring interface,Press CAL； enter into basic setting interface.

(2) Press CAL,enter into the Unit interface.

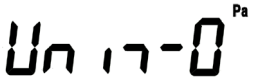
(3) Press CAL,enter into the Unit choose interface(Unit flashing).



ⓘRemark

At this time, the unit displayed is client measuring interface unit.maybe that is not match with the unit kPa in above pic.

(4) Press Zero and choose the Unit you need (if you choose the unit Pa).



ⓘRemark:The displayed unit:Pa,kPa,MPa.

(5) Press CAL,enter into the save interface.

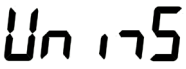
(6) If press LIGHT,save the setting,and then return unit selectable interface. that means the pressure unit modified well.

(7) Press LIGHT three times continuously.then back to the measuring interface.

4.7 Temperature modification display

(1) In Measuring interface,press CAL,enter into basic setting interface.

(2) Press CAL,enter into the Unit interface.



(3) Press ZERO three times enter into temperature interface below.

(4) Press CAL,enter into data modified interface.

The first character("-")located in activated interface (No flashing).

(5) If you want to modify the activated value,press ZERO and display"-"(flashing),if you don't need modify activated values,pls enter into next step directly.

(Minus)

(6) Press CAL,next character located in activated interface(Flashing).

When decimal point bit flashing, press ZERO for setting decimal point.
When the number flashing,press LIGHT for decreasing number from 9 to 0,press ZERO for increasing number from 0 to 9.
After selecting your number, repeat step(6).

(7) Repeat step(6),until the last bit.

(8) Press CAL, enter into the save selecting interface.

Press LIGHT for save the settings,if not,press ZERO.

(9) Press LIGHT twice continuously and back to the measuring interface.

4.8 DC24V output setting

(1) In measuring interface,press CAL,enter into basic setting interface.

(2) Press CAL,enter into the Unit interface.

(3) Press ZERO continuously until it get into “DC 24V” measurement interface below.

(4) Press CAL,switching ON/OFF.

(5) Press LIGHT twice continuously and back to the measuring interface.

4.9 COM Communication setting

(1) In measuring interface,press CAL enter into basic setting interface.

(2) Press CAL,enter into the Unit interface.

(3) Press ZERO,and select the menu,enter into setting interface below.

(4) Press CAL,switching ON/OFF.
ON-1 (Automatic)and ON-2 (Semi-automatic),OFF means to close.

(5) Press LIGHT twice continuously,and back to the measuring interface.

4.10 Digital display setting

(1) In measuring interface,press CAL,enter into basic setting interface.

(2) Press CAL,enter into the Unit interface.

(3) Press ZERO,and select the menu,enter into setting interface below.

(4) Press CAL,switching circularly4、5、6 bit.

(5) Press LIGHT twice continuously.and back to the measuring interface.

4.11 Factory reset

If the item could not work by error operation,that could restore factory reset.

(1) In measuring interface,press CAL,enter into basic setting interface.

(2) Press CAL,enter into the Unit interface.

(3) Press ZERO continuously and then enter into factory reset interface.

(4) Press CAL,enter into the Save interface.

If press LIGHT,it can resume to default setting. It will get back to factory reset interface and cancel the operation if you press ZERO.

(5) Press LIGHT twice continuously.and then enter into measuring interface.

5.Calibration step

ⓘThe calibration should be carried out under a standard calibration condition,such as the standard source must be accuracy 3 times,ambient temperature (20±2)℃ .

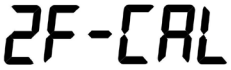
5.1 Pressure Low point, High Point Calibration

(1) Pressure input add low point standard pressure.

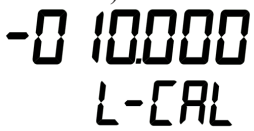
(2) Waitting for pressure stability.

(3) In measuring interface,press CAL,enter into basic setting interface.

(4) Press ZERO,enter into pressure low point, high point calibration interface.



(5) Press CAL,enter into pressure low point calibration(Press CAL, enter into pressure high point calibration) interface.



(6) Press CAL,enter into low point calibration data modify interface.

(7) Refer "4.7(7) step of Temperature displaying modified".and amend low point pressure data (If the gauge had stored data,that do not nead amend,then press CAL directly).

(8) Press CAL input the last a character,waiting for standard pressure stability and then press CAL,enter into save interface.

(9) Press LIGHT,save low point calibration data and return low point calibration interface.

(10) Press ZERO,enter high point calibration interface.

(11) Pressure input add high point standard pressure.

(12) Waitting for pressure stability.

(13) Press CAL,enter into high point calibration data modify interface.

(14) Refer"4.7(7) step of Temperature displaying modified".and amend high point pressure data（If the gauge had stored data,that do not need amend,then press CAL directly).

