

SMARTSTAT CUSTOM LCD DISPLAY

MANUFACTURED IN THE U.K.

The Series 800 Smartstat is a microprocessor controlled pressure switch, transmitter and indicator, which enables several instruments to be replaced with a single device.

- **PRESSURE RANGES FROM -1 TO 1000 BAR**
- **DP RANGES FROM 15 mBAR TO 4 BAR**
- **24VDC SUPPLY, 4-20mA LOOP POWERED**
- **HIGH ACCURACY AND REPEATABILITY**
- **STANDARD ELECTRICAL AND I.S. CERTIFIED VERSIONS AVAILABLE**
- **REDUCE COSTS**

There are some pressure and differential pressure (DP) switching applications that are very demanding due to the need for :-

1. Very high (or low) pressures.
2. High accuracy and repeatability.
3. Very large (or small) switching differentials.

These requirements may exceed the capabilities of conventional mechanical pressure switches, the Smartstat was designed to overcome these problems.

The Smartstat is available with pressure ranges from 100 mBar to 1000 Bar, and DP ranges from 15 mBar to 4 Bar providing a typical accuracy of 0.1%.

Two independent single-pole, double-throw (SPDT) relays are fitted in the Smartstat, the operating points of which can be set anywhere within the range. The switching differential can be set from 0.1% to 100.0% of range without loss of accuracy.

SUBSTANTIAL COST SAVINGS

Replacing a transmitter, switches and a gauge with a single Smartstat reduces equipment costs. Additionally there are reductions in documentation, installation time/fittings/cabling, and calibration/maintenance costs.

MICROPROCESSOR CONTROL

Additional benefits of the Smartstat include -

- Pushbutton calibration of setpoints and transmitter range enables calibration on site without tools.
- Programmable switching delays - the switching on or off (or both) of the relays may be delayed from 0.5 seconds to 15 minutes. This is particularly useful for preventing unwanted switching due to pressure transients.
- Display of maximum and minimum pressures recorded by the Smartstat.
- Display of transmitter output in mA.
- Displayed units of measurement - can be changed by the user as required.

QUALITY ASSURANCE

Designed and manufactured by HNL in accordance with BS EN ISO 9001:2000.





SERIES 800 SMARTSTAT SPECIFICATIONS & CODING

| SERIES 800 PRESSURE RANGE CODES | | | | | | |
|---------------------------------|------------------|-----------------------------|-------------------------------|-----------|-----------|---------------------|
| RANGE CODE | PRESSURE RANGE | PROOF RATING STANDARD (BAR) | PROOF RATING 'H' RANGES (BAR) | 4 - 20 mA | | ABSOLUTE RANGE CODE |
| | | | | MIN SPAN | MAX SPAN | |
| 825P | 0 - 100 mBar | 2 | – | 20 mBar | 100 mBar | 825PA |
| 834P | 0 - 200 mBar | 2 | – | 40 mBar | 200 mBar | 834PA |
| 835P | 0 - 500 mBar | 2.5 | 6 | 100 mBar | 500 mBar | 835PA |
| 836P | 0 - 1600 mBar | 4 | 10 | 320 mBar | 1600 mBar | 836PA |
| 825PZ | -50 - +50 mBar | 2 | – | 20 mBar | 100 mBar | – |
| 834PZ | -100 - +100 mBar | 2 | – | 40 mBar | 200 mBar | – |
| 835PZ | -250 - +250 mBar | 2.5 | 6 | 100 mBar | 500 mBar | – |
| 836PZ | -800 - +800 mBar | 4 | 10 | 320 mBar | 1600 mBar | – |
| 845P | 0 - 4 Bar | 7.5 | 16 | 800 mBar | 4 Bar | 845PA |
| 846P | 0 - 10 Bar | 15 | 30 | 2 Bar | 10 Bar | 846PA |
| 847P | 0 - 20 Bar | 30 | 75 | 4 Bar | 20 Bar | 847PA |
| 855P | 0 - 50 Bar | 75 | – | 10 Bar | 50 Bar | 855PA |
| 856P | 0 - 160 Bar | 250 | – | 32 Bar | 160 Bar | 856PA |
| 857P | 0 - 400 Bar | 520 | – | 80 Bar | 400 Bar | 857PA |
| 858P | 0 - 1000 Bar | 1100 | – | 200 Bar | 1000 Bar | 858PA |

