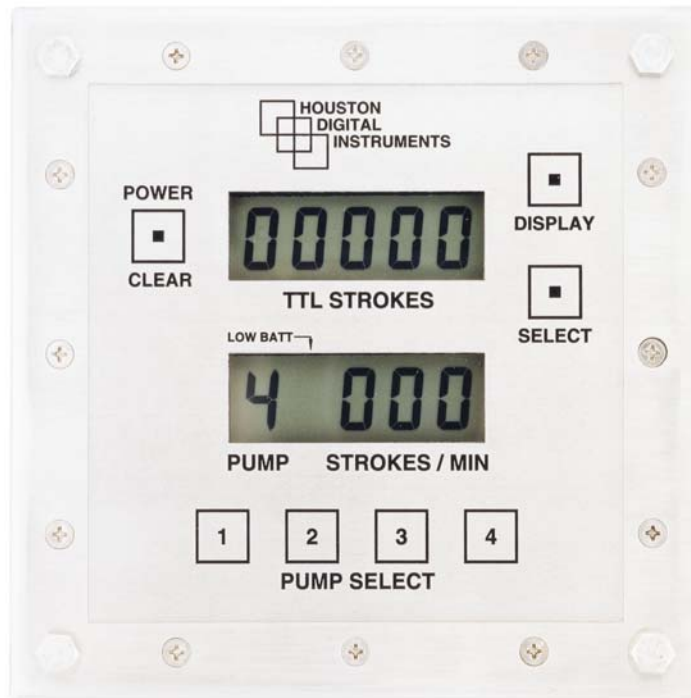


HDI 2100 Pump Stroke Counter

3 – 4 Pump Model



(4 Pump Model Shown)

Operations and Maintenance Manual

Rev. 1203

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**OPERATIONS AND MAINTENANCE MANUAL
TABLE OF CONTENTS
HDI 2100**

SECTION 1	Systems General Information: <ul style="list-style-type: none">1.A General Information:1.B Unpacking and Inspection:1.C Precautionary Information:1.D Personnel Qualifications:
SECTION 2	System Description: <ul style="list-style-type: none">2.A Pump Strokes Counter:2.B Pump Strokes Switches:2.C Pump Strokes System Capacities:
SECTION 3	Installation: <ul style="list-style-type: none">3.A Pump Strokes Counter Installation:<ul style="list-style-type: none">3.A.1 Pump Strokes Counter Display:3.A.2 Pump Strokes Counter Cables:
SECTION 4	Theory Of Operation: <ul style="list-style-type: none">4.A Pump Strokes Counting System:
SECTION 5	Calibration: <ul style="list-style-type: none">5.A Pump Strokes Counting System:
SECTION 6	Maintenance: <ul style="list-style-type: none">6.A Pump Strokes System:
SECTION 7	Warranty:

SECTION 1 Systems General Information:

1.A General Information:

This manual describes the installation operation and maintenance of the HDI Model # 2103 Pump Strokes Counter System. This manual shall provide the user with information necessary to properly utilize the Pump Strokes Counter. Included in this manual are all the necessary procedures to install and maintain this Pump Strokes Counter Instrumentation properly.

1.B Unpacking and Inspection:

Upon receipt of the equipment, assure all items are accounted for 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.

1.C Precautionary Information:

Assure all directions on the packages are followed during unpacking and handling.

1.D Personnel Qualifications:

This equipment requires experienced personnel to handle, install and maintain. HDI offers a technical training school on their premises if the Customer desires.

SECTION 2 Systems Description:

2.A Pump Strokes Counter:

One (1) Pump Strokes Counter with four (4) pump input capability.

2.B Pump Strokes Switches:

Switches and cable assemblies are provided to meet specific customer applications. The specific lengths shall be determined by the customer.

2.C Counter Capacities:

Strokes Counters are capable of a minimum of 30 strokes per minute and a maximum of 300 strokes per minute each.

SECTION 3 Installation:

3.A Pump Strokes Counter Installation:

3.A.1 Pump Strokes Counter Display:

This display is mounted from the backside of a Panel with a gasket, which is included, between the face of the Counter and the back of the Panel and held in place with four (4) bolts which come through the Panel from the front and into the four (4) corners of the counter. The bolts are included with the system. Care should be taken NOT to over tighten these bolts as the face Plexiglas can be cracked by the over tightening.

3.A.2 Pump Strokes Counter Cables:

The cables shall be mounted by the customer using predetermined cable lengths.

SECTION 4 Theory of Operation:

4.A Pump Strokes Counting Systems:

This system is comprised of; Control Head with Power Pack and Signal Source. The Control Head is a Two (2) window LCD display device. The Power Pack is a 3.6 volt dc source. The signal generated by the switches is a simple contact closure. The contact closure is sensed by the Control Head converting the contact closure to a logic pulse which then feeds two separate circuits, one a total strokes circuit adds and displays the closures one at a time. The other circuit is a rate circuit that averages the closure pulses against a real time clock and displays them as "strokes per minute".

USING THE GAUGE

There are seven switches and two digital displays on the front panel of the gauge.

