

INNOVATIVE
MEASUREMENT
TECHNOLOGY LTD.



LVDT

Linear Variable Differential
Transformers

Precision through Innovation

@IMTmetrology

Introduction

Linear Variable Differential Transformers

Since 1994 we have been one of the leading suppliers of precision engineered measurement equipment.

We supply a full range of high accuracy gauges, DRO, Sony Magnescale liner scales, LaserScale, measurement computers, IBR digital columns, Coordinate measuring machines, visual inspection systems, materials testers and Encoders. We also have an extensive range of machine shop tools such as height gauges, callipers, plug gauges and much more.



Whilst there are several ways to measure displacement, the Linear Variable Differential Transformer (LVDT) remains a popular transducer in most industrial applications. LVDT's were initially used as a means of taking dimensional readings in laboratories.

They gained popularity in a wide variety of industrial monitoring and control applications, and whilst an LVDT is used to measure displacement the technology can be employed within other transducer types.

Our LVDT's are made from stainless steel and can be sealed to most IP levels, including IP68. The rugged construction and simple principle of operation, results in high reliability and accuracy.

Applications and Technical Specifications

Our LVDT's are precision instruments for displacement measurement. They provide simple, cost effective solutions whenever you need accurate and precise measurement of linear displacement.



Typical applications

- Servo-hydraulic systems
- Automotive engine management
- Machine engine management
- Structural movement monitoring
- Test rigs
- Level monitoring

As well as many other engineering and laboratory applications

IMT LVDT's at a glance

- Industrial, low cost and compact versions available
- High precision - non-linearity $< \pm 0.5\%$ and repeatability $< 0.1\%$
- Four output signal options - unconditioned AC, unconditioned DC (voltage), conditioned DC (voltage) or conditioned DC (current)
- Fully customisable design service for non-standard applications
- Rugged construction to withstand harsh environments
- Measurement ranges from $\pm 0.25\text{mm}$ to $\pm 550\text{mm}$
- Efficient and accurate non-contact displacement measurement
- Available in a variety of configurations
- Zero mechanical friction models available

Common technical specifications

Non-linearity	<±0.5% stroke length
Repeatability	<±0.1% stroke length
Operating temperature range	-50°C to +85°C (optional to 200°C) -50°C to +85°C on DC models
Vibration resistance	20g up to 2kHz
Shock resistance	1000g for 10ms
Construction material	Stainless steel core and case
Connections	2 meter screened cable

Power requirements and electrical output

Power Input	Signal output
5Vrms @3kHz 50k load	AC
9-24VDC input	0-5VDC
14-24VDC input	0-10VDC
12VDC input	4-20mA
14-24VDC input	±2.5VDC

Which LVDT is right for you?

IMT/IDT

Industrial Series

Highest level of protection for severe factory and processing environments

Typical Applications:

- Paper mills
- Process plants
- Industrial test rigs

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IMT/EDT

Economy Series

Used in less demanding environments where cost is more important

Typical Applications:

- Mechanical testing machines
- Automotive research
- Actuator position monitoring

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IMT/MDT

Miniature Series

Used in demanding environments where space is at a premium

Typical Applications:

- Materials testing
- Automotive test rigs and actuators
- Aerospace test rigs and actuators
- Load cells
- Pressure transducers
- Weighing systems\Closed loop control applications

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Industrial Series

Linear Variable Differential Transformers

The Industrial Series has been specifically designed to meet the tough conditions that are experienced in industrial plant areas. The robust construction includes as standard, a stainless steel housing, sealing to IP65 (IP68 optional), armoured cable and a waterproof option.

To aid the engineer in fitting and replacement, the transducers come with a choice of spherical bearings, double rod ends and a spring-return core. Measuring ranges extend from $\pm 0.25\text{mm}$ to $\pm 550\text{mm}$.

