# NP785 Ultra Low Differential Pressure Transmitter

We Measure, We Control, We Record

**INSTRUCTION MANUAL V1.2x**

| | |
|---|---|
| ⚠ | **Recommended for devices with firmware version up to V 1.2x.** |

# 1 SAFETY ALERTS

The symbols below are used in the device and throughout this manual to draw the user's attention to important information related to device safety and use.

|  |  |  |
|---|---|---|
| **CAUTION**<br>Read the manual fully before installing and operating the device. | **CAUTION OR HAZARD**<br>Risk of electric shock. | **ATTENTION**<br>Material sensitive to static charge. Check precautions before handling. |

All safety recommendations appearing in this manual must be followed to ensure personal safety and prevent damage to the instrument or system. If the instrument is used in a manner other than that specified in this manual, the device's safety protections may not be effective.

## 2 PRESENTATION

**NP785 Ultra Low Differential Pressure Transmitter** uses a high precision differential pressure sensor and has the stability required to perform measurements in applications that require high sensitivity. It is a micro processed device with two communication interfaces: USB and RS485 via Modbus RTU protocol. The magnitude read by the sensor is provided through any of its interfaces, converted to a selected pressure unit from a set of options.

This device has a digital alarm output, which supports the configuration of the alarm condition, adjustable setpoints and custom timing, among other functions. Its transmission output can be configured to operate in the 0-10 V and 4-20 mA standards, with adjustable range within the sensor limits, and has adjustable behavior options in case of sensor error.

**NXperience** software offers a quick and intuitive way to configure of all device features. It is also possible to carry out the monitoring and obtain the diagnosis of the information downloaded.

**NP785 Ultra Low Differential Pressure Transmitter** is suitable for use in HVAC applications such as environmental monitoring or climate control or environmental monitoring of industrial processes where high accuracy is required at low pressure ranges.

# 3 IDENTIFICATION

## 3.1 DEVICE IDENTIFICATION

The identification of the device model is described on its side label, together with information regarding its electrical connections and its serial number. **Figure 01** shows the information available in the device housing:

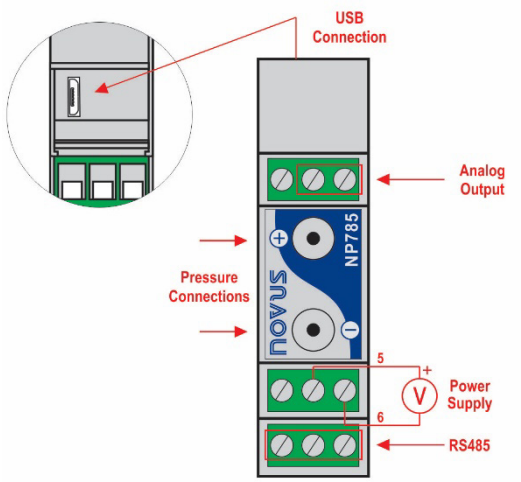


**Figure 1 – NP785 Ultra Low Differential Pressure Transmitter**

## 3.2 DEVICE MODEL

The **NP785 Ultra Low Differential Pressure Transmitter** line is available in 02 models:

- Model **NP785-05** of ± 5 mbar.
- Model **NP785-20** of ± 20 mbar.

| Model | Minimal Pressure | Maximal Pressure | Unit | Burst Pressure | Standard Configuration |
|---|---|---|---|---|---|
| **5 mbar** | -5.000 | 5.000 | mbar | ±200 mbar | ✖ |
| | -72.52 | 72.52 | mpsi | | |
| | -2.007 | 2.007 | in H2O | | |
| | -50.98 | 50.98 | mm H2O | | |
| | -500.0 | 500.0 | Pa | | |
| **20 mbar** | -20.000 | 20.000 | mbar | ±400 mbar | ✖ |
| | -290.08 | 290.08 | mpsi | | |
| | -8.029 | 8.029 | in H2O | | |
| | -203.94 | 203.94 | mm H2O | | |
| | -2000.0 | 2000.0 | Pa | | |

**Table 1 –** Model measuring range

# 4 INSTALLATION

## 4.1 MECHANICAL INSTALLATION

**NP785 Ultra Low Differential Pressure Transmitter** is designed to be fixed on 35 mm DIN rail, as shown in **Figure 02**. The 35 mm DIN rail installation must be carried out after the device has been configured.

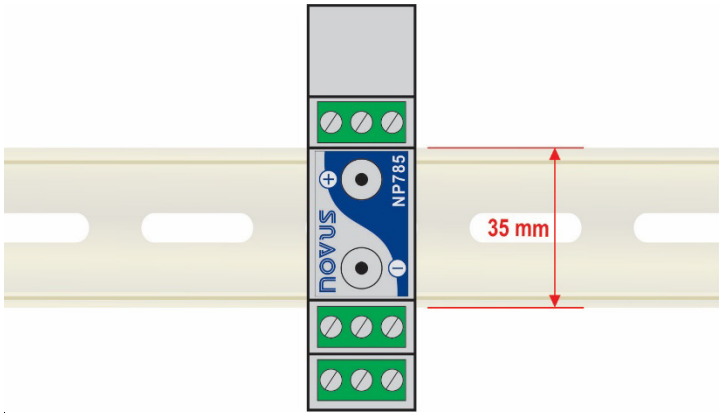


**Figure 2 –** Mechanical installation

**Installation recommendations**:

- The pneumatic hoses must be installed after the device has been fitted to the 35 mm DIN rail.
- To avoid problems with condensation, the device must be installed above the point to be measured.
- The extension of the hoses does not affect the device accuracy. Very long hoses, however, can result in measurement delays.
- Hoses should not be bent, and sharp curves should not be taken. Such actions may result in airflow interruption and possible sensor reading blockage.

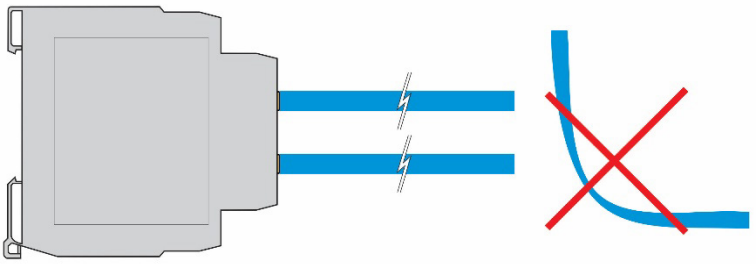

**Figure 3 –** Hose handling

| | |
|---|---|
| ⚠ | **The hose does not come with the device.**<br>**Overpressure: Excessive pressure, which exceeds the NP785 Ultra Low Differential Pressure Transmitter capacity, can cause irreversible mechanical and electrical damage to the device. To avoid damaging the operator or the device installer, follow the installation instructions and use the appropriate protection and device** |

### 4.1.1 DIMENSION

**Figure 04** shows the dimensions of the device:

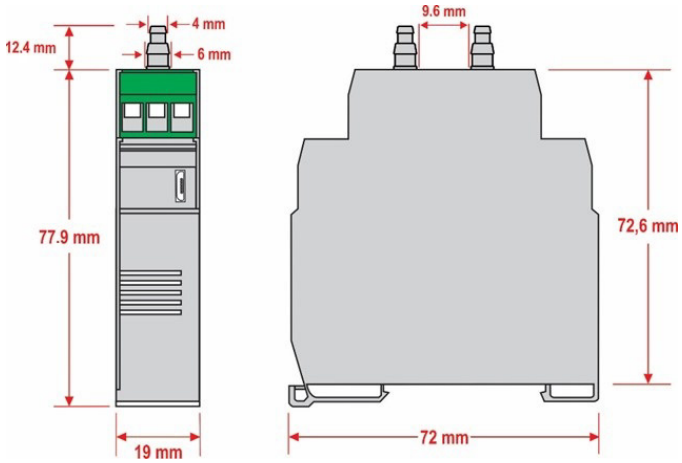


**Figure 4 –** Dimensions

## 4.2 ELECTRICAL INSTALLATION

### 4.2.1 INSTALLATION RECOMMENDATIONS

- Signal conductors should run through the plant separately from the power supply and output conductors. If possible, in grounded conduits.
- The power supply for electronic instruments must come from an appropriate grid for instruments.
- RC FILTERS (noise suppressor) are recommended in contactor coils, solenoids, etc.
- In control applications, it is essential to consider what could happen when some part of the system fails. The device's internal devices do not ensure total protection.
- Grounding helps limit the effects of noise due to electromagnetic interference (EMI). Run the grounding connection by using the grounding bolt and the grounding plane before turning on the device.

### 4.2.2 SPECIAL PRECAUTION

Because it is an electronic module, the device needs some care when handling:

- Due to the risk of damage caused by static electricity and may occur if the electronic circuit is exposed, the device should not be opened.
- Pay close attention when connecting the wires.
- Remember to pass all wires through a cable clip before completing electrical connections.
- When closing the housing, the cover should be placed again properly, ensuring proper sealing for this device.

### 4.2.3 ELECTRICAL CONNECTIONS

**Figure 05** shows the device electrical connections:

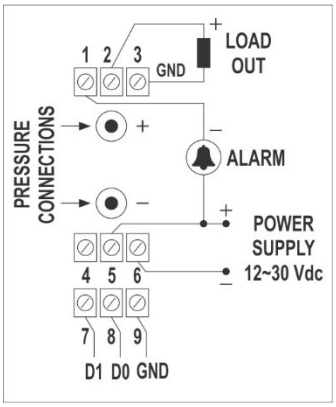


**Figure 5 –** **NP785** electrical connections

| | Electrical Connection | Input |
|---|---|---|
| **Output** | 1 | ALARM |
| | 2 | OUT (Retransmission) |
| | 3 | GND |
| **Power Supply** | 4 | NC |
| | 5 | POWER |
| | 6 | GND |
| **RS485** | 7 | D1 (D) |
| | 8 | D0 ($\overline{D}$) |
| | 9 | GND |

**Table 2 –** Electrical connections

### 4.2.4 USB CONNECTION

The USB connection is used exclusively for the device diagnosis and configuration. The USB interface is on the **NP785 Ultra Low Differential Pressure Transmitter** side.

It is recommended that the device be configured before it is attached to the DIN rail.