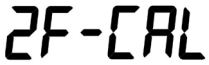
(15) Press CAL input the last a character,waiting for standard pressure stability and then press CAL,enter into save interface.

Press LIGHT,save high point calibration data and return high point calibration interface.

(16) Press LIGHT twice continuously.and then back to measuring interface.

5.2 Clear two point modification value

(1) In measuring interface, press CAL once time,and then press ZERO once time,that will display below.



(2) Press CAL once time,and then press ZERO twice,that will display below.

(3) Press CAL once time,that will display below.

(4) Press LIGHT three times,saving and returning measuring interface.

5.3 Clearing clear zero value

(1) In measuring interface,press CAL once time,and then press zero twice,that will display below.

(2) Press CAL once time,that will display below.

(3) Press CAL once time,that will display below.

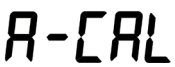
(4) Press LIGHT three times,saving and returning measuring interface.

5.4 Current measurement calibration

(1) Contacting the standard current with current input circuit.

(2) In the measuring interface,press CAL, enter into the setting interface.

(3) Press ZERO continuously for four times,until entering into current measurement calibration menu.



(4) Press CAL for entering into the current low point input interface.

(5) Press CAL for entering into low point data amend interface. Refer“4.7(7) step of Temperature modification display”and input current value (low calibration is 1 mA);Meanwhile, the input of external standard current is 1 mA(if the gauge had stored data,that do not need to amend,then press CAL directly).

(6) Press CAL for entering into the current low point input interface.

(7) Press LIGHT for save the data of current low point calibration,back to the current low point input interface.

(8) Press ZERO for entering into current high point input interface.

(9) Press CAL for entering into high point data amend interface. Refer“4.7(7) step of Temperature displaying modified”and input the current value (high point calibration 25mA),Meanwhile,the external standard current input is 25mA.

(10) After input the last character,press CAL for entering into save interface.

(11) Press LIGHT for saving the settings,back to current high point input interface.

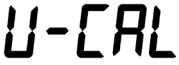
(12) Press LIGHT continuously for two times,back to the measuring interface.

5.5 Voltage measurement calibration

(1) Contacting the standard voltage with port of voltage input measurement.

(2) In the measuring interface,press CAL for entering into main menu.

(3) Press ZERO continuously for five times,until entering into voltage measurement calibration menu.



(4) Press CAL,enter into voltage low point calibration interface.

(5) Press CAL,enter into low point data amend interface.Refer “4.7(7) step of Temperature displaying modified”and input the voltage value(low point calibration 1V),Meanwhile,the external standard power supply input is 1V.(If the gauge had stored data,that do not amend,you may press CAL directly).

(6) Press CAL for entering into save interface.

(7) Press LIGHT for saving the data of voltage low point calibration,back to voltage low point calibration interface.

(8) Press ZERO enter into voltage high point input interface.

(9) Press CAL,enter into high point data amend interface.Refer“4.7(7) step of Temperature displaying modified”and input voltage(high point calibration 25V),meanwhile,the external standard voltage is 25V.(If the gauge had stored data,that do not amend,you may press CAL directly).

(10) After input the last character,press CAL for entering into save interface.

(11) Press LIGHT for saving the data of voltage high point calibration,back to voltage high point calibration interface.

(12) Press LIGHT continuously for two times, back to the measuring interface.

6.HART

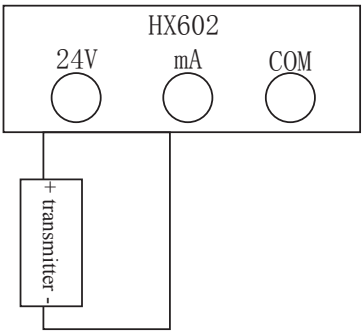
6.1 Using HS602 Calibrated HART Pressure transmitter

(1) Pressure transmitter must be HART Intelligent transmitter.it is current type.

(2) The power supply is provided by HS602 inside 24V.

(3) Transmitter 250Ω The sampling resistor is provided by HS602 inside.

6.2 Connection



6.3.Operation step

(1) Refer“4.8 DC24V output setting”open 24Vdc.

(2) HART menus

By MEASURE enter into HART menu, switching state by ZERO.

1>HART0:Display standard real pressure values and transmitter output current

ⓘ Waitting for HART Connection sign.and confirming the connection is correct.

2>HART1:Display standard gauge testing current and pressure transmitter output current.

3>HART2:Display the real pressure value of standard gauge and pressure transmitter.

4>HART3:Display pressure transmitter upper limit,lower limit and unit.The unit modified by UNIT key.

(3) Hart function modification menu.

After Hart transmitter communicate successfully,that display the menu below

1>H-CAL:transmitter range modification menu(Reading&modification available).

- H-zero:lower limit of transmitter
- H-span:upper limit of transmitter
- Dap:Damping

2>DAAdj:Current testing and calibration menu.