Standard Specifications

- Range: ± 0.25 to $\pm 550\text{mm}$
- Body diameter: 22.2mm
- Sealed to IP55
- Temperature range: -50°C to $+85^\circ\text{C}$

Electrical Output Options

Either:

- AC (4 - 6 wires)
- 0 to 5VDC (3 wire)
- 0 to 10VDC (3 wire)
- 4-20mA (3 wire)
- $\pm 2.5\text{VDC}$ (Bipolar (4 wire))

Build Options

- Plain core and extension
- Spring-loaded core and extension; ($\pm 0.25\text{mm}$ to $\pm 125\text{mm}$)
- Core and extension with rod end bearings

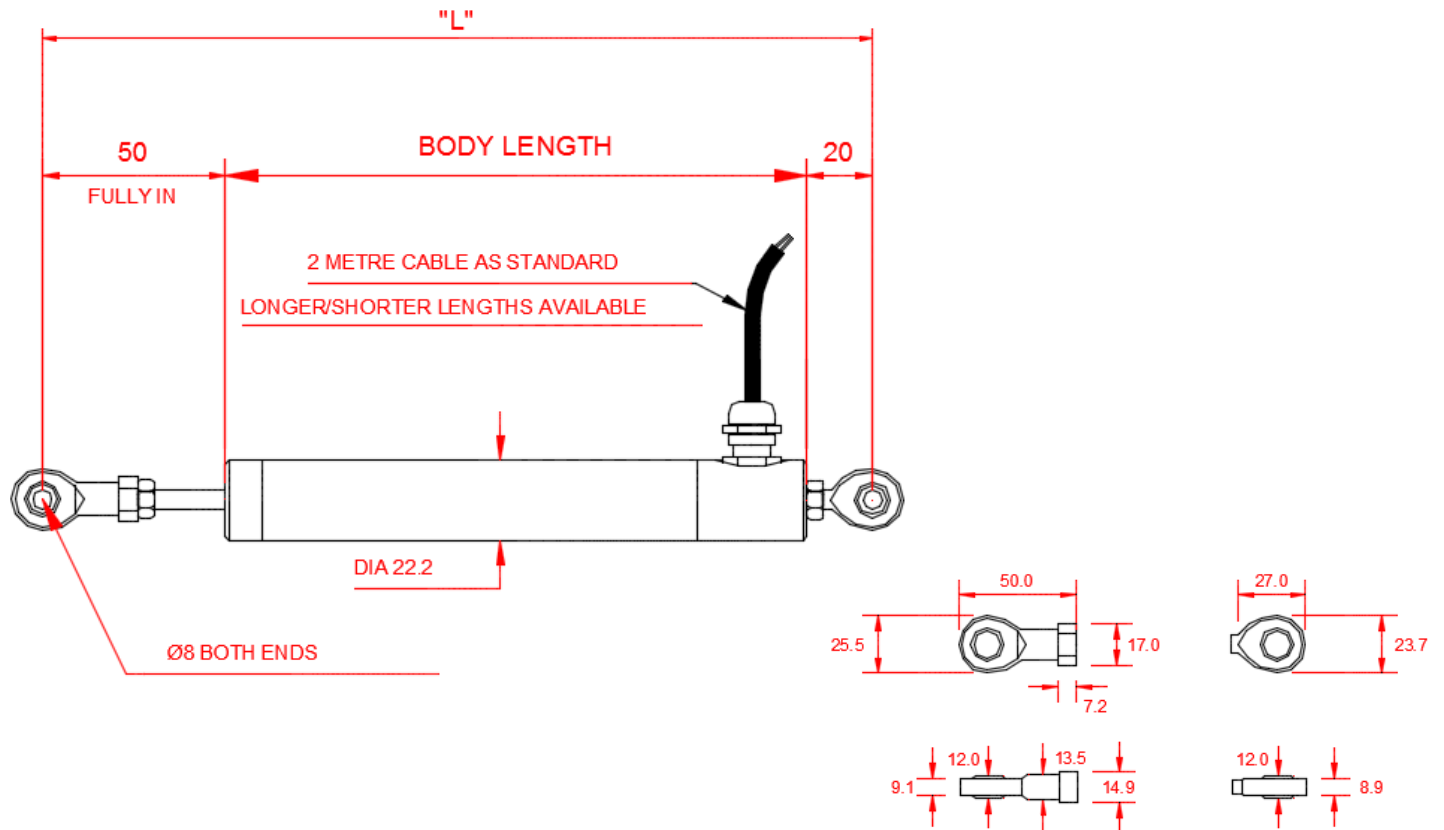
Cable Outlet:

- Radial
- Axial
- Sealed to IP68
- Temperature range: -50°C to 200°C



Industrial Series

Dimensions



Stroke (mm)	Body Length (mm)	"L" (mm)	Sensitivity at 3KHz with 50K Load	NULL (mV)	Primary Resistance (OHMS)	Secondary Resistance (OHMS)
±0.5	80	150	50	20	40	1800
±2.5	100	170	90	5	180	460
±5	120	190	80	5	100	110
±10	140	200	280	10	70	170
±12.5	160	230	300	15	120	190
±15	175	245	230	20	90	190
±25	235	305	240	5	130	210
±50	320	390	320	2	200	270
±75	390	460	350	20	260	460
±100	450	520	190	5	150	150
±125	500	570	300	2	180	320
±150	560	630	330	5	210	290
±175	615	685	310	2	230	360
±200	700	770	300	10	250	430
±250	810	880	350	10	290	560
±300	920	990	400	5	690	770
±400	1150	1220	460	20	450	1010
±500	1410	1480	390	10	550	1530
±550	1410	1480	430	10	550	1530

Industrial Series

IMT/IDT5W

Main Features

- $\pm 5\text{mm}$ measuring stroke
- Heavy duty stainless steel construction
- Magnetically shielded
- Radial exit
- Non-captive guided core & extension
- Stainless steel M8 rod end bearings
- Sealed to IP68
- 4 wire PTFE cable (5, 10 or 15m)

Product Code	IMT/IDT5W
Stroke	$\pm 5\text{mm}$
Input Voltage	5V RMS @ 3kHz
Sensitivity	29.50 mv/V/mm
Non-Linearity	$\pm 0.5\%$ of full range, (higher specification optional)
Repeatability	Better than 0.1%
Resolution	Infinite (depended on measuring instrument)
Frequency Response	3dB @ 180Hz (dependent on conditioning unit)
Current Range	0.5mA - 8mA
Temperature Range (Standard)	-30°C to + 85°C
Temperature Range (High)	-30°C to + 150°C
Temperature Range (Very High)	-30°C to + 250°C
Vibration Resistance	20g up to 2kHz
Shock Resistance	1000g for 10 milliseconds
Coil Impedance	600 Ω + 100 Ω (3kHz)
Insulation Resistance	Above 10M Ω at 500VDC (between wires and case)
Dielectric Strength	500V RMS for one minute (between wires and case)
Magnetic Shielding	Internal magnetic shielding
Construction Material	Stainless steel * Option SS316
Sealing	IP68
Connection Details	Red: Primary +ve Yellow: Primary -ve Blue: Secondary +ve Green: Secondary -ve

Industrial Series

IMT/IDT25W

Main Features

- $\pm 25\text{mm}$ measuring stroke
- Heavy duty stainless steel construction
- Magnetically shielded
- Radial exit
- Non-captive guided core & extension
- Stainless steel M8 rod end bearings
- Sealed to IP68
- 4 wire PTFE cable (5, 10 or 15m)

Product Code	IMT/IDT25W
Stroke	$\pm 25\text{mm}$
Input Voltage	5V RMS @ 3kHz
Sensitivity	9.40 mv/V/mm
Non-Linearity	$\pm 0.5\%$ of full range, (higher specification optional)
Repeatability	Better than 0.1%
Resolution	Infinite (depended on measuring instrument)
Frequency Response	3dB @ 180Hz (dependent on conditioning unit)
Current Range	0.5mA - 8mA
Temperature Range (Standard)	-30°C to + 85°C
Temperature Range (High)	-30°C to + 150°C
Temperature Range (Very High)	-30°C to + 250°C
Vibration Resistance	20g up to 2kHz
Shock Resistance	1000g for 10 milliseconds
Coil Impedance	600 Ω + 100 Ω (3kHz)
Insulation Resistance	Above 10M Ω at 500VDC (between wires and case)
Dielectric Strength	500V RMS for one minute (between wires and case)
Magnetic Shielding	Internal magnetic shielding
Construction Material	Stainless steel * Option SS316
Sealing	IP68
Connection Details	Red: Primary +ve Yellow: Primary -ve Blue: Secondary +ve Green: Secondary -ve