For more information, check the USB Interface chapter.

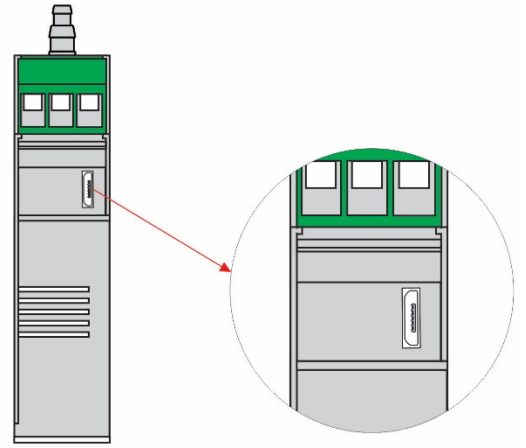

**Figure 6 –** USB Cable connection

# 5 CONFIGURATION

**NP785 Ultra Low Differential Pressure Transmitter** is configurable by any of its interfaces. Due to the ease of use of the interface, it is recommended to configure via USB using the **NXperience** software, but the device can also be configured via Modbus RTU by writing directly in their configuration registers.

The description of the device registers, together with the configuration tables, can be found in the Serial Communication chapter.

## 5.1 GENERAL SETTINGS

The purchase of the pressure value is done in digital analogue analysis solutions of the internal sensor of the device. You can select the pressure unit to be used from the following options: mbar, mpsi, in H2O, mm H2O or Pa. Changes in this setting cause transmission limits and alarm set points to be reverted to the default values, which are the operating limits of the device.

The device also has an **Offset** function and an internal digital filter for treatment of the measured signal. An offset value can be set, which will be described on the selected pressure unit, to make small adjustments to the output value. The digital filter allows you to set a time interval, in seconds, to reduce the occurrence of noise effects and peaks of pressure over a faster response.

It is also possible to configure the Modbus RTU communication parameters, such as Baud Rate, parity and slave address of the device.

For purposes of differentiation between units of the same model, an identifier can be configured in the device.

For testing purposes, the device supports forcing differential pressure measurement, analog output and alarm output. For each of these cases, you can configure a value to be forced and enable or disable the forcing.

## 5.2 ALARM SETTINGS

**NP785 Ultra Low Differential Pressure Transmitter** has a digital alarm output. The digital output will be activated whenever an alarm situation is satisfied, except cases defined by some of its settings.

You can configure the alarm operation mode, high and low setpoints, hysteresis value, status transition timers, error condition and initial blocking.

Alarm configuration can be performed through the **NXperience** software (see Output Parameter section), allowing different modes of operation:

- **Off:** No alarm situation is active.
- **Sensor Error:** While there is some error reading the sensor, the alarm output will remain on.
- **Below Lower Setpoint:** The alarm output will be triggered when the current pressure is lower than the lower set point. To exit the alarm condition, the differential pressure must be greater than the lower set point plus the hysteresis value.
- **Above Higher Setpoint:** The alarm output will be triggered when the differential pressure is higher than the upper set point. To exit the alarm condition, the differential pressure must be lower than the lower set point minus the hysteresis value.
- **Intra-range:** The alarm output will be activated when the differential pressure is higher than the lower set point and lower than the upper set point. To exit the alarm condition, the differential pressure must be greater than the upper set point plus the hysteresis value or lower than the lower set point minus the hysteresis value.
- **Extra-range:** The alarm output will be activated when the differential pressure is higher than the set point higher or lower than the lower set point. To exit the alarm condition, the differential pressure must be less than the upper set point minus the hysteresis value and higher than the lower set point plus the hysteresis value.

In addition to the alarm operation modes, other parameters, which do not apply to the Sensor Error mode, can be configured to refine the behavior of the alarm output:

- **Initial Blocking:** This parameter determines the use of the alarm output lock soon after the device is started. After initialization, a non-alarm condition is required for the alarm output to be enabled.
- **Error Condition:** The status of this parameter determines whether the alarm output will remain on or off in case of sensor failure.
- **Hysteresis:** This parameter stores the pressure value that, with the values of the set points, determines the limit value to leave the alarm situation. **Fig. 07** shows the conditions for alarm activation and deactivation.

The alarm output can be timed by means of the **Time On** and **Time Off** parameters. For a given status transition to occur, the device must remain in the new status for a period equal to the one configured in the respective transition parameter. These values are initialized to 0 by default.

**Extra-range** mode is the default mode of alarm output. The default values of the set points, in turn, are the operating limits of the device. Any changes in the pressure unit configuration readjust the values of the set points to the operating limits.

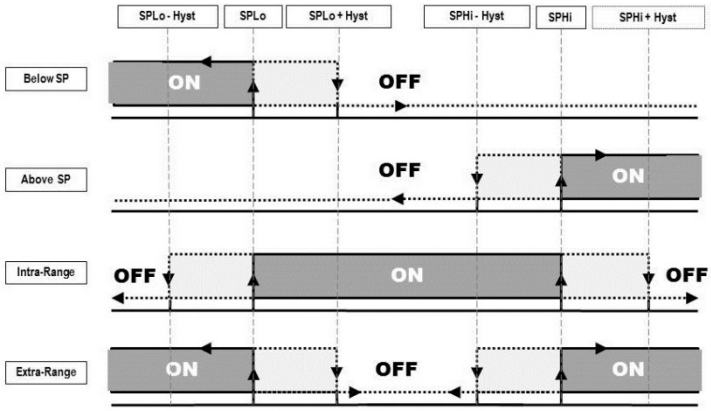


**Figure 7 –** Conditions of activation and deactivation of the different alarm modes

## 5.3 ANALOG OUTPUT CONFIGURATION

The device has a configurable analog output. You can configure it using the **NXperience** software (check the Output Parameters section), and you can define: the electrical pattern, the error mode, and the excursion range of the pressure to be transmitted.

The electrical pattern can be selected between 0-10 V and 4-20 mA modes, and the error mode determines the behavior of the analog output in case of sensor failure, as shown in table below:

| | ERROR MODE | | |
|---|---|---|---|
| **Mode** | **Low** | **High** | **Low/High*** |
| **0 – 10 V** | 0 V | 10 V | < Minimum Limit → 0 V |
| | | | Sensor error → 10 V |
| | | | > Maximum Limit → 10 V |
| **4 – 20 mA** | 3.6 mA | 21.0 mA | < Minimum Limit → 3.6 mA |
| | | | Sensor error → 21.0 mA |
| | | | > Maximum Limit → 21.0 mA |

* Available starting with firmware version 1.20 and software version 2.0.6.02.

**Table 3 –**Behavior of the analog output in case of sensor failure

The excursion of the electric signal respects the values set in the configuration of the lower and upper transmission limits, which allows customizing the differential pressure range. The factory setting also defines the upper and lower limits of the sensor as the maximum operating limits of each respective model.

The device is factory set with the 4-20 mA electrical standard and the pressure unit in mbar. Any changes in the pressure unit configuration readjust the values of the transmission limits to the operating limits of the device.

# 6 USB INTERFACE

The USB interface is used for CONFIGURING or MONITORING the device.

For CONFIGURATION, you must use the **NXperience** software to create, view, save, and open configurations from the device or files on your computer. The feature to save and open configurations in files makes it possible to transfer configurations between devices and make backup copies.

**NXperience** allows you to update the **NP785 Ultra Low Differential Pressure Transmitter** firmware (internal software) via USB interface.

For MONITORING, any supervision (SCADA) or laboratory software that supports Modbus RTU communication over a serial communication port can be used. When connected to a computer USB port, **NP785 Ultra Low Differential Pressure Transmitter** is recognized as a conventional serial port (COM x). Use **NXperience** or refer to the Device Manager on Windows Control Panel to identify the COM port assigned to the device.

Refer to the Modbus memory mapping in the device communication manual and its supervision software documentation to perform MONITORING.

Follow the procedure below to use the device USB communication:

- Download **NXperience** from our website and install it on your computer (see NXperience Software chapter). The USB drivers required for communication will be installed along with the software.
- Connect the USB cable between the device and the computer. The device does not need a power supply. The USB will provide enough power for the communication operation (other device functions may not operate).
- Run **NXperience**, configure the communication and start the device recognition.

**The USB interface IS NOT ISOLATED from retransmission output and alarm output. Its purpose is temporary use during CONFIGURATION and MONITORING periods. For the safety of people and device, it should only be used with the device fully disconnected from the external power supply input.**

**In any other situation, the USB interface use is possible, but requires a careful analysis by the person responsible for its installation.**

**For MONITORING for long periods and with inputs and outputs connected, it is recommended to use the RS485, available or optional in most of our device.**

# 7 SERIAL COMMUNICATION

**NP785 Ultra Low Differential Pressure Transmitter** can be recognized on an RS485 network with Modbus RTU protocol as a slave device. All the configurable parameters of the device can be read and/or written via serial communication.
The device supports writing in Broadcast mode, using the slave address Modbus **0**.
The available Modbus commands are as follows:
*03 – Read Holding Register*
*05 – Write Single Coil*
*06 – Write Single Register*
*16 – Write Multiple Register*

## 7.1 REGISTERS TABLE

| NP785-05 MODEL: OUTPUT REGISTERS TABLE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Address** | **Name** | **Description** | **R/W** | **Type** | **Standard** | **Min.** | **Max.** | **Decimal Places** |
| 0 | HR_PRESS | Differential pressure value | RO | int_32 | 0 | -5 mbar<br>-72,52 mpsi<br>-2,007 inH2O<br>-50,98 mmH2O<br>-500,0 Pa | 5 mbar<br>72,52 mpsi<br>2,007 inH2O<br>50,98 mmH2O<br>500,0 Pa | **mbar:** 3 decimal places<br>**mpsi:** 2 decimal places<br>**inH2O:** 3 decimal places<br>**mmH2O:** 2 decimal places<br>**Pa:** 1 decimal place |
| 1 | HR_PRESS_H | | | | | | | |
| 2 | HR_PRESS_MIN | Minimum differential pressure value logged | RO | int_32 | 0 | -5 mbar<br>-72,52 mpsi<br>-2,007 inH2O<br>-50,98 mmH2O<br>-500,0 Pa | 5 mbar<br>72,52 mpsi<br>2,007 inH2O<br>50,98 mmH2O<br>500,0 Pa | **mbar:** 3 decimal places<br>**mpsi:** 2 decimal places<br>**inH2O:** 3 decimal places<br>**mmH2O:** 2 decimal places<br>**Pa:** 1 decimal place |
| 3 | HR_PRESS_MIN_H | | | | | | | |
| 4 | HR_PRESS_MAX | Maximum differential pressure value logged | RO | int_32 | 0 | -5 mbar<br>-72,52 mpsi<br>-2,007 inH2O<br>-50,98 mmH2O<br>-500,0 Pa | 5 mbar<br>72,52 mpsi<br>2,007 inH2O<br>50,98 mmH2O<br>500,0 Pa | **mbar:** 3 decimal places<br>**mpsi:** 2 decimal places<br>**inH2O:** 3 decimal places<br>**mmH2O:** 2 decimal places<br>**Pa:** 1 decimal place |
| 5 | HR_PRESS_MAX_H | | | | | | | |

