

# HDI 2021 4-20mA Transmitter



(Custom designed top pictured above. Unit may vary)

## Operation and Maintenance Manual

Revision: 1203

**SECTION I**

**Systems General Information:**

A. General Information ..... 1  
B. Unpacking and Inspection  
C. Precautionary Information  
D. Personnel Qualifications

**SECTION II**

**System Description:**

A. Systems Description ..... 2.A  
B. System Components  
    2.B.1. Pressure Transducers ..... 2.B.1  
    2.B.2 Cables ..... 2.B.2  
C. System Capacities ..... 2.C  
    2.C.1. Transducers ..... 2.C.1

**SECTION III**

**Installation:**

A. Components  
    3.A.1. Transducers ..... 3.A.1  
    3.A.2. Cables ..... 3.A.2  
B. Mounting Components  
    3.B.1. Pressure Transducers ..... 3.B.1

**SECTION IV**

**Theory of Operation:**

A. Pressure System ..... 4.A  
B. Factory Preset Calibration ..... 4.B

**SECTION V**

**Maintenance :**

A. Guidelines ..... 5.A  
B. Schematic Drawing / Parts List (pending) ..... 5.B

**SECTION VI**

**Warranty :**

## **SECTION I** General Information

### **A General Information:**

This manual describes the installation, operation, maintenance and calibration of the HDI 2021 Transducer Assembly. This manual will provide the user with information necessary to properly utilize the instrument. Included in this manual are all the necessary procedures to install and maintain this instrument properly.

### **B Unpacking and Inspection:**

Upon receipt account for all pieces on the packing list. If any items are missing, immediately inform the freight forwarder. Inspect all items for damage. If any items are damaged, immediately inform the freight forwarder and Houston Digital Instruments, Inc.

### **C Precautionary Information:**

Assure all directions on the packages are followed during unpacking and handling. Extra care should be taken to assure that the pressure sensor, which is mounted in the transducer housing supplied with the system, is protected from contact with any hard or sharp objects, i.e. screwdriver, fingernail, etc., during the installation of the sensor. Any evidence of mishandling or abuse shall **VOID** the warranty. (See Section VI Warranty for detailed coverage) Also avoid any extreme tightening efforts, with a hammer, at installation.

### **D Personnel Qualifications:**

This equipment requires experienced personnel to handle, install and maintain. HDI may provide technical schooling if required at their Houston facility or on-site.

## **SECTION II** Systems Description:

### **A Systems Description:**

The transducer (sensor) is an embedded strain gauge housed in a stainless steel case. The strain gauge is commonly housed in either a 1502 hammer union or a flange. Any style housing may be specified by the customer.

### **B Systems Components:**

**2.B.1** Pressure Transducer: 2" 1502, 2" 2202, 1" NPT transducer housing or possible Flanged housings:

[Houston Digital Instruments, Inc.](http://www.hdi.com) • 4130 Directors Row • Houston, TX 77092 Ph 713-688-8555 Fx 713-688-2228

**2.B.2 Cables:**

A high grade shipboard approved instrument cable with woven shield is recommended to reduce noise interference. Other types of cable are available at additional cost.

**C System Capacities:**

**2.C.1 Transducer:**

Transducers are rated at full range. Units 10K and under are capable of withstanding a 30 percent over pressurization without damage to the system. 16K units are capable of withstanding a 10 percent over pressurization without damage to the system. System capacities are as follows:

6,000 PSI      10,000 PSI      16,000 PSI      20,000 PSI\* (Developmental)

**SECTION III**

**Installation:**

**3.A Components:**

**3.A.1 Transducer:**

The transducer is to be mounted by the customer at the locations deemed most suitable for such equipment.

**3.A.2 Cables:**

Maximum recommended cable length is 200'. Cable lengths, other than standard, shall have been specified by the customer to the factory in advance. Other cable types are available upon request. Cabling will be installed using acceptable industry standards for such installations.

**3.B Mounting Components:**

**3.B.1 Pressure Transducer:**

The pressure system transducer comes from the factory as a complete assembly and only requires mounting of the transducer housing using standard practices for such installations.

**Note:** Special care should be taken to insure that the transducer pill mounted in the center of the transducer housing, is not allowed to make contact with any hard and/or sharp object as the accuracy and the sensitivity could be affected. The transducer pill is vulnerable to this type of contact. Any evidence of mishandling or abuse shall **void** the warranty. We have

installed an “orifice plate” to help minimize direct contact; in doing so, regular cleaning should be performed to increase longevity with the above precautions.

## **SECTION IV** Theory of Operation:

### **4.A Pressure System:**

The major components of this system are the transducer and the communications link (cable). The transducer utilizes a four active arm Wheatstone Bridge Strain Gauge which, when excited by the current source, will produce an electrical signal that is proportional to pressure applied to it. The cabling serves as an interconnect for the transducer, taking the excitation power in and carrying away the signal.