If fixed output ring simulated current of transmitter is not very good,you may enter into current calibration.

Transmitter current testing may specify transmitter fixed output ring simulated current.

- ADJ4:transmitter 4mA calibration
- ADJ20:transmitter 20mA calibration
- TSTSA:transmitter current testing(4,8,12,16,20mA testing)

3>H-CLI:Transmitter two point calibration menu.

Transmitter two point calibration is that the actual pressure value set zero point or full scale values.

After finishing low limit calibration,the current pressure set the low limit of pressure range.transmitter output adjust 4mA.

After finishing high limit calibration,the current pressure set the high limit of pressure range. transmitter output adjust 20mA.

- H-C-L:transmitter pressure low limit calibration
- H-C-H:transmitter pressure high limit calibration

7.Field instrument testing

7.1 Using storing function calibrate pressure transmitter in the field

(1) Transmitter is current type.

(2) Power supply of transmitter is provided by 24Vof HS602.

7.2 Basic Setting

(1) Press MEASURE key enter into SAVE-S menu.that displays below.

(2) Press CAL key enter into SAVE-N menu,press ZERO switching the state,press LIGHT and back out SAVE-S.

1>SAVE-N:displaying the present save position,range between 1 and 30.

2>SAVE-N:Displaying low limit of instrument.

3>SAVE-H:Displaying upper limit of instrument.

4>SAVE-C:Displaying the items testing point .range between 5 and 13.

(3) The value modification.

1>Press Cal key and choose position,press ZERO&LIGHT key and choose the value.

2>Press CAL,until displaying the interface below.

3>Press LIGHT key and confirm the setting.press ZERO key and cancel the setting.

7.3 Starting testing

(1) Press MEASURE enter into SAVE-T.

(2) Press CAL enter into testing menu.

1>“107-01” 1 stand for testing circle,total two circle.

07 stands for testing points,01 stands for the current test points.

2>Press CAL key and store current testing data,press LIGHT key and back out testing and displaying SAVE-T menu.

3>Press CAL key until testing finished, that will back out automatically testing and displaying SAVE-T menu.

7.4 Data browsing

(1) Press MEASURE data browsing enter into SAVE-B.

(2) Press CAL key enter into SAVE-N,finishing setting,please press LIGHT key and back out the displaying SAVE-B menu.
1>SAVE-N:Setting the current store position,between1and 30.

2>Setting finished store position,that displays the pic below;
Press ZERO that looping browse data.Press LIGHT or CAL key and back out SAVE-B.

8.Maintenance

8.1 Maintenance and instruments

(1) The using environment had to satisfied the manual demand,the user can operate by manual.

(2) Make sure the normal display,the screen will show the upper limit of calibrator pressure range.if it does not mach the label on the gauge,pls contract with supplier.

(3) HS602 adopt the built-in DC7.4V rechargeable lithium battery. Automatically cut off power if the voltage is very low. Please charge in this case. when the item is charging,that displays red light. once it is completely charged,that displays green light.Please take out the power adapter.

8.2 Attention items

(1) Please operate under the manual.

(2) ⚠HS602 is high precision measuring instrument,please do not free to beat,shock,disassemble and poke the mental diaphragm of sensor and pressure hole with sharp ware.

(3) ⚠Self-disassembling is forbidden.

(4) ⚠ Please don't use it in high temperature and high humidity environment.

With improvement of technology,the products performance will be adjusted without notice.

9.Accessories List

No.	Name	Q'TY	Unit
①	Test report	1	Copy
②	Testing wire	1	Two
③	Packing list	1	Copy
④	Power adapter	1	Copy
⑤	Operation manual	1	Copy
⑥	Certificate of conformity	1	Copy

10.Standard

Factory produce manometer by the standard Q/CPHXF003-2014.

11.Support

The product specifications and other information contained this manual are subject to change without notice.if you have any questions,please call our services hotline:400 611 3558 or Tel:+86-10-62392087

HUAXIN Products series

Digital Pressure Gauge

HX601/HS108

Intelligent Pressure Calibrator

HS602

Pressure Comparator

HS700(-0.5-0.5)bar
HS701(-0.95-6)bar
HS702(-0.95-16/25)bar
HS703(-0.95-40/60)bar
HS720(0-140)bar
HS704(0-160/250)bar
HS705/HS705A(0-600/700)bar
HS710/HS710A(0-600/700)bar
HS706(0-1600/2500)bar

Electrical Pressure Comparator

HS318L(0-600)bar 5pcs output
HS316L(0-25)bar 5pcs output
HS317L(0-60)bar 5pcs output
HS315(-0.95-0)bar 2pcs output
HS316(0-25)bar 3pcs output
HS318(0-600)bar 3pcs output

Automatic Pressure Calibrator

HS620(-0.1-1)bar,(-0.95-25)bar

Sphygomanometer Calibrator

ME01 & ME02

Temperature Calibrator

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