**Table 4 –** NP785-05 Model: Output Registers Table

| NP785-05 MODEL: CONFIGURATION REGISTERS TABLE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Address** | **Name** | **Description** | **R/W** | **Type** | **Standard** | **Min.** | **Max.** | **Decimal Places** |
| 100 | HR_SENSOR_TYPE | Sensor type: 5 mbar or 20 mbar | RO | uint16 | 0 | 0 | 1 | N.A. |
| 101 | HR_OUT1_TYPE | Retransmission output type* | RW | uint16 | 0 | 0 | 1 | N.A. |
| 103 | HR_OUT1_IN_HIGH_LIMIT | Retransmission upper limit input | RW | int_32 | 5 mbar<br>72,52 mpsi<br>2,007 inH2O<br>50,98 mmH2O<br>500,0 Pa | -5 mbar<br>-72,52 mpsi<br>-2,007 inH2O<br>-50,98 mmH2O<br>-500,0 Pa | 5 mbar<br>72,52 mpsi<br>2,007 inH2O<br>50,98 mmH2O<br>500,0 Pa | **mbar:** 3 decimal places<br>**mpsi:** 2 decimal places<br>**inH2O:** 3 decimal places<br>**mmH2O:** 2 decimal places<br>**Pa:** 1 decimal place |
| 104 | HR_OUT1_IN_HIGH_LIMIT_H | | | | | | | |
| 105 | HR_OUT1_IN_LOW_LIMIT | Retransmission lower limit input | RW | int_32 | -5 mbar<br>-72,52 mpsi<br>-2,007 inH2O<br>-50,98 mmH2O<br>-500,0 Pa | -5 mbar<br>-72,52 mpsi<br>-2,007 inH2O<br>-50,98 mmH2O<br>-500,0 Pa | 5 mbar<br>72,52 mpsi<br>2,007 inH2O<br>50,98 mmH2O<br>500,0 Pa | **mbar:** 3 decimal places<br>**mpsi:** 2 decimal places<br>**inH2O:** 3 decimal places<br>**mmH2O:** 2 decimal places<br>**Pa:** 1 decimal place |
| 106 | HR_OUT1_IN_LOW_LIMIT_H | | | | | | | |
| 107 | HR_OUT1_ERR | Error type (higher, lower or low/high)* | RW | uint16 | 1 | 0 | 2 | N.A. |
| 108 | HR_OUT1_HIGH_LIMIT | Retransmission upper limit | RO | int_32 | 5 mbar<br>72,52 mpsi<br>2,007 inH2O<br>50,98 mmH2O<br>500,0 Pa | -5 mbar<br>-72,52 mpsi<br>-2,007 inH2O<br>-50,98 mmH2O<br>-500,0 Pa | 5 mbar<br>72,52 mpsi<br>2,007 inH2O<br>50,98 mmH2O<br>500,0 Pa | **mbar:** 3 decimal places<br>**mpsi:** 2 decimal places<br>**inH2O:** 3 decimal places<br>**mmH2O:** 2 decimal places |
| 109 | HR_OUT1_HIGH_LIMIT_H | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | **Pa:** 1 decimal place |
| 110 | HR_OUT1_LOW_LIMIT | Retransmission lower limit | RO | int_32 | -5 mbar<br>-72,52 mpsi<br>-2,007 inH2O<br>-50,98 mmH2O<br>-500,0 Pa | -5 mbar<br>-72,52 mpsi<br>-2,007 inH2O<br>-50,98 mmH2O<br>-500,0 Pa | 5 mbar<br>72,52 mpsi<br>2,007 inH2O<br>50,98 mmH2O<br>500,0 Pa | **mbar:** 3 decimal places<br>**mpsi:** 2 decimal places<br>**inH2O:** 3 decimal places<br>**mmH2O:** 2 decimal places<br>**Pa:** 1 decimal places |
| 111 | HR_OUT1_LOW_LIMIT_H | | | | | | | |
| 113 | HR_PRESS_FLTR | Filter for differential pressure reading | RW | uint16 | 0 | 0 | 300 | 0 |
| 115 | HR_UNIT_SYSTEM | Units configuration* | RW | uint16 | 0 | 0 | 4 | N.A. |
| 122 | HR_A1FU | Alarm type* | RW | uint16 | 5 | 0 | 5 | N.A. |
| 123 | HR_A1SPHI_IN | Alarm Setpoint High Input | RW | int_32 | 0 | -5 mbar<br>-72,52 mpsi<br>-2,007 inH2O<br>-50,98 mmH2O<br>-500,0 Pa | 5 mbar<br>72,52 mpsi<br>2,007 inH2O<br>50,98 mmH2O<br>500,0 Pa | **mbar:** 3 decimal places<br>**mpsi:** 2 decimal places<br>**inH2O:** 3 decimal places<br>**mmH2O:** 2 decimal places<br>**Pa:** 1 decimal place |
| 124 | HR_A1SPHI_IN_H | | | | | | | |
| 125 | HR_A1SPLO_IN | Alarm Setpoint Low Input | RW | int_32 | 0 | -5 mbar<br>-72,52 mpsi<br>-2,007 inH2O<br>-50,98 mmH2O<br>-500,0 Pa | 5 mbar<br>72,52 mpsi<br>2,007 inH2O<br>50,98 mmH2O<br>500,0 Pa | **mbar:** 3 decimal places<br>**mpsi:** 2 decimal places<br>**inH2O:** 3 decimal places<br>**mmH2O:** 2 decimal places<br>**Pa:** 1 decimal place |
| 126 | HR_A1SPLO_IN_H | | | | | | | |
| 127 | HR_A1BL | Alarm block | RW | uint16 | 0 | 0 | 1 | N.A. |
| 128 | HR_A1HY | Alarm hysteresis | RW | uint16 | 0 | 0 | 1 mbar<br>14,50 mpsi<br>0,401 inH2O<br>10,20 mmH2O<br>100,0 Pa | **mbar:** 3 decimal places<br>**mpsi:** 2 decimal places<br>**inH2O:** 3 decimal places<br>**mmH2O:** 2 decimal places<br>**Pa:** 1 decimal place |
| 129 | HR_A1T1 | Alarm time ON | RW | uint16 | 0 | 0 | 6500 | 0 |
| 130 | HR_A1T2 | Alarm time OFF | RW | uint16 | 0 | 0 | 6500 | 0 |
| 131 | HR_A1IERR | Determines the alarm status in case of sensor error | RW | uint16 | 0 | 0 | 1 | N.A. |
| 132 | HR_A1SPHI | Alarm Setpoint High | RO | int_32 | 0 | -5 mbar<br>-72,52 mpsi<br>-2,007 inH2O<br>-50,98 mmH2O<br>-500,0 Pa | 5 mbar<br>72,52 mpsi<br>2,007 inH2O<br>50,98 mmH2O<br>500,0 Pa | **mbar:** 3 decimal places<br>**mpsi:** 2 decimal places<br>**inH2O:** 3 decimal places<br>**mmH2O:** 2 decimal places<br>**Pa:** 1 decimal place |
| 133 | HR_A1SPHI_H | | | | | | | |
| 134 | HR_A1SPLO | Alarm Setpoint Low | RO | int_32 | 0 | -5 mbar<br>-72,52 mpsi<br>-2,007 inH2O<br>-50,98 mmH2O<br>-500,0 Pa | 5 mbar<br>72,52 mpsi<br>2,007 inH2O<br>50,98 mmH2O<br>500,0 Pa | **mbar:** 3 decimal places<br>**mpsi:** 2 decimal places<br>**inH2O:** 3 decimal places<br>**mmH2O:** 2 decimal places<br>**Pa:** 1 decimal place |
| 135 | HR_A1SPLO_H | | | | | | | |
| 137 | HR_BAUD | Baud Rate* | RW | uint16 | 4 | 0 | 7 | N.A. |
| 138 | HR_PRTY | Parity* | RW | uint16 | 0 | 0 | 2 | N.A. |
| 139 | HR_ADDR | Slave address | RW | uint16 | 1 | 1 | 247 | N.A. |
| 146 | HR_OFST_PRESS | Differential pressure Offset | RW | uint16 | 0 | -1 mbar<br>-14,50 mpsi<br>-0,401 inH2O | 1 mbar<br>14,50 mpsi<br>0,401 inH2O | **mbar:** 3 decimal places<br>**mpsi:** 2 decimal |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | -10,20 mmH2O<br>-100,0 Pa | 10,20 mmH2O<br>100,0 Pa | places<br>**inH2O:** 3 decimal places<br>**mmH2O:** 2 decimal places<br>**Pa:** 1 decimal place |
| 152 | HR_OUT1_FORCE_ENAB | Enables forcing output 1 | RW | uint16 | 0 | 0 | 1 | N.A. |
| 153 | HR_OUT1_FORCE_VAL | Forced value for output 1 | RW | uint16 | 0 | 0,00 V<br>3,60 mA | 10,00 V<br>21 mA | 2 |
| 154 | HR_A1_FORCE_ENAB | Enables forcing alarm 1 | RW | uint16 | 0 | 0 | 1 | N.A. |
| 155 | HR_A1_STATE | Changes forced status on alarm | RW | uint16 | 0 | 0 | 1 | N.A. |
| 156 | HR_FORCE_IN_PRESS | Enables differential pressure forcing | RW | uint16 | 0 | 0 | 1 | N.A. |
| 157 | HR_FORCE_PRESS_IN | Forced differential pressure value input | RW | int_32 | 0 | -5 mbar<br>-72,52 mpsi<br>-2,007 inH2O<br>-50,98 mmH2O<br>-500,0 Pa | 5 mbar<br>72,52 mpsi<br>2,007 inH2O<br>50,98 mmH2O<br>500,0 Pa | **mbar:** 3 decimal places<br>**mpsi:** 2 decimal places<br>**inH2O:** 3 decimal places<br>**mmH2O:** 2 decimal places<br>**Pa:** 1 decimal place |
| 158 | HR_FORCE_PRESS_IN_H | | | | | | | |
| 159 | HR_FORCE_PRESS | Forced differential pressure value | RO | int_32 | 0 | -5 mbar<br>-72,52 mpsi<br>-2,007 inH2O<br>-50,98 mmH2O<br>-500,0 Pa | 5 mbar<br>72,52 mpsi<br>2,007 inH2O<br>50,98 mmH2O<br>500,0 Pa | **mbar:** 3 decimal places<br>**mpsi:** 2 decimal places<br>**inH2O:** 3 decimal places<br>**mmH2O:** 2 decimal places<br>**Pa:** 1 decimal place |
| 160 | HR_FORCE_PRESS | | | | | | | |
| 161 | HR_RESET_MIN_MAX | Reset all lows and highs | RW | uint16 | 0 | 0 | 1 | N.A. |
| 166 | HR_PRODUCT_TAG01 | Equipment tag | RW | 2 char | 0 | 0x0000 | 0xFFFF | N.A. |
| 167 | HR_PRODUCT_TAG02 | | RW | 2 char | 0 | 0x0000 | 0xFFFF | N.A. |
| 168 | HR_PRODUCT_TAG03 | | RW | 2 char | 0 | 0x0000 | 0xFFFF | N.A. |
| 169 | HR_PRODUCT_TAG04 | | RW | 2 char | 0 | 0x0000 | 0xFFFF | N.A. |
| 170 | HR_PRODUCT_TAG05 | | RW | 2 char | 0 | 0x0000 | 0xFFFF | N.A. |
| 171 | HR_PRODUCT_TAG06 | | RW | 2 char | 0 | 0x0000 | 0xFFFF | N.A. |
| 172 | HR_PRODUCT_TAG07 | | RW | 2 char | 0 | 0x0000 | 0xFFFF | N.A. |
| 173 | HR_PRODUCT_TAG08 | | RW | 2 char | 0 | 0x0000 | 0xFFFF | N.A. |
| 174 | HR_PRODUCT_TAG09 | | RW | 2 char | 0 | 0x0000 | 0xFFFF | N.A. |
| 175 | HR_PRODUCT_TAG10 | | RW | 2 char | 0 | 0x0000 | 0xFFFF | N.A. |

