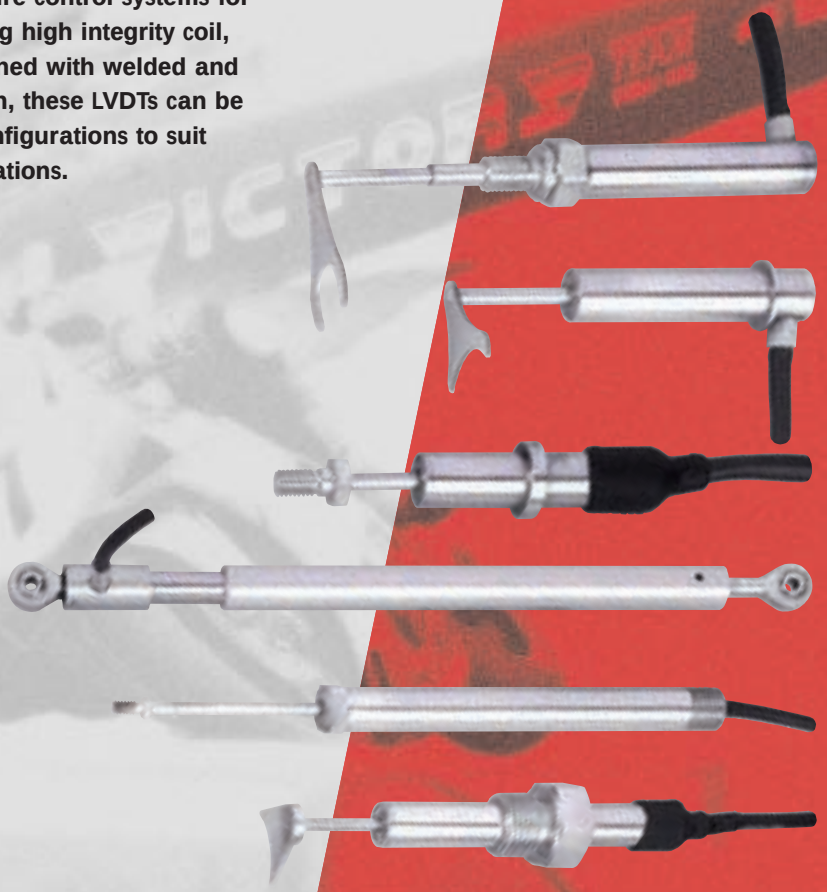
Penny+Giles
A Curtiss-Wright Company

LVDT DISPLACEMENT TRANSDUCERS

The Penny+Giles high performance ratiometric LVDTs benefit from our extensive experience in fly-by-wire control systems for flight critical aerospace applications. Using high integrity coil, screen and connection assemblies, combined with welded and vacuum brazed stainless steel construction, these LVDTs can be supplied in a range of shaft and body configurations to suit clutch, gearbox, engine and brake applications.



Features

- No contact between the sensing elements
- Infinite resolution
- Small transducer body length to stroke ratio
- Welded and vacuum brazed stainless steel construction
- Sealed to IP66
- Temperature range -55 to +200°C
- High integrity coil, screen and connection assemblies
- Screened and sheathed interface cable
- Temperature error less than 35ppm/°C

Benefits

- Virtually infinite life and fast dynamic response
- All displacement will be sensed
- Minimal operational footprint and weight
- Maximum reliability in hostile environments
- High performance in electrically noisy environments
- Maximises system accuracy

AF111 LVDT

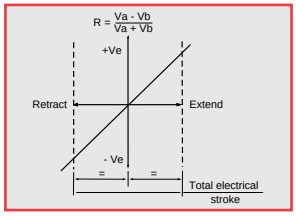
The AF111 range of high accuracy LVDT displacement transducers have been designed primarily for use in the ratiometric configuration and have a compact size, with stroke lengths from 5mm to 150mm. Suitable for clamp mounting, the AF111 range has a threaded, unguided core assembly to simplify installation. Suited to numerous applications, such as vehicle research, and test rigs.