| SERIES 800 DIFFERENTIAL PRESSURE (DP) RANGE CODES | | | | | |
|---|------------------|-----------------------------|-------------------------------|-----------|----------|
| RANGE CODE | PRESSURE RANGE | PROOF RATING STANDARD (BAR) | PROOF RATING 'H' RANGES (BAR) | 4 - 20 mA | |
| | | | | MIN SPAN | MAX SPAN |
| 814DP | 0 - 15 mBar | 50 | – | 5 mBar | 15 mBar |
| 824DP | 0 - 50 mBar | 50 | – | 10 mBar | 50 mBar |
| 834DP | 0 - 250 mBar | 100 | 200 | 50 mBar | 250 mBar |
| 835DP | 0 - 600 mBar | 100 | 200 | 120 mBar | 600 mBar |
| 836DP | 0 - 1.6 Bar | 100 | 200 | 320 mBar | 1.6 Bar |
| 837DP | 0 - 4.0 Bar | 100 | 200 | 800 mBar | 4.0 Bar |
| 814DPZ | -7.5 - +7.5 mBar | 50 | – | 5 mBar | 15 mBar |
| 824DPZ | -25 - +25 mBar | 50 | – | 10 mBar | 50 mBar |
| 834DPZ | -125 - +125 mBar | 100 | 200 | 50 mBar | 250 mBar |
| 835DPZ | -300 - +300 mBar | 100 | 200 | 120 mBar | 600 mBar |
| 836DPZ | -800 - +800 mBar | 100 | 200 | 320 mBar | 1.6 Bar |
| 837DPZ | -1 - +3.0 Bar | 100 | 200 | 800 mBar | 4.0 Bar |

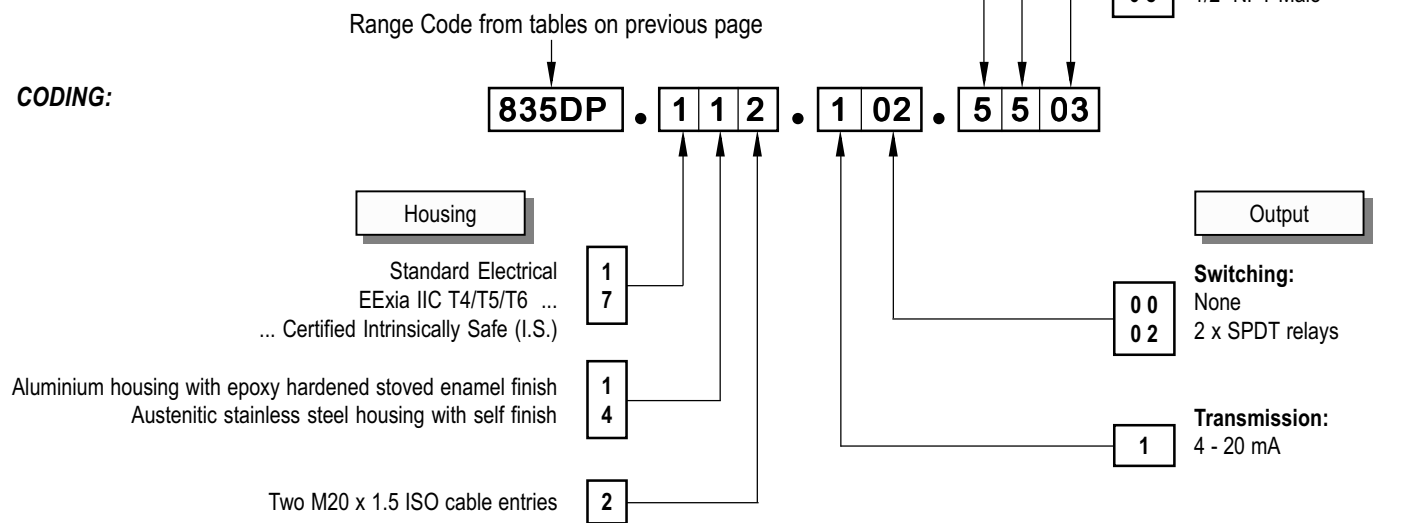
NOTES ON RANGE TABLES:

- Pressures quoted are gauge or DP. If an absolute pressure range is required then add an 'A' to the range code
e.g. 835P becomes 835PA.
- If a higher proof rating than the standard is available the figure is shown in the 'H' ranges column. To specify this option add 'H' to the range code.
e.g. 835P becomes 835PH (835PA becomes 835PAH)
- Smartstat pressure sensors are capable of being subjected to full vacuum.

