Models 704 & 744 LVDT Conditioners
Fast, Accurate, Versatile, User Friendly

Unexcelled for conditioning AC operated LVDT displacement transducers. Includes important, built-in, processing functions.

- acquires, displays, classifies, holds and outputs:
  - displacement
  - runout
  - diameter
  - concentricity
  - thickness
  - taper
  - perpendicularity
- engineering unit display with legends and 0.01% resolution
- 2000 samples/second/channel
- RS232/RS422/RS485 serial communication
- auto-scaled ±5V and/or ±10V analog outputs

Notes: 1. A Model 704 requires a reference fixture or, you must use a Model 744. 2. Requires a Model 744. 3. See back cover for application details.

These instruments are full featured LVDT condition-er/readouts; the Model 704 handles one and the Model 744 handles two LVDT inputs. Both provide fast, accurate data for each input. Built-in processing functions and real-time digital calculations make the Model 704/744 powerful test analyzers with easily configured characteristics. No need to write code or add hardware to be up-and-running a productive test.

The alphanumeric readout displays measured and computed data, units of measure and test status. It guides you with English language prompts. There are no manual adjustments. Calibration is simple; enter the full scale in engineering units and the instrument provides 0.01% accuracy and ±5V and/or ±10V analog outputs at full scale. Keystrokes access measured data, derived data, stored data, limit status, and/or I/O status without test disruption. User set values may be password protected, when needed.

Select either RS232, RS422, or RS485 serial communications to remotely control instrument modes, settings and measurements. Input actions and output events can be controlled by user configurable logic I/O's. These can be combined to create virtually any imaginable test without the need for special software or hardware. Available software remotely controls all instrument functions from a Windows based PC. It displays, plots and saves real-time data and will also save and download the instruments' setup parameters.

The flexible, software-based operating structure simplifies integration with your production and data acquisition processes. For example, set limits to classify either current, held, max, min, or spread data. Limits can be latched or unlatched, signed or absolute and can have user set hysteresis, if desired. Similarly, control functions can be user tailored and logic I/O's can be used in logical operations together with derived signals thus, enhancing the instruments versatility.
Model 704/744 Specifications

Transducer(s)

Type
Impedance
Connections
Transducer Excitation
Signal Input

Sensitivity
Impedance
Automatic Zero Range
Auto Calibration
Spurious Signal Rejection
Antialias Filter
Low Pass Filtering
Signal-to-Noise Ratio

Resolution
Overall Accuracy
Temperature Effects
System Display
Views
Data Displayed
Data Format
System Response (per channel)

Data Sampling & Max/Min Update Rates
Limit Checking Rate
Logic I/O Response Time
Update Rate for Each Analog Output

System Control

All I/O functions can be OR’d in any combination. The pattern function adds ANDing capabilities.

Input Actions/Channel

Logic inputs, outputs, and internal Matrix signals control following actions. Tare, Clear Tare, Hold, Clear Hold, Reset Max/Min, Clear Latched Limits, Check Limits, Do Max/Mins, Apply CAL, Apply -CAL.

Output Events/Channel

The following events drive Logic outputs and internal Matrix signals. HI Limit, NOT HI Limit, IN Limit, NOT IN Limit, LO Limit, NOT LO Limit, At Max, Not At Max, At Min, Not At Min.

Eight User-defined Patterns

Patterns of Logic inputs, outputs and Matrix signals drive Logic outputs and internal Matrix signals.

State Machine Capability

User enabled/disabled. Permits up to eight states and allows event driven testing. See AN7000 for details.

Limit Checking

Each channel has a HI and LO limit which may be latched or unlatched, absolute or signed, and with or without hysteresis. Select either Current, Max, Min, Spread or held data for limit checking.

Limit violations on any or all channels can be set to trigger backlight flashing in any of the display view modes.

Four Logic Inputs

Each with programmable destination, protected to ±130VDC or 130Vrms.

Type

TTL compatible, Schmitt Trigger, low true with 47kΩ pull-up. Input current is -100μA @ 0V.

Six Logic Outputs

Each with programmable source, short circuit (current and thermal limits) and overvoltage (fuse) protected.

Type

Open collector, low true. Operating @ 24V (max) and 0.3A max sink current.

External + 5VDC Power (on I/O connector)

250mA, short circuit (current limit) and overvoltage (fuse) protected.

Serial Communication Port (selectable as RS232, RS422, or RS485. Supports 32 devices on RS485 port and 1 device on RS232/422)

BAUD Rate

300 to 38400. Maximum Cable Length: 4000ft (RS422/485), 50ft (RS232).

120Ω Termination Resistors (RS485)

User selectable for RXD and TXD.

RS422/485 Transceivers

Slew-rate limited, short circuit protected (current & thermal limits).

RS232 Drivers

Short circuit protected (current limit).

Serial I/O’s

Use a 9 pin D connector. They are ±5V or ±10V (user selectable). COSEL, PWR, GND, IN, OUT, Data0-7, REA, CEN, and D+/D-.

Commands

Control of all modes, settings, and measurements.

Non-Volatile Memory Storage for System Settings

EEPROM, batteries are not used.