PERFORMANCE

Electrical stroke E	**mm**	***5***	***15***	***25***	***50***	***75***	***100***	***125***	***150***
	±	***2.5***	***7.5***	***12.5***	***25.0***	***37.5***	***50.0***	***62.5***	***75.0***
Input voltage and frequency		1 to 10VRMS at 400Hz to 12.5kHz (sinewave)							
Insulation resistance		Greater than 100MΩ at 500Vdc							
Operational temperature	**°C**	-35 to +125							
Storage temperature	**°C**	-55 to +135							
Vibration		RTCA/DO - 160C, Section 8, Fig 8 - 1 Curve C (Random), 10 - 2000Hz, 4.12g rms							
		RTCA/DO - 160C, Section 8, Fig 8 - 3 Curve L (Sine), 10 - 2000Hz, 3g rms							
Environmental protection		IP66							
Electrical output R proportional to position		$R = \frac{Va - Vb}{Va + Vb}$							
Electrical output R at extremes from null	**±1% total stroke**	0.3	0.3	0.4	0.4	0.6	0.6	0.6	0.6
Non-linearity	**±% total stroke**	0.25	0.25	0.25	0.25	0.25	0.125	0.125	0.125
Secondary coil output voltage		3.3VRMS maximum							
Input impedance		Greater than 300Ω							
Load resistance (per coil)		Greater than 50kΩ (non reactive)							
Temperature error maximum % total stroke/°C		0.0012	0.0012	0.0012	0.0018	0.0018	0.0035	0.0030	0.0030

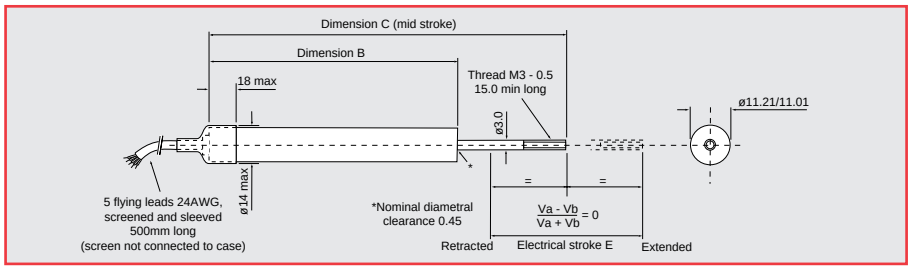
OUTPUT SCHEMATIC

Ratiometric configuration



DIMENSIONS

Note: drawings not to scale



Electrical stroke E	**mm**	***5***	***15***	***25***	***50***	***75***	***100***	***125***	***150***
Mechanical stroke M (non captive shaft)	**mm**	***9***	***19***	***29***	***54***	***79***	***104***	***129***	***154***
Dimension B	**mm**	55	65	80	105	150	175	215	240
Dimension C	**mm**	75	90	110	147.5	205	242.5	295	332.5
Weight (maximum)	**g**	45	50	55	67	90	100	120	140

AVAILABILITY

Normally available from stock

ORDERING CODE

AF111/.....

Electrical stroke (total) mm

ELECTRICAL CONNECTIONS

See AF145 page 15

AF145 LVDT

The AF145 range of high accuracy LVDT displacement transducers have been designed primarily for use in the ratiometric configuration, and have a compact size, with stroke lengths from 5mm to 150mm. The AF145 has self-aligning rod end bearing mounting, with an outer sliding sleeve which protects the movable core whilst enhancing the rigidity of the transducer during operation. Suited to harsh automotive and industrial environments.

PERFORMANCE

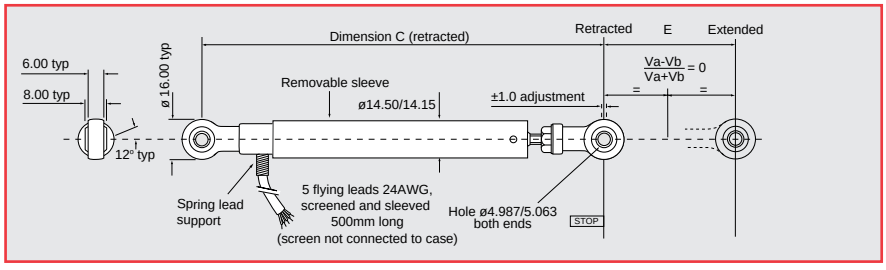
Electrical stroke E	**mm**	***5***	***15***	***25***	***50***	***75***	***100***	***125***	***150***
	±	***2.5***	***7.5***	***12.5***	***25.0***	***37.5***	***50.0***	***62.5***	***75.0***
Input voltage and frequency		1 to 10VRMS at 400Hz to 12.5kz (sinewave)							
Insulation resistance		Greater than 100MΩ at 500Vdc							
Operational temperature	**°C**	-35 to +125							
Storage temperature	**°C**	-55 to +135							
Vibration		RTCA/DO - 160C, Section 8, Fig 8 - 1 Curve C (Random), 10 - 2000Hz, 4.12g rms							
		RTCA/DO - 160C, Section 8, Fig 8 - 3 Curve L (Sine), 10 - 2000Hz, 3g rms							
Environmental protection		IP66							
Electrical output R proportional to position		$R = \frac{Va - Vb}{Va + Vb}$							
Electrical output R at extremes from null ±1% total stroke		0.3	0.3	0.4	0.4	0.6	0.6	0.6	0.6
Non-linearity ±% total stroke		0.25	0.25	0.25	0.25	0.25	0.125	0.125	0.125
Secondary coil output voltage		3.3VRMS maximum							
Input impedance		Greater than 300Ω							
Load resistance (per coil)		Greater than 50kΩ (non reactive)							
Temperature error maximum % total stroke/°C		0.0012	0.0012	0.0012	0.0020	0.0020	0.0030	0.0030	0.0030