NOTES:

1. Dust and weatherproof ratings are IP65 to BS EN 60529 (IEC 60529).
2. Options marked * are only available on pressure ranges and not DP ranges.
3. Standard Pressure Smartstats have a viton 'O' ring seal, DP Smartstats have a PTFE seal.
4. Standard equalising manifolds can be bolted directly on to DP Smartstats.
5. Transmission to the silicon pressure transducer is via a silicone oil fill, isolated from the process medium by a metal diaphragm.
6. A large number of flanged and chemical seal connections are available as special options. Please contact HNL Technical Sales for details.

CODING:



SMARTSTAT OPERATION

The input pressure or differential pressure applied to the Smartstat is converted to a proportional electrical signal by the silicon pressure sensor. After amplification this signal inputs directly into the analogue to digital (a/d) port on the microprocessor.

The microprocessor continuously calculates the pressure from the input signal, compares this to the switch setpoints and operates the relays as required. If the pressure rises above the UPPER switch point the relay changes over from normally closed (NC) to normally open (NO), as the pressure falls below the LOWER switch point the relay changes over from NO to NC.

In addition the microprocessor updates the LCD display of the pressure and the status of the relays. The typical response time of the relays to an alarm condition is about 125mSec.

Should the 24Vdc power supply fail (or fall below 12 volts) the relays can be configured to remain in their current position or switch to the NO or NC position. This is the 'Fail State' that is indicated on the LCD.

A separate watchdog timer (WDT) continuously monitors the operation of the microprocessor. In the unlikely event that the processor 'hangs' this is detected by the WDT which re-boots the processor, restoring normal operation within 3 seconds.

Entry of the switching points, the Fail State and switching delays for each relay is carried out using the pushbuttons on the front of the Smartstat. An access code must be entered first to ensure that there are no unauthorised changes.

The pressure settings for each relay are adjustable throughout the range enabling the switching differential to be varied from just one digit, up to 100% of the range. All of the information entered is stored on an EEPROM so that it is retained when the power supply is off.

The pushbuttons on the front of the Smartstat are also used to calibrate the transmitter output. An access code must be entered first to ensure that there are no unauthorised changes. The 'start of range' and 'end of range' can be input and 4-20 mA or 20-4 mA selected. In addition for DP Smartstats used on flow applications square-root extraction can be enabled. If the transmitter output is not required it can be disabled, resulting in a constant supply current of 3.5mA to the Smartstat.

The maximum and minimum pressures applied to the Smartstat can be displayed by pressing the MAX or MIN pushbuttons. These values can be reset to the current pressure by holding down the appropriate pushbutton for 15 seconds.

The relays are optional on the Smartstat and can be obtained at a later date and easily fitted by the customer.



SERIES 800 SMARTSTAT TECHNICAL SPECIFICATIONS

STANDARD ELECTRICAL SMARTSTATS:

Power Supply

24Vdc @ 3.5mA without 4 - 20mA transmission.

24Vdc @ 22mA with 4 - 20mA transmission.

Maximum supply voltage 30Vdc.

Switching

Relays have multi-layered contacts making them suitable for switching from 100mVdc 100µA to 30Vdc 3A or 250Vac 4A. Minimum switching life 10⁵ operations.

I.S. CERTIFIED SMARTSTATS:

EExia IIC T4/T5/T6 EN50 014, EN50 020 & EN50 284.

T4 = 80°C, T5 = 55°C, T6 = 40°C.

Certificate No: Baseefa 03ATEX0504X.

Power Supply

24Vdc @ 3.5mA without 4 - 20mA transmission.

24Vdc @ 22mA with 4 - 20mA transmission.

24Vdc supply via any 28V 300ohm I.S. source certified by Baseefa or any EEC approved certification body to EEx ia IIC.

For Smartstat supply C=0, L=0.

Suitable barriers include MTL702+, MTL3041, MTL5041 etc.

Switching

Each relay must be connected to a separate (or the same) I.S. source certified by Baseefa or any EEC approved certification body to EEx ia IIC whose output does not exceed 28Vdc.

U_{max} IN = 28Vdc, I_{max} IN=3.33A. For relay outputs C=0, L=0.

Suitable barriers include MTL707+, MTL2210B, MTL5016 etc.

ALL SMARTSTATS:

Ambient temperature range: -20°C to +85°C (I.S. may be lower).

Accuracy

Linearity Error: +/- 0.1% typical, +/-0.25% max.