* Check the **Table 10** for more information about the device configuration registers.

**Table 5 –** NP785-05 Model: Configuration Registers Table

The registers 103 to 106, 123 to 126, 157 and 158 must be used by the user to enter the values of their respective parameters. If they are within limits, the device will automatically pass these values to registers 108 to 111, 132 to 135, 159 and 160, which show the values considered during the operation. In case of extrapolation of limits, this condition will be signaled in register 343 (HR_DIAGNOSE03).

For 32-bit data, the two registers that compose them must be read and/or written for the values to be updated.

| NP785-05 MODEL: INFORMATION REGISTERS TABLE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Address** | **Name** | **Description** | **R/W** | **Type** | **Standard** | **Min.** | **Max.** | **Decimal Places** |
| 300 | HR_NUM_SERIEH | Serial Number High | RO | uint_32 | - | 0x0000 | 0xFFFF | N.A. |
| 301 | HR_NUM_SERIEL | Serial Number Low | | | - | 0x0000 | 0xFFFF | N.A. |
| 302 | HR_VERSAO_SW | Firmware version | RO | uint16 | - | 0x0000 | 0xFFFF | 2 |
| 303 | HR_RELEASE | Release version | RO | uint16 | - | 0x0000 | 0xFFFF | 0 |
| 304 | HR_ID | ID | RO | uint16 | 0xB3 | 0x0000 | 0xFFFF | N.A. |
| 305 | HR_MODEL | Informs the product model | RO | uint16 | 0 | 0x0000 | 0xFFFF | N.A. |
| 341 | HR_DIAGNOSE01 | Diagnostic** | RO | uint16 | 0 | 0x0000 | 0xFFFF | N.A. |
| 342 | HR_DIAGNOSE02 | | RO | uint16 | 0 | 0x0000 | 0xFFFF | N.A. |
| 343 | HR_DIAGNOSE03 | | RO | uint16 | 0 | 0x0000 | 0xFFFF | N.A. |
| 359 | HR_PRESS_HIGH_LIMIT | Maximum limits | RO | uint32 | 5 mbar<br>72,52 mpsi<br>2,007 inH2O<br>50,98 mmH2O<br>500,0 Pa | -5 mbar<br>-72,52 mpsi<br>-2,007 inH2O<br>-50,98 mmH2O<br>-500,0 Pa | 5 mbar<br>72,52 mpsi<br>2,007 inH2O<br>50,98 mmH2O<br>500,0 Pa | **mbar:** 3 decimal places<br>**mpsi:** 2 decimal places<br>**inH2O:** 3 decimal places<br>**mmH2O:** 2 decimal places<br>**Pa:** 1 decimal place |
| 360 | HR_PRESS_HIGH_LIMIT_H | | | | | | | |
| 361 | HR_PRESS_LOW_LIMIT | Minimum limits | RO | uint32 | -5 mbar<br>-72,52 mpsi<br>-2,007 inH2O<br>-50,98 mmH2O<br>-500,0 Pa | -5 mbar<br>-72,52 mpsi<br>-2,007 inH2O<br>-50,98 mmH2O<br>-500,0 Pa | 5 mbar<br>72,52 mpsi<br>2,007 inH2O<br>50,98 mmH2O<br>500,0 Pa | **mbar:** 3 decimal places<br>**mpsi:** 2 decimal places<br>**inH2O:** 3 decimal places<br>**mmH2O:** 2 decimal places<br>**Pa:** 1 decimal place |
| 362 | HR_PRESS_LOW_LIMIT_H | | | | | | | |

** Check the **Table 11** for more information about the device configuration registers.

**Table 6 –** NP785-05 Model: Information registers

| NP785-20 MODEL: OUTPUT REGISTERS TABLE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Address** | **Name** | **Description** | **R/W** | **Type** | **Standard** | **Min.** | **Max.** | **Decimal Places** |
| 0 | HR_PRESS | Differential pressure value | RO | int_32 | 0 | -20 mbar<br>-290,08 mpsi<br>-8,029 inH2O<br>-203,94 mmH2O<br>-2000,0 Pa | 20 mbar<br>290,08 mpsi<br>8,029 inH2O<br>203,94 mmH2O<br>2000,0 Pa | **mbar:** 3 decimal places<br>**mpsi:** 2 decimal places<br>**inH2O:** 3 decimal places<br>**mmH2O:** 2 decimal places<br>**Pa:** 1 decimal place |
| 1 | HR_PRESS_H | | | | | | | |
| 2 | HR_PRESS_MIN | Minimum differential pressure value logged | RO | int_32 | 0 | -20 mbar<br>-290,08 mpsi<br>-8,029 inH2O<br>-203,94 mmH2O<br>-2000,0 Pa | 20 mbar<br>290,08 mpsi<br>8,029 inH2O<br>203,94 mmH2O<br>2000,0 Pa | **mbar:** 3 decimal places<br>**mpsi:** 2 decimal places<br>**inH2O:** 3 decimal places<br>**mmH2O:** 2 decimal places<br>**Pa:** 1 decimal place |
| 3 | HR_PRESS_MIN_H | | | | | | | |
| 4 | HR_PRESS_MAX | Maximum differential pressure value logged | RO | int_32 | 0 | -20 mbar<br>-290,08 mpsi<br>-8,029 inH2O<br>-203,94 mmH2O<br>-2000,0 Pa | 20 mbar<br>290,08 mpsi<br>8,029 inH2O<br>203,94 mmH2O<br>2000,0 Pa | **mbar:** 3 decimal places<br>**mpsi:** 2 decimal places<br>**inH2O:** 3 decimal places<br>**mmH2O:** 2 decimal places<br>**Pa:** 1 decimal place |
| 5 | HR_PRESS_MAX_H | | | | | | | |