Dual Analog Outputs

Each assignable to any of the 3 channels are short circuit (current limit) and overvoltage (fuse) protected.

Output Impedance/Minimum Load Resistance

<1Ω/10kΩ.

Full Scale

±5V or ±10V (user selectable). Resolution is 2mV @ ±5V F.S. or 4mV @ ±10V F.S.

Overrange

±8.2V @ ±5V F.S. or ±13.5V @ ±10V F.S.

Non-linearity

±2mV @ ±5V F.S. or ±4mV @ ±10V F.S.

Overall Error (worst case, including temperature effects)

±5mV @ ±5V F.S. or ±10mV @ ±10V F.S.

Filter

100Hz, 5 pole Bessel response low pass filter.

Size and Weight

6.5” wide, 2.9” high, 8.7” deep. Weight is 3 pounds.

Operating Temperature

+41°F to +122°F (+5°C to +50°C).

Input Power

90VAC to 250VAC, 50/60Hz @ 25VA, max. Two 2A/250V fuses, line filter, and rear power switch.

Option 12D1 converts from AC line power to 10 to 15VDC operation @ 15 Watts, max. It includes a rear power switch, fuse & filter.

Notes:

1. The ratio expressed in decibels (dB), of full scale (F.S.) signal to noise spread. Measurements are made for a 1 minute interval using a 1000Ω source impedance.

2. Specification is subject to change without notice.
Model LVTG-4000 Precision Gage Heads

The LVTG-4000 Series precision gaging transducers have full scale ratings from ±0.04 to ±0.4 inches. Linear ball bearings reduce friction while providing smooth, repeatable operation. All stainless steel construction minimizes corrosion and also reduces errors from thermal expansion. The contact tip, which is made of tungsten carbide, can easily be replaced with any standard 4-48 or M2.5 thread gage tip. A chemically inert Viton accordion cover prevents dust and liquids from entering the transducer housing. See the back cover of this bulletin for typical applications. Bulletin 580A describes long stroke (0.6 to 12”) LVDT’s.

<table>
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<tr>
<th>Dimensions (inch)</th>
<th>LVTG-4000-40</th>
<th>LVTG-4000-60</th>
<th>LVTG-4000-100</th>
<th>LVTG-4000-200</th>
<th>LVTG-4000-400</th>
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DETAILED SPECIFICATIONS

| Linear Stroke (inch)               | ±0.040 | ±0.060 | ±0.100 | ±0.200 | ±0.400 |
| Linear Stroke (mm)                 | ±1.0   | ±1.5   | ±2.5   | ±5.0   | ±10.0  |
| Outward Travel From Zero (inch)    | 0.045  | 0.065  | 0.104  | 0.203  | 0.400  |
| Inward Travel From Zero (inch)     | 0.053  | 0.092  | 0.130  | 0.230  | 0.420  |
| Spring Preload At Zero (ounce)     | 2.5    |        |        |        |        |
| Nominal Sensitivity @ 5kHz (mV/V/millinch) | 5.0 | 3.4 | 2.0 | 1.0 | 0.5 |
| Repeatability (microinch)          | -60    |        |        |        |        |
| Linearity (the greater of % of reading, or listed error in microinches) | 0.5%, 40μin | 0.5%, 60μin | 0.5%, 99μin | 0.5%, 200μin | 0.7%, 395μin |
| Temperature Effects (% of Full Scale/°F) | 0.011 |        |        |        |        |
| Operating Temperature Range (°F)   | +14 to +175 |        |        |        |        |
| Storage Temperature Range (°F)     | -40 to 212 |        |        |        |        |
| Excitation Voltage                 | 1 to 5Vrms Sine Wave @ 2 to 20kHz |        |        |        |        |
| Termination                        | 4½ foot shielded cable with type D hooded connector; Option B has Bendix PC01W-106P connector |        |        |        |        |
| Standard Connector Pinout          | 1 = Shields, 2 = NC, 3 = +Sig, 4 = +Sig, 5 = NC, 6 = +Exc, 7 = +Sense, 8 = -Sense, 9 = -Exc. |        |        |        |        |
| Option B Connector Pinout          | A = +Exc, B = +Sig, C = -Sig, D = -Exc, E = Shield, F = NC |        |        |        |        |
| Cable to Model 704/744 Instruments | Standard connector mates with Instrument; Option B Connector Requires P/N 224-4024V-20 cable. |        |        |        |        |
Typical LVDT Applications

S. Himmelstein and Company can furnish the LVDT, Model 704/744 Instrument and interconnect cables to perform the required signal conditioning, processing, display and classification functions. Additionally, if needed, we can furnish more complex systems with statistics, data storage, curve plotting, etc. Please contact the factory should you have special needs. The full LVDT range can be used for most applications. However, highest accuracy is achieved using differential measurements. Thus, when a 0.35” thickness must be checked, a ±0.4” range LVDT-4000-400 is an obvious choice. However, a ±0.04” LVDT-4000-40 can also be used. First, TARE it against a 0.3500” master. Thereafter, part deviation from the master will be measured with 10 times the accuracy of the LVDT-4000-400 using a direct measurement.