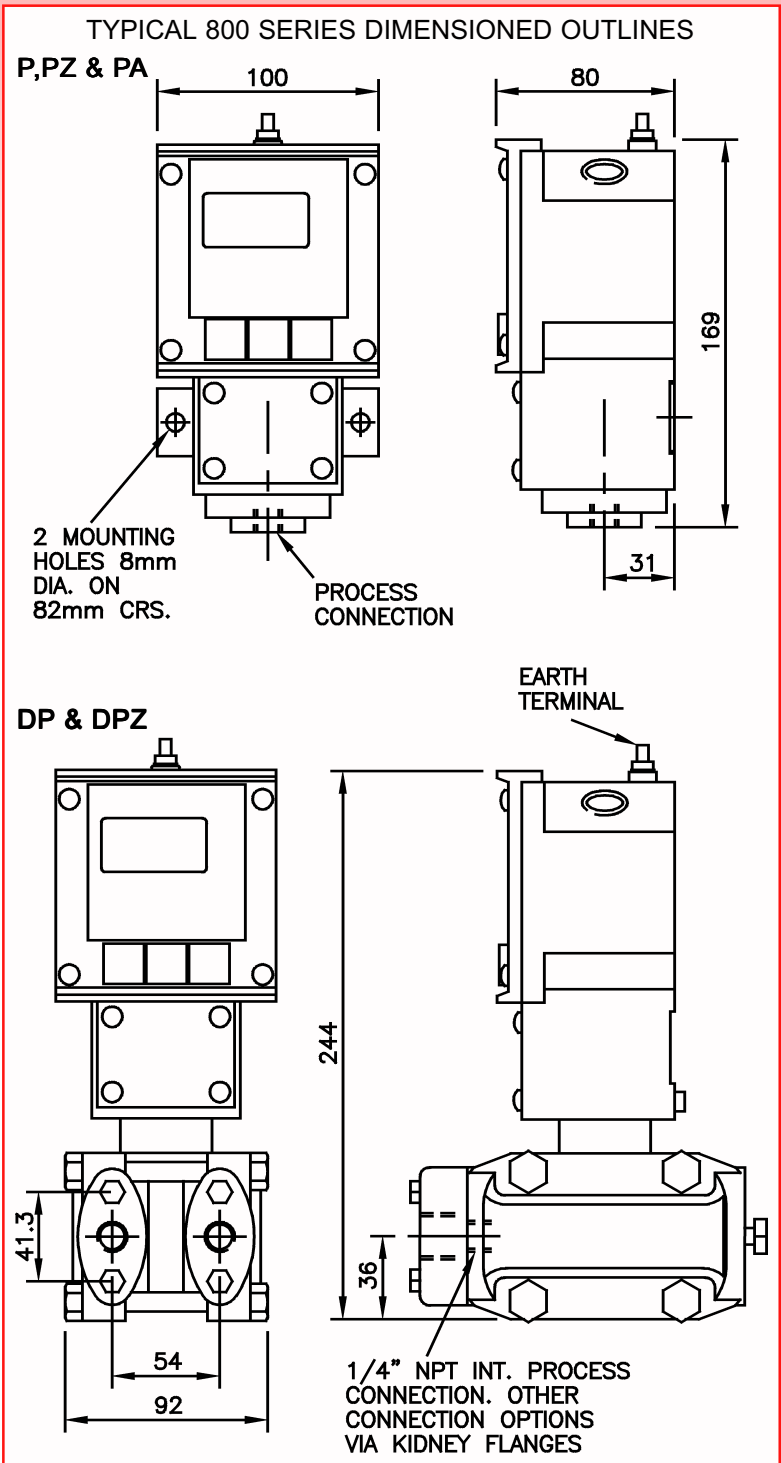
Pressure hysteresis: +/- 0.1% max.

Temperature coefficient: 0.01% per °C typical, 0.025% max.

CE

This product satisfies the requirements of the Electromagnetic Compatibility Directive 89/336/EEC and amendments by compliance with standards EN50081-2:1993 and EN50082-2:1995. This product also complies with standard EN60947-5-1:1997 in addition to the standards listed for hazardous area certification. Refer to HNL datasheet S-306 for further information.

For information on **Temperature Smartstats** please refer to technical datasheet TD800 TSMT.



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HNL Engineering Ltd comprises three Divisions offering a wide range of products & services which includes:

Instruments & Controls

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Turning, Milling, Drilling, Tapping, Sawing, Welding, Painting, Anodising. From small to large batch sizes in a wide range of materials.

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The information contained in this data sheet may be changed without notice.