POWER CLEAR	<ol style="list-style-type: none">1. Pressing this button once activates the panel.(POWER ON)2. Pressing this button while the system is already active will clear the currently selected upper display.
SELECT	Pressing the button once, and within four seconds pressing the POWER CLEAR button powers down the gauge (POWER OFF).
DISPLAY	As configured, No Function Available.
1	Selects Pump1 in the lower display. This display shows the current rate calculations for a 3" plunger.
2	Selects Pump2 in the lower display. This display shows the current rate calculatoins for a 4" plunger.
3	Selects Pump3 in the lower display. This display shows the current rate calculations for a 5 ¼" plunger.
4	As configured, No Function Available.

UPPER DISPLAY	<ol style="list-style-type: none">1. Displays the total system strokes under normal conditions.
LOWER DISPLAY	Displays the RATE of the currently selected plunger size (in strokes per minute).

SECTION V Calibration:

5.A Pump Strokes Counting Systems:

This system does not require set-up or calibration.

SECTION VI Maintenance:

6.A Strokes System:

The internal Battery Pack will need to be replaced on average every (1.7) years with 24 hour operation. By turning off the unit when not in use the battery life can be greatly extended.

SECTION VII 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 for **Normal Oilfield Usage**. For the purpose of this Warranty, **Normal Oilfield Usage** shall be defined as normal, oilfield monitoring applications.

HDI shall not honor the Warranty if any evidence of tampering, misuse or intrusion is indicated except by an HDI authorized technician.

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.

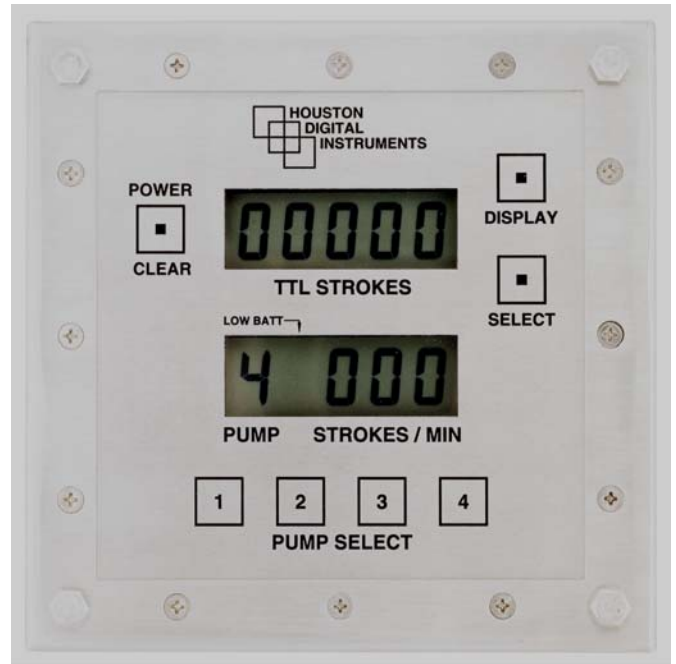
This Warranty is non transferable and HDI shall not be liable for any damage, injury, loss to property or persons resulting from the use of any HDI's products or equipment whether such damage, injury or loss results from, or is caused by: manner of use, defects in materials or workmanship or otherwise.



Drilling Instrumentation

Mud Pump Stroke Counter

The HDI *StrokeCounter* (Model 2140) monitors and displays the total accumulated mud pump strokes and the stroke rate of up to 4 individual mud pumps simultaneously. The stroke rate for each mud pump can be individually selected for display and is updated every second. The HDI Battery Pack is designed to operate continuously for 1.7 years. No calibration is required. The quartz crystal oscillator provides high precision counts with no drift. The HDI *StrokeCounter* is designed to be intrinsically safe and is rated by CSA International for use in Class I, Groups A, B, C, and D hazardous locations. The stainless steel case is completely sealed and features stainless steel piezo switches for long life. Labels are engraved permanently on the front panel. The entire package is constructed to operate in harsh environments and high vibration conditions encountered in land and offshore drilling.



Specifications

Dimensions	8"X8"X4" LXWXD (20.3X20.3X10.2 cm)
Weight	5 Lbs. (2.27 Kgs)
Case Material	Stainless steel
Front Panel Controls	Power/Clear, Display, Select, Pump Select 1-4
Stroke Rate Range	30 to 300 strokes per minute (SPM)
Total Accumulated Strokes	65,535 strokes
Battery	Intrinsically Safe sealed HDI Power Pack
Battery Life	1.7 years continuous operation
External Power	Optional +12 or +24VDC
Low Battery Indicator	LCD bar above selected pump number
Display	Liquid crystal display of total strokes and selected pump SPM
Time Base	Quartz crystal oscillator
Pump Switch	Micro-switch or passive proximity sensor
Maximum Cable Length	250 ft (76 m) from pump switch to StrokeCounter
Operating & Storage Temperature	-40 to 100°C

An ISO 9001:2000 Registered Company

Specifications subject to change without notice
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Mounting Pattern for HDI 2100 Series Pump Stroke Counter (Gauge)