Industrial Series

IMT/IDT50W

Main Features

- $\pm 50\text{mm}$ measuring stroke
- Heavy duty stainless steel construction
- Magnetically shielded
- Radial exit
- Non-captive guided core & extension
- Stainless steel M8 rod end bearings
- Sealed to IP68
- 4 wire PTFE cable (5, 10 or 15m)

Product Code	IMT/IDT50W
Stroke	$\pm 50\text{mm}$
Input Voltage	5V RMS @ 3kHz
Sensitivity	5.40W mv/V/mm
Non-Linearity	$\pm 0.5\%$ of full range, (higher specification optional)
Repeatability	Better than 0.1%
Resolution	Infinite (depended on measuring instrument)
Frequency Response	3dB @ 180Hz (dependent on conditioning unit)
Current Range	0.5mA - 8mA
Temperature Range (Standard)	-30°C to + 85°C
Temperature Range (High)	-30°C to + 150°C
Temperature Range (Very High)	-30°C to + 250°C
Vibration Resistance	20g up to 2kHz
Shock Resistance	1000g for 10 milliseconds
Coil Impedance	600 Ω + 100 Ω (3kHz)
Insulation Resistance	Above 10M Ω at 500VDC (between wires and case)
Dielectric Strength	500V RMS for one minute (between wires and case)
Magnetic Shielding	Internal magnetic shielding
Construction Material	Stainless steel * Option SS316
Sealing	IP68
Connection Details	Red: Primary +ve Yellow: Primary -ve Blue: Secondary +ve Green: Secondary -ve

Industrial Series

IMT/IDT75W

Main Features

- $\pm 75\text{mm}$ measuring stroke
- Heavy duty stainless steel construction
- Magnetically shielded
- Radial exit
- Non-captive guided core & extension
- Stainless steel M8 rod end bearings
- Sealed to IP68
- 4 wire PTFE cable (5, 10 or 15m)

Product Code	IMT/IDT75W
Stroke	$\pm 75\text{mm}$
Input Voltage	5V RMS @ 3kHz
Sensitivity	5.40 mv/V/mm
Non-Linearity	$\pm 0.5\%$ of full range, (higher specification optional)
Repeatability	Better than 0.1%
Resolution	Infinite (depended on measuring instrument)
Frequency Response	3dB @ 180Hz (dependent on conditioning unit)
Current Range	0.5mA - 8mA
Temperature Range (Standard)	-30°C to + 85°C
Temperature Range (High)	-30°C to + 150°C
Temperature Range (Very High)	-30°C to + 250°C
Vibration Resistance	20g up to 2kHz
Shock Resistance	1000g for 10 milliseconds
Coil Impedance	600 Ω + 100 Ω (3kHz)
Insulation Resistance	Above 10M Ω at 500VDC (between wires and case)
Dielectric Strength	500V RMS for one minute (between wires and case)
Magnetic Shielding	Internal magnetic shielding
Construction Material	Stainless steel * Option SS316
Sealing	IP68
Connection Details	Red: Primary +ve Yellow: Primary -ve Blue: Secondary +ve Green: Secondary -ve

Industrial Series

IMT/IDT100W

Main Features

- $\pm 100\text{mm}$ measuring stroke
- Heavy duty stainless steel construction
- Magnetically shielded
- Radial exit
- Non-captive guided core & extension
- Stainless steel M8 rod end bearings
- Sealed to IP68
- 4 wire PTFE cable (5, 10 or 15m)

Product Code	IMT/IDT100W
Stroke	$\pm 100\text{mm}$
Input Voltage	5V RMS @ 3kHz
Sensitivity	1.70 mv/V/mm
Non-Linearity	$\pm 0.5\%$ of full range, (higher specification optional)
Repeatability	Better than 0.1%
Resolution	Infinite (depended on measuring instrument)
Frequency Response	3dB @ 180Hz (dependent on conditioning unit)
Current Range	0.5mA - 8mA
Temperature Range (Standard)	-30°C to + 85°C
Temperature Range (High)	-30°C to + 150°C
Temperature Range (Very High)	-30°C to + 250°C
Vibration Resistance	20g up to 2kHz
Shock Resistance	1000g for 10 milliseconds
Coil Impedance	600 Ω + 100 Ω (3kHz)
Insulation Resistance	Above 10M Ω at 500VDC (between wires and case)
Dielectric Strength	500V RMS for one minute (between wires and case)
Magnetic Shielding	Internal magnetic shielding
Construction Material	Stainless steel * Option SS316
Sealing	IP68
Connection Details	Red: Primary +ve Yellow: Primary -ve Blue: Secondary +ve Green: Secondary -ve