OUTPUT SCHEMATIC

See AF111 page 14

DIMENSIONS

Note: drawings not to scale



Electrical stroke E	**mm**	***5***	***15***	***25***	***50***	***75***	***100***	***125***	***150***
Mechanical stroke M (non captive shaft)	**mm**	***9***	***19***	***29***	***54***	***79***	***104***	***129***	***154***
Dimension C retracted	**mm**	100	110	125	150	195	220	260	285
Weight (maximum)	**g**	65	80	90	115	155	175	200	220

AVAILABILITY

Normally available from stock

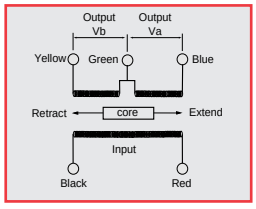
ORDERING CODE

AF145/.....

Electrical stroke (total) mm

ELECTRICAL CONNECTIONS

5 flying leads 24AWG, screened and sleeved 500mm long



Phasing notes

With blue and black leads common, the output on the yellow lead will be in-phase with the red lead (input) as the shaft retracts from the null position.

Ø8mm LVDT SPECIAL

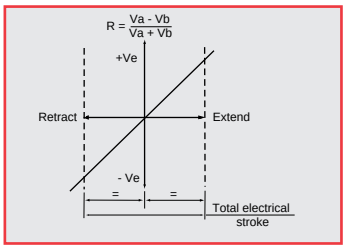
This specially developed ac LVDT is an example of our capability in producing an extremely compact size (8mm diameter) with a minimal footprint (20mm stroke within a 44mm body length). This LVDT is also suitable for continuous operation at temperatures up to +200°C and is ideally suited for use in clutch position and brake caliper position measurement in the premier classes of motor sport. For optimum performance this LVDT is designed to operate in the ratiometric configuration.

PERFORMANCE

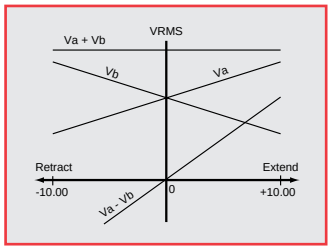
Electrical stroke E	**mm**	**20**
	±	**10**
Input voltage and frequency		3VRMS at 5kHz (sinewave)
Insulation resistance		Greater than 20MΩ at 500Vdc
Operational temperature	**°C**	-55 to +200
Environmental protection		IP66
Electrical output R proportional to position		$R = \frac{Va - Vb}{Va + Vb}$
Electrical output R at extremes from null	**±1% total stroke**	0.441
Non-linearity	**±% total stroke**	1
Ratiometric sensitivity per mm	**±3%**	0.0441
Summed output voltage (Va+Vb)	**±20%**	0.7V/V
Total stroke ratio		0.882
Input impedance		Greater than 150Ω
Load resistance (per coil)		Greater than 50kΩ (non reactive)
Temperature error maximum % total stroke/°C		0.0030

OUTPUT SCHEMATIC

Ratiometric configuration



ac output schematic



AVAILABILITY

Please consult our sales office for details

ORDERING CODE

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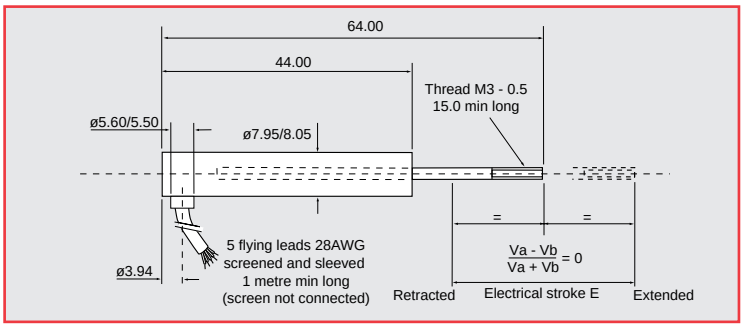
DIMENSIONS

Note: drawings not to scale



Electrical stroke E	**mm**	**20**
Mechanical stroke M	**mm**	**22**
(non captive shaft)		
Weight (maximum)	**g**	47 (15g for sensor and core only)

Ø11mm LVDT SPECIAL

This high accuracy LVDT displacement transducer has been designed for use in the ratiometric configuration and has a compact size, with stroke lengths from 25mm to 75mm. This design has self-aligning rod end bearing mounting and features an outer sliding sleeve which protects the movable core whilst enhancing the rigidity of the transducer during operation. Suited to suspension and throttle position feedback applications in premier classes of motorsport.