### **4.B Factory Preset Calibration:**

The HDI 2021 is a digital electronic pressure measurement device designed specifically for Oilfield applications. This system has been factory preset and will not require periodic calibration as with the previous version of the HDI 2021 or to our similar product line, HDI 2400 Pressure Gauge Systems.

The HDI 2000 is based on a "Strain Gauge" design concept. The calibration of the strain gauge is similar to tuning a stringed instrument. It is necessary to understand the system is based on small resonant electronic signals.

The baseline for calibration is the current excitation across the bridge. This is preset at the factory and cannot be changed.

**SECTION V**  
Maintenance:

**5.A Guidelines:**

First, maintain the integrity of the cable and visually check for abuse. Second, assure the system is cleaned and checked periodically for damage following our listed precautions. Last of all, set a schedule for periodic calibrations by Houston Digital Instruments, if required.

**5.B Schematic Drawing / Parts List: (pending)**

**SECTION VI**  
**Warranty:**

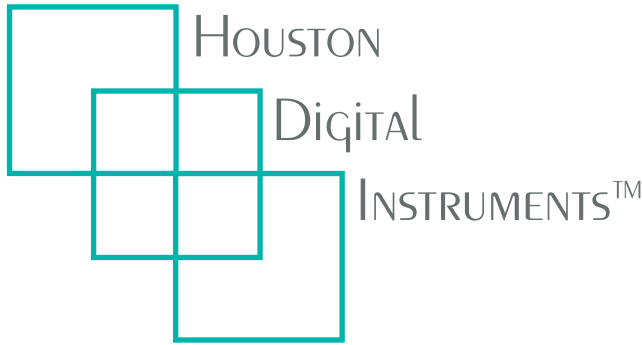
Houston Digital Instruments, Inc. (HDI) warrants for a period of one year from the date of shipment, HDI's manufactured products to the extent that HDI will replace those parts having defects in material or workmanship when used for the purpose or specification HDI recommends.

HDI will replace or repair, as it deems necessary, any products covered by this warranty, after HDI's examination discloses to its satisfaction, that in fact the products are defective and an adjustment is required. If an adjustment is required, the amount of the adjustment is the net sales price of the defective product. No allowances shall be made for labor or expenses of repairing defective products or damage resulting from same. All products accepted under the provisions of this warranty shall be shipped prepaid to HDI and returned to the customer prepaid by HDI. All products not accepted under the provisions of this warranty shall be shipped prepaid to HDI and returned freight collect.

HDI shall not be responsible for repair or replacement of products, resulting from improper handling, storage, installation, misuse, negligence, or use in a manner contrary to the recommendations of HDI.

HDI warrants only the products which it sells of Other Manufacturers to the extent of their warranties. All warranty claims shall be made in writing to the nearest HDI office or authorized factory representative. HDI makes no other warranty of any kind, expressed or implied, and all implied warranties of merchantability or fitness for a particular purpose which exceed HDI's afore-stated obligation are hereby disclaimed by HDI and excluded from this warranty.

This warranty is non transferable and HDI shall not be liable for any damage, injury, loss to property or persons resulting from the use of any HDI's products or equipment whether such damage, injury or loss results from, or is caused by: manner of use, defects in materials or workmanship or otherwise.



# HDI 2000 SERIES

## Model 2021 4-20mA Transducer

The HDI Model 2021 4-20mA Transducer senses pressure and incorporates a specially designed strain gauge that outputs a current proportional to the pressure applied to it. It requires an external power source and is accurate to within 0.5% of full scale. The HDI 2021 works in drive circuits where pressure control and monitoring are critical. The 4-20mA output can be used by individual instruments, chart recorders or local/remote data loggers with compatible current loop interfaces.

### FEATURES

- 4-20mA output
- User scaleable
- Low maintenance, field repairable design
- Oilfield rugged
- Wide range voltage excitation
- Automatic temperature compensation
- Proven HDI reliability

### OPTIONS

- Remote monitoring of wells and pipelines
- Multiple fit-ups

### SPECS

Dimensions:	Type dependent	Transducers:	1502 Hammer union 2202 Hammer union Flanges (Several sizes) NPT Adapters 9/16" Autoclave
Weight:	Type dependent		
Average Response Time(Head):	+20° to 0° C      0.5 sec -10° to -20° C    0.2 sec -30° to -40° C    0.5 sec	Accuracy:	0.5% of Full Scale
		Non Linearity and Hysteresis:	0.5% of Full Scale
Analog Inputs:	3.5K Strain Gauge	Processing Temperature:	-40° to 150° C -40° to 350° F
Power:	External @ 12-28VDC	Ambient Temperature:	-40° to 70° C -40° to 158° F
Standard Ranges:	6000 PSI 10000 PSI 16000 PSI	Ambient Humidity:	100%
		Custom Ranges:	Available
Certifications:	Pending: CSA		