Industrial Series

IMT/IDT150W

Main Features

- $\pm 150\text{mm}$ measuring stroke
- Heavy duty stainless steel construction
- Magnetically shielded
- Radial exit
- Non-captive guided core & extension
- Stainless steel M8 rod end bearings
- Sealed to IP68
- 4 wire PTFE cable (5, 10 or 15m)

Product Code	IMT/IDT150W
Stroke	$\pm 150\text{mm}$
Input Voltage	5V RMS @ 3kHz
Sensitivity	1.55 mv/V/mm
Non-Linearity	$\pm 0.5\%$ of full range, (higher specification optional)
Repeatability	Better than 0.1%
Resolution	Infinite (depended on measuring instrument)
Frequency Response	3dB @ 180Hz (dependent on conditioning unit)
Current Range	0.5mA - 8mA
Temperature Range (Standard)	-30°C to + 85°C
Temperature Range (High)	-30°C to + 150°C
Temperature Range (Very High)	-30°C to + 250°C
Vibration Resistance	20g up to 2kHz
Shock Resistance	1000g for 10 milliseconds
Coil Impedance	600 Ω + 100 Ω (3kHz)
Insulation Resistance	Above 10M Ω at 500VDC (between wires and case)
Dielectric Strength	500V RMS for one minute (between wires and case)
Magnetic Shielding	Internal magnetic shielding
Construction Material	Stainless steel * Option SS316
Sealing	IP68
Connection Details	Red: Primary +ve Yellow: Primary -ve Blue: Secondary +ve Green: Secondary -ve

Economy Series

Linear Variable Differential Transformers

The Economy Series is the most popular choice for engineers for general purpose use and their low cost pricing. They are ideal for OEM applications in mechanical testing machines, vehicle research, actuators etc.

To aid the engineer in fitting and replacement, the transducers come with a choice of spherical bearings, double rod ends and a spring-return core. Measuring ranges extend from $\pm 0.5\text{mm}$ to $\pm 550\text{mm}$.

Standard Specifications

- Range: ± 0.25 to $\pm 550\text{mm}$
- Body diameter: 20.6mm
- Sealed to IP55
- Temperature range: -50°C to $+85^\circ\text{C}$

Electrical Output Options

Either:

- AC (4 - 6 wires)
- 0 to 5VDC (3 wire)
- 0 to 10VDC (3 wire)
- 4-20mA (3 wire)
- $\pm 2.5\text{VDC}$ (Bipolar (4 wire))

Build Options

- Plain core and extension
- Spring-loaded core and extension; ($\pm 0.25\text{mm}$ to $\pm 125\text{mm}$)
- Core and extension with rod end bearings

Cable Outlet:

- Radial
- Axial
- Sealed to IP68
- Temperature range: -50°C to 200°C



Miniature Series

Linear Variable Differential Transformers

The miniature series are ideal where space is limited. Their small size make them suitable for OEM applications in load cells, pressure transducers, weighing systems and closed-loop control. The low mass of the core can also be advantageous in projects having minimal weight restrictions.

Measuring ranges are available from $\pm 0.25\text{mm}$ to $\pm 50\text{mm}$ with a linearity better than $\pm 0.5\%$. Additional options are also available like high temperature (150°C), improved linearity, plain core & extension, sprung loaded core & extension. Available outputs are AC, and a range of signal conditioners housed in an external box fitted in-line (or separate if preferred) with the LVDT cable of DC Bipolar, 0-5V, 0-10V, and 4-20mA.

Standard Specifications

- Range: ± 0.25 to $\pm 50\text{mm}$
- Body diameter: 9.5mm
- Sealed to IP55
- Temperature range: -50°C to $+85^\circ\text{C}$

Electrical Output Options

Either:

- AC (4 - 6 wires)
- In-Line signal conditioner
- 0-5VDC
- 0-10VDC
- 4-20mA

Build Options

- Core only
- Core and extension
- Spring-loaded core and extensions (Radial exit only)

Cable Outlet:

- Radial
- Axial
- Temperature range: -50°C to 200°C



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