PERFORMANCE

Electrical stroke E	**mm**	***25***	***50***	***75***
	±	**12.5**	**25.0**	**37.5**
Input voltage and frequency		3VRMS at 2.5kHz (sinewave)		
Insulation resistance		Greater than 20MΩ at 500Vdc		
Operational temperature	**°C**	-30 to +130		
Storage temperature	**°C**	-55 to +135		
Environmental protection		IP66		
Electrical output R proportional to position		$R = \frac{Va - Vb}{Va + Vb}$		
Electrical output R at extremes from null	**±1% total stroke**	0.5	0.5	0.5
Non-linearity	**±% total stroke**	0.5	0.5	0.5
Ratiometric sensitivity per mm		0.04	0.02	0.0133
Summed output voltage (Va+Vb)	**±20%**	0.641	0.872	0.761
Input impedance		Greater than 200Ω		
Load resistance (per coil)		Greater than 50kΩ (non reactive)		
Temperature error maximum % total stroke/ °C		0.0030		

OUTPUT SCHEMATIC

See Ø8mm Special LVDT output schematic, page 16

AVAILABILITY

Please consult our sales office for details

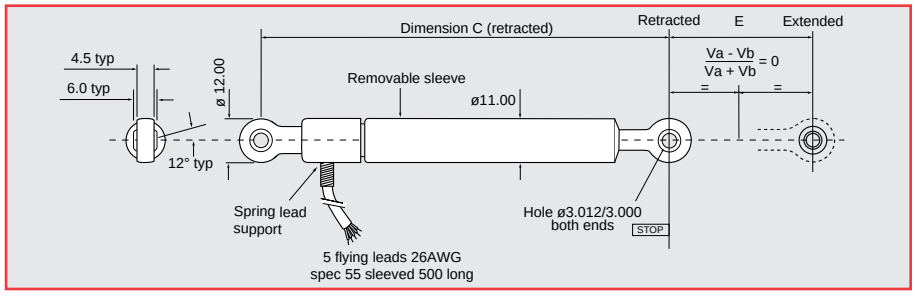
ORDERING CODE

D45371/.....

Electrical stroke (total) mm

DIMENSIONS

Note: drawings not to scale



Electrical stroke E	**mm**	***25***	***50***	***75***
Mechanical stroke M (non captive shaft)	**mm**	***27***	***52***	***77***
Dimension C retracted	**mm**	115	135	180
Weight (maximum)	**g**	42	52	68

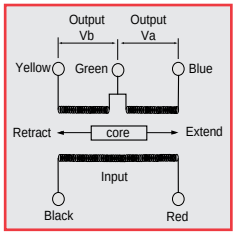
ELECTRICAL CONNECTIONS

SPECIAL Ø8mm

5 flying leads 28AWG, screened and sleeved 1000mm long

SPECIAL Ø11mm

5 flying leads 26AWG, screened and sleeved 500mm long



Ratiometric connection configuration

Phasing notes

With blue and black leads common, the output on the yellow lead will be in-phase with the red lead (input) as the shaft retracts from the null position.

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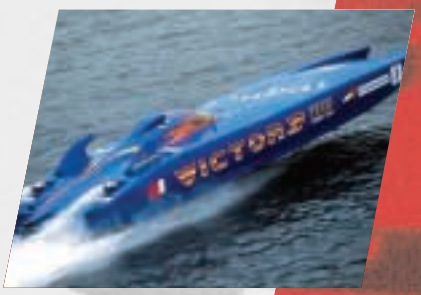
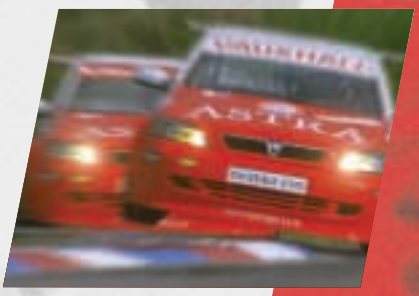
Penny+Giles - one of the world's major suppliers of measurement and control sensors



throttle pedal position

gear select position indication



hydraulic reservoir level

front and rear suspension movement

throttle actuator position

steering angle position

gearbox actuator position

clutch pedal position

clutch actuator position

brake balance measurement

brake pad/disc wear indication

Penny+Giles

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