**Table 7 –** NP785-20 Model:16:30 Output Registers Table

| NP785 MODEL: CONFIGURATION REGISTERS TABLE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Address** | **Name** | **Description** | **R/W** | **Type** | **Standard** | **Min.** | **Max.** | **Decimal Places** |
| 100 | HR_SENSOR_TYPE | Sensor type: 5 mbar or 20 mbar | RO | uint16 | 1 | 0 | 1 | N.A. |
| 101 | HR_OUT1_TYPE | Retransmission output type* | RW | uint16 | 0 | 0 | 1 | N.A. |
| 103 | HR_OUT1_IN_HIGH_LIMIT | Retransmission upper limit input | RW | int_32 | 20 mbar<br>290,08 mpsi<br>8,029 inH2O<br>203,94 mmH2O<br>2000,0 Pa | -20 mbar<br>-290,08 mpsi<br>-8,029 inH2O<br>-203,94 mmH2O<br>-2000,0 Pa | 20 mbar<br>290,08 mpsi<br>8,029 inH2O<br>203,94 mmH2O<br>2000,0 Pa | **mbar:** 3 decimal places<br>**mpsi:** 2 decimal places<br>**inH2O:** 3 decimal places<br>**mmH2O:** 2 decimal places<br>**Pa:** 1 decimal place |
| 104 | HR_OUT1_IN_HIGH_LIMIT_H | | | | | | | |
| 105 | HR_OUT1_IN_LOW_LIMIT | Retransmission lower limit input | RW | int_32 | -20 mbar<br>-290,08 mpsi<br>-8,029 inH2O<br>-203,94 mmH2O<br>-2000,0 Pa | -20 mbar<br>-290,08 mpsi<br>-8,029 inH2O<br>-203,94 mmH2O<br>-2000,0 Pa | 20 mbar<br>290,08 mpsi<br>8,029 inH2O<br>203,94 mmH2O<br>2000,0 Pa | **mbar:** 3 decimal places<br>**mpsi:** 2 decimal places<br>**inH2O:** 3 decimal places<br>**mmH2O:** 2 decimal places<br>**Pa:** 1 decimal place |
| 106 | HR_OUT1_IN_LOW_LIMIT_H | | | | | | | |
| 107 | HR_OUT1_ERR | Error type (higher, lower or low/high)* | RW | uint16 | 1 | 0 | 2 | N.A. |
| 108 | HR_OUT1_HIGH_LIMIT | Retransmission upper limit | RO | int_32 | 20 mbar<br>290,08 mpsi<br>8,029 inH2O<br>203,94 mmH2O<br>2000,0 Pa | -20 mbar<br>-290,08 mpsi<br>-8,029 inH2O<br>-203,94 mmH2O<br>-2000,0 Pa | 20 mbar<br>290,08 mpsi<br>8,029 inH2O<br>203,94 mmH2O<br>2000,0 Pa | **mbar:** 3 decimal places<br>**mpsi:** 2 decimal places<br>**inH2O:** 3 decimal places<br>**mmH2O:** 2 decimal places<br>**Pa:** 1 decimal place |
| 109 | HR_OUT1_HIGH_LIMIT_H | | | | | | | |
| 110 | HR_OUT1_LOW_LIMIT | Retransmission lower limit | RO | int_32 | -20 mbar<br>-290,08 mpsi<br>-8,029 inH2O<br>-203,94 mmH2O<br>-2000,0 Pa | -20 mbar<br>-290,08 mpsi<br>-8,029 inH2O<br>-203,94 mmH2O<br>-2000,0 Pa | 20 mbar<br>290,08 mpsi<br>8,029 inH2O<br>203,94 mmH2O<br>2000,0 Pa | **mbar:** 3 decimal places<br>**mpsi:** 2 decimal places<br>**inH2O:** 3 decimal places<br>**mmH2O:** 2 decimal places<br>**Pa:** 1 decimal place |
| 111 | HR_OUT1_LOW_LIMIT_H | | | | | | | |
| 113 | HR_PRESS_FLTR | Filter for differential pressure reading | RW | uint16 | 0 | 0 | 300 | 0 |
| 115 | HR_UNIT_SYSTEM | Units configuration* | RW | uint16 | 0 | 0 | 4 | N.A. |
| 122 | HR_A1FU | Alarm type* | RW | uint16 | 5 | 0 | 5 | N.A. |
| 123 | HR_A1SPHI_IN | Alarm Setpoint High Input | RW | int_32 | 0 | -20 mbar<br>-290,08 mpsi<br>-8,029 inH2O<br>-203,94 mmH2O<br>-2000,0 Pa | 20 mbar<br>290,08 mpsi<br>8,029 inH2O<br>203,94 mmH2O<br>2000,0 Pa | **mbar:** 3 decimal places<br>**mpsi:** 2 decimal places<br>**inH2O:** 3 decimal places<br>**mmH2O:** 2 decimal places<br>**Pa:** 1 decimal place |
| 124 | HR_A1SPHI_IN_H | | | | | | | |
| 125 | HR_A1SPLO_IN | Alarm Setpoint Low Input | RW | int_32 | 0 | -20 mbar<br>-290,08 mpsi<br>-8,029 inH2O<br>-203,94 mmH2O<br>-2000,0 Pa | 20 mbar<br>290,08 mpsi<br>8,029 inH2O<br>203,94 mmH2O<br>2000,0 Pa | **mbar:** 3 decimal places<br>**mpsi:** 2 decimal places<br>**inH2O:** 3 decimal places<br>**mmH2O:** 2 decimal places<br>**Pa:** 1 decimal place |
| 126 | HR_A1SPLO_IN _H | | | | | | | |
| 127 | HR_A1BL | Alarm block | RW | uint16 | 0 | 0 | 1 | N.A. |
| 128 | HR_A1HY | Alarm hysteresis | RW | uint16 | 0 | 0 | 4 mbar<br>58,02 mpsi<br>1,606 inH2O<br>40,78 mmH2O<br>400,0 Pa | **mbar:** 3 decimal places<br>**mpsi:** 2 decimal places<br>**inH2O:** 3 decimal places<br>**mmH2O:** 2 decimal places<br>**Pa:** 1 decimal place |
| 129 | HR_A1T1 | Alarm time ON | RW | uint16 | 0 | 0 | 6500 | 0 |
| 130 | HR_A1T2 | Alarm time OFF | RW | uint16 | 0 | 0 | 6500 | 0 |
| 131 | HR_A1IERR | Determines the alarm status in case of sensor error | RW | uint16 | 0 | 0 | 1 | N.A. |
| 132 | HR_A1SPHI | Alarm Setpoint High | RO | int_32 | 0 | -20 mbar | 20 mbar | **mbar:** 3 decimal places |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 133 | HR_A1SPHI_H | | | | | -290,08 mpsi<br>-8,029 inH2O<br>-203,94 mmH2O<br>-2000,0 Pa | 290,08 mpsi<br>8,029 inH2O<br>203,94 mmH2O<br>2000,0 Pa | **mpsi:** 2 decimal places<br>**inH2O:** 3 decimal places<br>**mmH2O:** 2 decimal places<br>**Pa:** 1 decimal place |
| 134 | HR_A1SPLO | Alarm Setpoint Low | RO | int_32 | 0 | -20 mbar<br>-290,08 mpsi<br>-8,029 inH2O<br>-203,94 mmH2O<br>-2000,0 Pa | 20 mbar<br>290,08 mpsi<br>8,029 inH2O<br>203,94 mmH2O<br>2000,0 Pa | **mbar:** 3 decimal places<br>**mpsi:** 2 decimal places<br>**inH2O:** 3 decimal places<br>**mmH2O:** 2 decimal places<br>**Pa:** 1 decimal place |
| 135 | HR_A1SPLO_H | | | | | | | |
| 137 | HR_BAUD | Baud Rate* | RW | uint16 | 4 | 0 | 7 | N.A. |
| 138 | HR_PRTY | Parity* | RW | uint16 | 0 | 0 | 2 | N.A. |
| 139 | HR_ADDR | Slave address | RW | uint16 | 1 | 1 | 247 | N.A. |
| 146 | HR_OFST_PRESS | Differential pressure offset | RW | uint16 | 0 | -4 mbar<br>-58,02 mpsi<br>-1,606 inH2O<br>-40,78 mmH2O<br>-400,0 Pa | 4 mbar<br>58,02 mpsi<br>1,606 inH2O<br>40,78 mmH2O<br>400,0 Pa | **mbar:** 3 decimal places<br>**mpsi:** 2 decimal places<br>**inH2O:** 3 decimal places<br>**mmH2O:** 2 decimal places<br>**Pa:** 1 decimal place |
| 152 | HR_OUT1_FORCE_ENAB | Enables forcing output 1 | RW | uint16 | 0 | 0 | 1 | N.A. |
| 153 | HR_OUT1_FORCE_VAL | Forced value for output 1 | RW | uint16 | 0 | 0,00 V<br>3,60 mA | 10,00 V<br>21 mA | 2 |
| 154 | HR_A1_FORCE_ENAB | Enables forcing alarm 1 | RW | uint16 | 0 | 0 | 1 | N.A. |
| 155 | HR_A1_STATE | Changes forced status on alarm | RW | uint16 | 0 | 0 | 1 | N.A. |
| 156 | HR_FORCE_IN_PRESS | Enables differential pressure forcing | RW | uint16 | 0 | 0 | 1 | N.A. |
| 157 | HR_FORCE_PRESS_IN | Forced differential pressure value input | RW | int_32 | 0 | -20 mbar<br>-290,08 mpsi<br>-8,029 inH2O<br>-203,94 mmH2O<br>-2000,0 Pa | 20 mbar<br>290,08 mpsi<br>8,029 inH2O<br>203,94 mmH2O<br>2000,0 Pa | **mbar:** 3 decimal places<br>**mpsi:** 2 decimal places<br>**inH2O:** 3 decimal places<br>**mmH2O:** 2 decimal places<br>**Pa:** 1 decimal place |
| 158 | HR_FORCE_PRESS_IN_H | | | | | | | |
| 159 | HR_FORCE_PRESS | Forced differential pressure valure | RO | int_32 | 0 | -20 mbar<br>-290,08 mpsi<br>-8,029 inH2O<br>-203,94 mmH2O<br>-2000,0 Pa | 20 mbar<br>290,08 mpsi<br>8,029 inH2O<br>203,94 mmH2O<br>2000,0 Pa | **mbar:** 3 decimal places<br>**mpsi:** 2 decimal places<br>**inH2O:** 3 decimal places<br>**mmH2O:** 2 decimal places<br>**Pa:** 1 decimal places |
| 160 | HR_FORCE_PRESS_H | | | | | | | |
| 161 | HR_RESET_MIN_MAX | Reset all lows and highs | RW | uint16 | 0 | 0 | 1 | N.A. |
| 166 | HR_PRODUCT_TAG01 | Equipment tag | RW | 2 char | 0 | 0x0000 | 0xFFFF | N.A. |
| 167 | HR_PRODUCT_TAG02 | | RW | 2 char | 0 | 0x0000 | 0xFFFF | N.A. |
| 168 | HR_PRODUCT_TAG03 | | RW | 2 char | 0 | 0x0000 | 0xFFFF | N.A. |
| 169 | HR_PRODUCT_TAG04 | | RW | 2 char | 0 | 0x0000 | 0xFFFF | N.A. |
| 170 | HR_PRODUCT_TAG05 | | RW | 2 char | 0 | 0x0000 | 0xFFFF | N.A. |
| 171 | HR_PRODUCT_TAG06 | | RW | 2 char | 0 | 0x0000 | 0xFFFF | N.A. |
| 172 | HR_PRODUCT_TAG07 | | RW | 2 char | 0 | 0x0000 | 0xFFFF | N.A. |
| 173 | HR_PRODUCT_TAG08 | | RW | 2 char | 0 | 0x0000 | 0xFFFF | N.A. |
| 174 | HR_PRODUCT_TAG09 | | RW | 2 char | 0 | 0x0000 | 0xFFFF | N.A. |
| 175 | HR_PRODUCT_TAG10 | | RW | 2 char | 0 | 0x0000 | 0xFFFF | N.A. |

* Check the **Table 10** for more information about the device configuration registers.

**Table 8 –** NP785 Model: Configuration Registers Table

The registers 103 to 106, 123 to 126, 157 and 158 must be used by the user to enter the values of their respective parameters. If they are within limits, the device will automatically pass these values to registers 108 to 111, 132 to 135, 159 and 160, which show the values considered during the operation. In case of extrapolation of limits, this condition will be signaled in register 343 (HR_DIAGNOSE03). For 32-bit data, the two registers that compose them must be read and/or written for the values to be updated.

| NP785-20 MODEL: INFORMATION REGISTERS TABLE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Address** | **Name** | **Description** | **R/W** | **Type** | **Standard** | **Min.** | **Max.** | **Decimal Places** |
| 300 | HR_NUM_SERIEH | Serial number High | RO | uint_32 | - | 0x0000 | 0xFFFF | N.A. |
| 301 | HR_NUM_SERIEL | Serial number Low | | | - | 0x0000 | 0xFFFF | N.A. |
| 302 | HR_VERSAO_SW | Firmware version | RO | uint16 | - | 0x0000 | 0xFFFF | 2 |
| 303 | HR_RELEASE | Release version | RO | uint16 | - | 0x0000 | 0xFFFF | 0 |
| 304 | HR_ID | ID | RO | uint16 | 0xB3 | 0x0000 | 0xFFFF | N.A. |
| 305 | HR_MODEL | Informs the product model | RO | uint16 | 0 | 0x0000 | 0xFFFF | N.A. |
| 341 | HR_DIAGNOSE01 | Diagnostic* | RO | uint16 | 0 | 0x0000 | 0xFFFF | N.A. |
| 342 | HR_DIAGNOSE02 | | RO | uint16 | 0 | 0x0000 | 0xFFFF | N.A. |
| 343 | HR_DIAGNOSE03 | | RO | uint16 | 0 | 0x0000 | 0xFFFF | N.A. |
| 359 | HR_PRESS_HIGH_LIMIT | Maximum limits | RO | uint32 | 20 mbar<br>290,08 mpsi<br>8,029 inH2O<br>203,94 mmH2O<br>2000,0 Pa | -20 mbar<br>-290,08 mpsi<br>-8,029 inH2O<br>-203,94 mmH2O<br>-2000,0 Pa | 20 mbar<br>290,08 mpsi<br>8,029 inH2O<br>203,94 mmH2O<br>2000,0 Pa | **mbar:** 3 decimal places<br>**mpsi:** 2 decimal places<br>**inH2O:** 3 decimal places<br>**mmH2O:** 2 decimal places<br>**Pa:** 1 decimal place |
| 360 | HR_PRESS_HIGH_LIMIT_H | | | | | | | |
| 361 | HR_PRESS_LOW_LIMIT | Minimum limits | RO | uint32 | -20 mbar<br>-290,08 mpsi<br>-8,029 inH2O<br>-203,94 mmH2O<br>-2000,0 Pa | -20 mbar<br>-290,08 mpsi<br>-8,029 inH2O<br>-203,94 mmH2O<br>-2000,0 Pa | 20 mbar<br>290,08 mpsi<br>8,029 inH2O<br>203,94 mmH2O<br>2000,0 Pa | **mbar:** 3 decimal places<br>**mpsi:** 2 decimal places<br>**inH2O:** 3 decimal places<br>**mmH2O:** 2 decimal places<br>**Pa:** 1 decimal place |
| 362 | HR_PRESS_LOW_LIMIT_H | | | | | | | |

* Check the **Table 11** for more information about the device configuration registers.

**Table 9 –** NP785-20 Model: Information Registers

**Table 10** lists the device configuration registers and the captions for their respective values:

| REGISTER | NAME | VALUE | DESCRIPTION |
|---|---|---|---|
| 101 | HR_OUT1_TYPE | 0<br>1 | Output 4-20 mA<br>Output 0-10 V |
| 107 | HR_OUT1_ERR | 0<br>1<br>2 | Low alarm in case of failure<br>High alarm in case of failure<br>Low/high alarm in case of failure |
| 115 | HR_UNIT_SYSTEM | 0<br>1<br>2<br>3<br>4 | Unity: mbar<br>Unity: mpsi<br>Unity: inH2O<br>Unity: mmH2O<br>Unity: Pa |
| 122 | HR_A1FU | 0<br>1<br>2<br>3<br>4<br>5 | Alarm: Off<br>Alarm: Sensor Error<br>Alarm: Lower Setpoint<br>Alarm: Higher Setpoint<br>Alarm: Intra-range<br>Alarm: Extra-range |
| 137 | HR_BAUD | 0<br>1<br>2<br>3<br>4<br>5<br>6<br>7 | Baud Rate: 1200 bps<br>Baud Rate: 2400 bps<br>Baud Rate: 4800 bps<br>Baud Rate: 9600 bps<br>Baud Rate: 19200 bps<br>Baud Rate: 38400 bps<br>Baud Rate: 57600 bps<br>Baud Rate: 115200 bps |

| | | | |
|---|---|---|---|
| 138 | HR_PRTY | 0<br>1<br>2 | Parity: No parity<br>Parity: Odd parity<br>Parity: Even parity |

**Table 10 –** Subtitle

**Table 11** shows the diagnostic bits:

| REGISTER | NAME | DESCRIPTION | BIT |
|---|---|---|---|
| HR_DIAGNOSE01 | DIAG_RESTART_UNITS_ERROR | Units Configuration error. | 0 |
| | DIAG_OUT1_OVERLOAD | Alarm output overload detection. | 1 |
| | DIAG_ALM1_OUT_STATUS | Forced alarm status. | 3 |
| | DIAG_ALM1_STATUS | Alarm status. | 5 |
| | DIAG_FORCE_ALM1 | Forced alarm function is enabled. | 10 |
| | DIAG_FORCE_OUT1 | Forced output function is enabled. | 12 |
| HR_DIAGNOSE02 | DIAG_SENSOR_ERROR | Differential pressure sensor error. | 0 |
| HR_DIAGNOSE03 | DIAG_OUT1_LIMIT_OOR | Input of retransmission limits outside the range. | 1 |
| | DIAG_ALM1_SETPT_OOR | Input of alarm setpoints outside the range. | 3 |
| | DIAG_FORCE_PRESS_OOR | Input of pressure forcing values out of range. | 6 |
| HR_DIAGNOSE04 | DIAG_UNDER_RANGE | Indicates that the lower limit of the range has been exceeded. | 1 |
| | DIAG_OVER_RANGE | Indicates that the lower limit of the range has been exceeded. | 2 |

**Table 11 –** Diagnostic Bits

# 8 NXPERIENCE SOFTWARE

**NXperience** software is the leading configuration, data download and analysis tool for **NP785 Ultra Low Differential Pressure Transmitter**. It allows you to explore all the device features by communicating via the USB interface.

This manual describes the software generic features. For instructions about device configuration, check the specific operating manual.

## 8.1 INSTALLING NXPERIENCE

To install **NXperience**, just execute the ***NXperienceSetup.exe*** file

## 8.2 RUNNING NXPERIENCE

When opening **NXperience** software, the home screen is displayed:

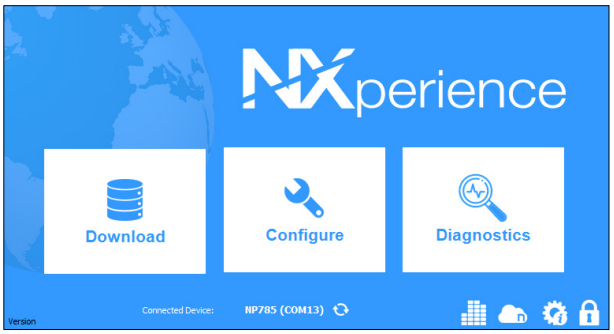


**Figure 8 –** **NXperience** home screen

To communicate with the software, you must connect the **NP785 Ultra Low Differential Pressure Transmitter** to the computer and with the previously installed USB drivers.

Then you can click on **Configure** or **Diagnostic**. The **Download** option is not available for this device model.

The first time you read a device, you must select the device to be connected. Simply double click on the desired device or, once it is selected, click on the **Ok** button. This device will be adopted as the default option for the next times the software performs the communication process.

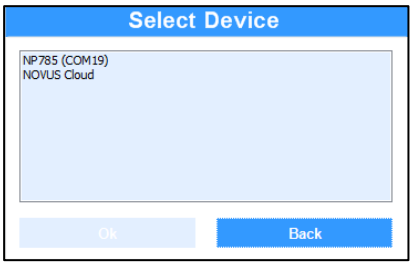


**Figure 9 –** Select Device screen

## 8.3 CONFIGURING WITH NXPERIENCE

To configure the device, it must be connected to a USB port on the computer.

When clicking on the **Configure** button, the following screen will be displayed:

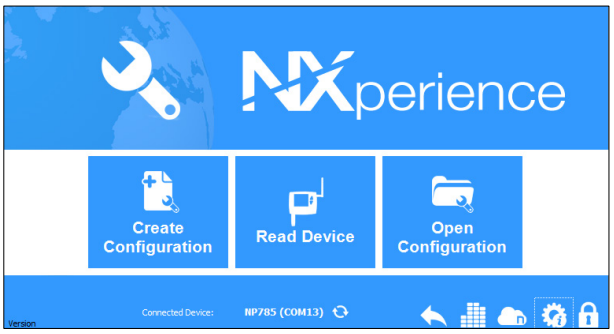


**Figure 10 –** Configuring the device screen

The **Create Configuration** button creates a configuration from scratch, without needing the device. This configuration can be saved in a file for future use or can be recorded to a connected device.

The **Open Configuration** button reads a configuration file already created.

The **Read Device** button reads the current device configuration. When selecting this option, all features available for configuration will be displayed, as shown in **Figure 11**:

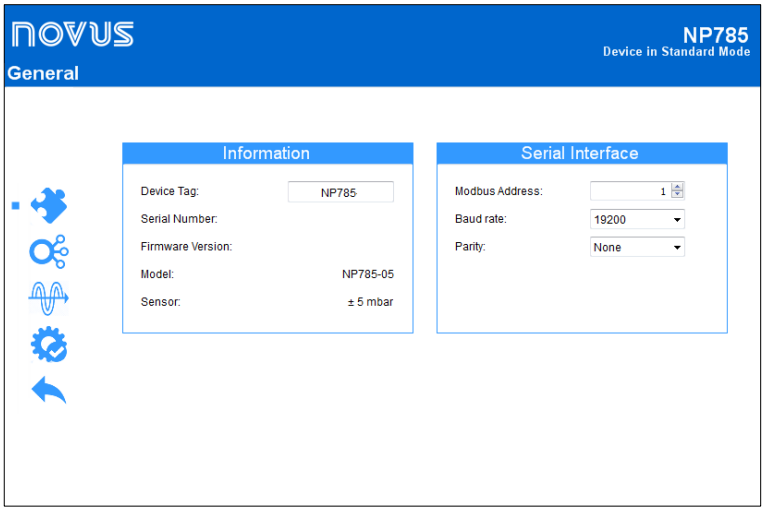


**Figure 11 –** Configuration screen

**General:** On this tab you can assign an identification name to the device and define the configuration parameters for the serial interface. Additionally, the device model, serial number, firmware version and the maximum and minimum pressure range of the sensor can be identified.

**Input:** On this tab you can select the system of measures to be used by the device, in addition to configuring the Offset and digital filter for the pressure sensor input.

**Output:** On this tab you can configure the transmission analog output and the alarm output.

**Finalization:** On this tab you can send the configuration to the device, save the configurations in a file, update the device firmware, and configure a password to protect the device.

**Back:** Returns to **NXperience** home screen.

### 8.3.1 GENERAL PARAMETERS

By clicking on the icon, you can view information of the device being configured and the serial interface configuration parameters.

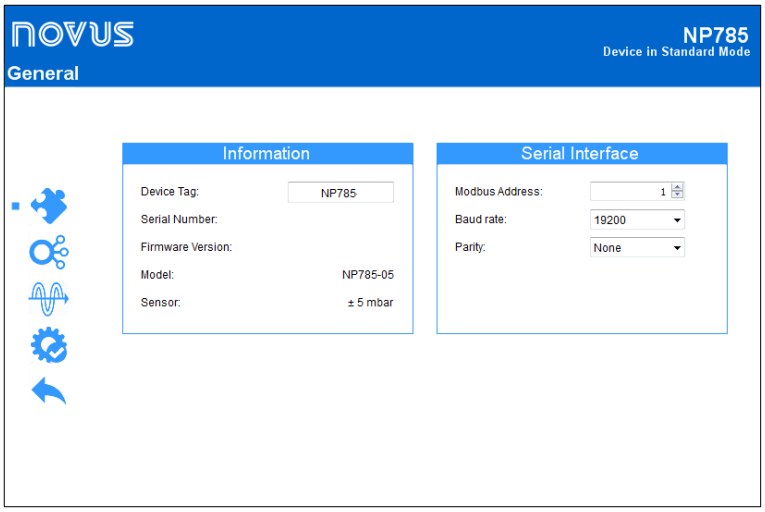


**Figure 12 –** General screen

In the **Device Tag** parameter, you can assign a name to the device to be configured. This helps to make it easily identifiable within a network with multiple devices. **Serial Number**, **Firmware Version** and **Model** are non-editable parameters that are read by the software directly from the device.

For **NP785 Ultra Low Differential Pressure Transmitter** to be recognized on a Modbus network, you must assign a unique **Modbus** Address on the network and configure the communication **Baud Rate** and **Parity**.

### 8.3.2 INPUT PARAMETERS

By clicking on the icon, you can configure the pressure sensor input.

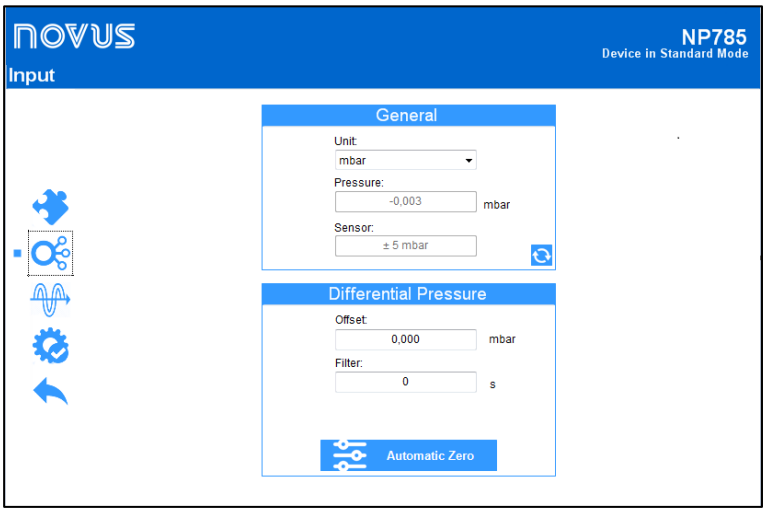


**Figure 13 –** Input configuration screen

In the **Unit** parameter, you can select the unit mbar, mpsi, inH2O, mmH2O or pascal. By factory default, the device is configured as mbar.

The **Pressure** parameter informs the differential pressure of the device when the window is opened. You can click the button to update this value.

The device also provides **Offset** and **Filter** settings. This allows you to make small corrections to the sensor readings and change its response speed.

The **Automatic Zero** feature, on the other hand, makes it possible to automatically adjust the offset. To adjust the value, you must make sure that the pressure inputs are depressurized and click Automatic Zero.

### 8.3.3 OUTPUT PARAMETERS

By clicking on the icon, you can configure the transmission analog output and the alarm output.

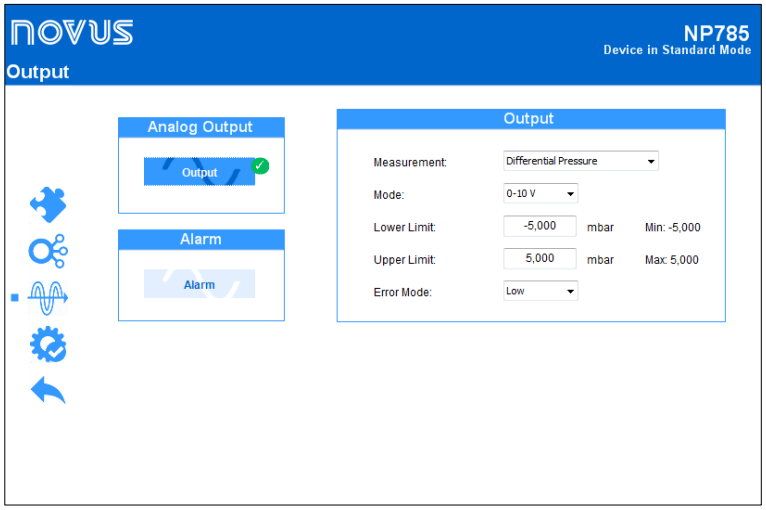


**Figure 14 –** Output configuration screen

#### 8.3.3.1 TRANSMISSION OUTPUT CONFIGURATION

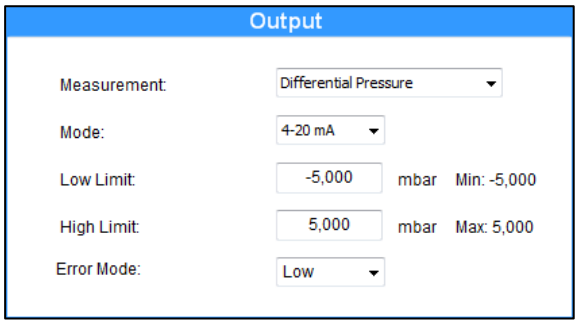


**Figure 15 –** Output

The **Measurement** parameter allows you to read the differential pressure magnitude.

The analog output **Mode** allows you to select the electrical standard to be used for transmission: 0-10 V or 4-20 mA. The electrical signal of the output will be proportional to the selected magnitude, respecting the values configured in the **Lower Limit** and **Upper Limit** parameters.

In case of a sensor failure, the quantity to be transmitted by the analog output will enter the **Error Mode**. For the error condition, you must select the **High**, **Low** or **Low-High** status (see **Table 03**).

#### 8.3.3.2 ALARM OUTPUT CONFIGURATION

To select the alarm output to be configured, you must click on the 

button and enable it by sliding it to the right.

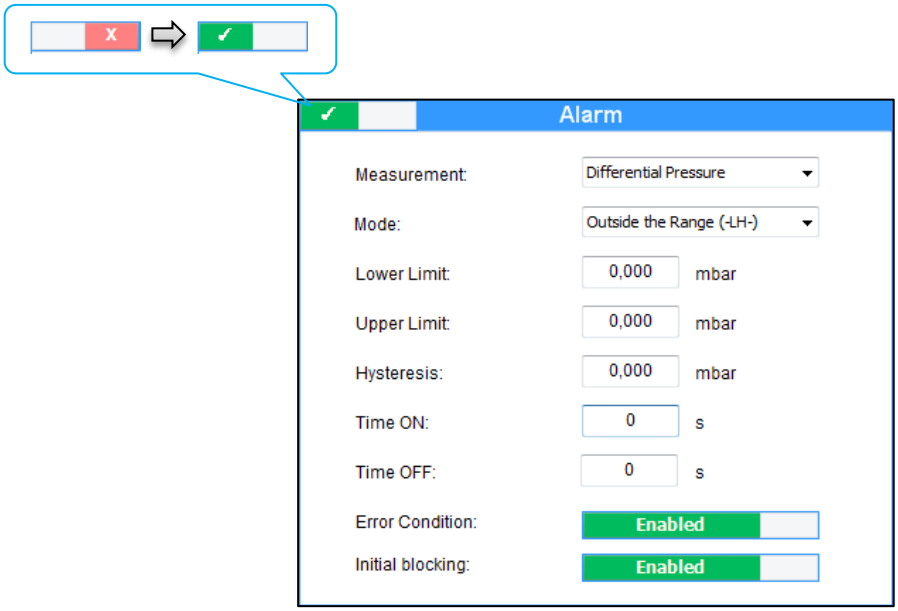


**Figure 16 –** Alarm

The alarm output may be timed by the **Time On** and **Time Off** parameters.

If the device is configured in the **Value Lower than SPLo**, **Value Higher than SPHi**, **Inside the Range** or **Outside the Range** modes, the **Error Condition** parameter allows you to configure a safe status of the alarm output in case of sensor failure. Thus, the output will be on or off depending on the value set in this parameter.

**Upper Limit** and **Lower Limit** are the differential pressure values that act as alarm activation conditions that, together with the **Hysteresis**, define the barrier to be exceeded so that the channel exits the alarm situation. For more information about the alarm configuration, check the Alarm Configuration section.

### 8.3.4 FINALIZATION

By clicking on the icon, you can send the configuration to the device, save the configurations in a file, update the firmware, and configure a password to protect it.

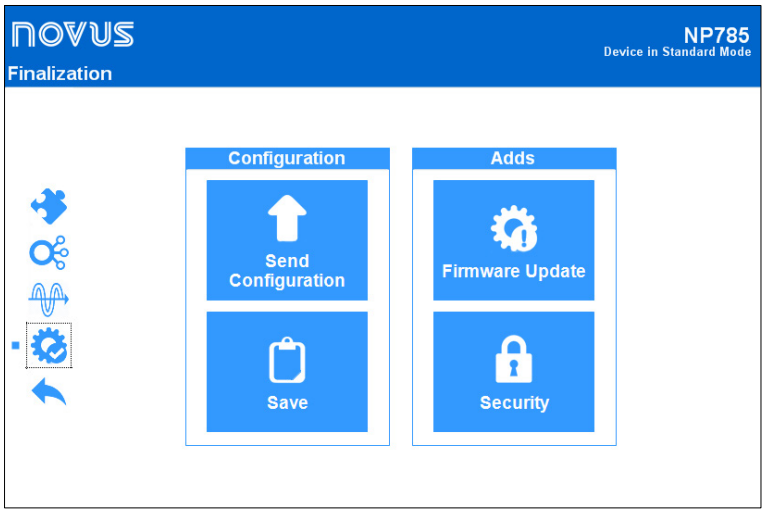


**Figure 17 –** Finalization parameters

### 8.3.5 DIAGNOSTICS

To access this feature, you must connect the device to the USB port and select the **Diagnostics** option from the **NXperience** home screen.

Thus, it is possible to analyze the operation of the device by forcing the pressure readings. The forcing can be performed either on the sensor reading or directly on the output.

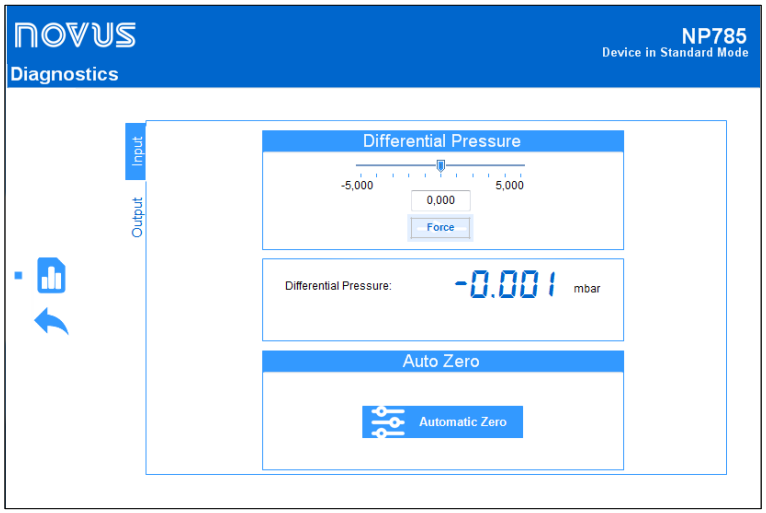


**Figure 18 –** Diagnostics parameters

In the input diagnosis you can view the instantaneous value of the differential pressure and force a value for it. To force a value, you must type the desired value in the field or slide the slider to the desired value within the pressure range of the model. Then press the Force button.

In the **Auto-Zero** section, you can enable the Auto-Zero function.

In output diagnostics, on the other hand, you can monitor the value of the analog output in real time or force a value. This interface depends on the type of analog output configured (0-10 V or 4-20 mA) and will be adjusted automatically.

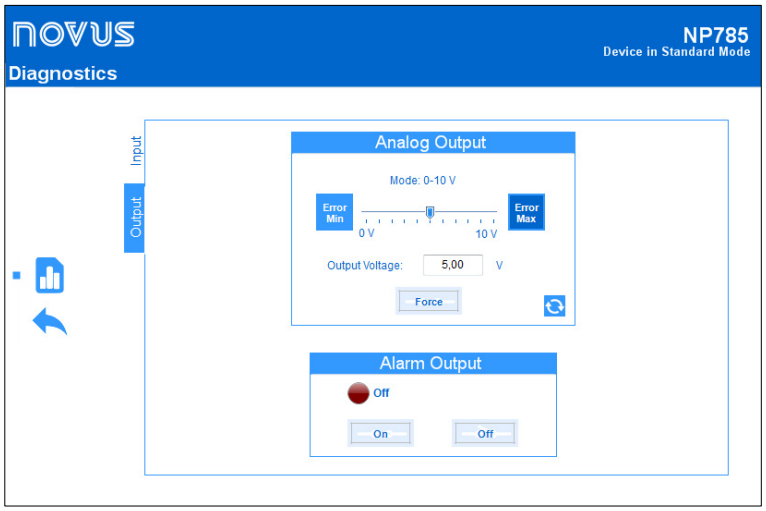


**Figure 19 –** Output Diagnostics

To force a value at a transmission analog output, use the slider or type de desired value directly into the edit field and then press the button Force.

From this moment, **NP785 Ultra Low Differential Pressure Transmitter** will force the adjusted value into the transmission output and the button used to perform the forcing will change to Release. If pressed again, the forced value will no longer be applied to the output.

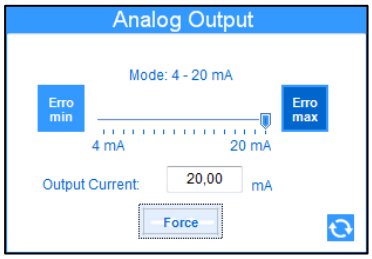


**Figure 20 –** Output

For each analog output you can force the transmission of an error value by means of the Error min and Error max buttons. These values depend on the mode (0-10 V or 4-20 mA) configured for each output.

The alarm output allows you to force an on and off condition. In some cases, an alarm output may be on due to an alarm condition. Thus, it may be desirable to force the status off to identify some fault in the wiring or device configuration.

The images below show the alarm output forcing interface in the three possible conditions: No forcing, forcing on status, and forcing off status.


**Figure 21 –** Alarm output without forcing

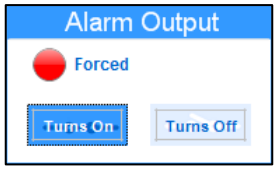


**Figure 22 –** Alarm output with forcing in on status


**Figure 23 –** Alarm output with forcing in off status

# 9 TECHNICAL SPECIFICATION

| | NP785-05 MODEL | NP785-20 MODEL |
|---|---|---|
| **Measuring Range** | -5 to 5 mbar | -20 to 20 mbar |
| **Burst Pressure** | 200 mbar | 400 mbar |
| **Proof Pressure*** | 100 mbar | 300 mbar |
| **Accuracy** | 1 % of maximum range F.S.** | 1 % of maximum range F.S.** |
| **Sensor Resolution (per unit)** | 7.630E-4 mbar | 3.052E-3 mbar |
| | 1.107E-2 mpsi | 4.426E-2 mpsi |
| | 3.063E-4 inH2O | 1.226E-3 inH2O |
| | 7.780E-3 mmH2O | 3.112E-2 mmH2O |
| | 7.630E-2 Pa | 3.052E-1 Pa |
| **Granularity of Pressure Recorders (per unit)** | 0.001 mbar | 0.001 mbar |
| | 0.01 mpsi | 0.01 mpsi |
| | 0.001 inH2O | 0.001 inH2O |
| | 0.01 mmH2O | 0.01 mmH2O |
| | 0.1 Pa | 0.1 Pa |
| **Start-Up Time** | < 2 s | |
| **Operating Temperature** | -5 to 65 °C (23 to 149 °F) | -20 to 70 °C (-4 to 158 °F) |
| **Storage Temperature** | -20 to 85 °C (-4 to 185 °F) | |
| **Power Supply Voltage** | • Power supply from PWR terminals: 12 Vdc to 30 Vdc.<br>• USB cable power: 4.75 Vdc to 5.25 Vdc.<br>Internal protection against reverse polarity of the supply voltage. | |
| **Power Supply Current** | < 45 mA ± 10 % @ 24 Vdc | |
| **Input** | Two sockets for the pneumatic hose connection of 4 or 6 mm internal diameter. | |
| **Output** | They may be configured independently to operate with signals 0-10 V or 4-20 mA.<br>• 0-10 V<br>  ○ Maximum current: 2 mA<br>  ○ Resolution: 0.003 V<br>• 4-20 mA<br>  ○ Maximum load: 500 R<br>  ○ Resolution: 0.006 mA | |
| **Protection Rating** | IP20 | |
| **Housing** | ABS + PC | |
| **Electromagnetic Compatibility** | EN/IEC 61326-1 | |
| **NXperience** | 10, 8 / 8.1 (32 and 64 bits), 7, Vista and XP. configurator software.<br>Menus in Portuguese, Spanish, French, and English. | |
| **Certifications** | **CE MARK**<br>This is a Class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures. | |

*** Proof Pressure**: The maximum pressure that the device can be subjected to and still perform within specifications after returning to operating range.

**** F.S .:** Full scale at 25 °C.

**Table 12 –** Technical Specifications