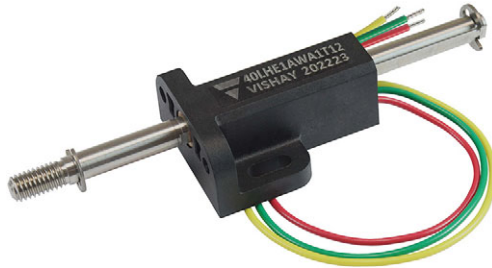


## Linear Position Sensor in Hall Effect Technology (0 mm to 40 mm Max.)



### FEATURES

- Accurate linearity down to:  $\pm 1\%$
- Absolute position
- Electrical strokes from 0 mm to 40 mm
- Long life: greater than 10M cycles
- Non contacting technology: Hall effect
- Model dedicated to all applications in harsh environments
- Versatile “2 faces” mounting
- Spring return (optional)
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT

### LINKS TO ADDITIONAL RESOURCES



QUICK REFERENCE DATA	
Sensor type	LINEAR, non contacting Hall effect
Output type	Wires
Market appliance	Industrial
Dimensions	35 mm x 14.5 mm x 28 mm

ELECTRICAL SPECIFICATIONS	
PARAMETER	STANDARD
Electrical stroke	Up to 40 mm
Independent linearity	Analog output: $\pm 1\%$ (at $V_{max.} = 0.5$ m/s) / $\pm 2\%$ (at $V_{max.} = 1$ m/s) PWM output: $\pm 1\%$ (at $V_{max.} = 0.4$ m/s) / $\pm 2\%$ (at $V_{max.} = 0.8$ m/s)
Resolution (40 mm stroke)	12 $\mu$ m
Supply voltage	5 $V_{DC} \pm 10\%$
Supply current	< 16 mA typical
Output signal	Analog ratiometric (10 % to 90 % of $V_{supply}$ ) or PWM (1 kHz - 10 % to 90 % of duty cycle) Other on request
Over voltage protection (input)	+20 $V_{DC}$
Reverse voltage protection (input)	-10 $V_{DC}$
Over voltage protection (output)	+10 $V_{DC}$ (+14 $V_{DC}$ peak - 200 s at 25 °C)
Recommended load resistance	Min. 1 k $\Omega$ for analog output and PWM output
Hysteresis	Static: 0.1 % of $V_{supply}$
Start up cycle	< 15 ms

MECHANICAL SPECIFICATIONS	
PARAMETER	
Mechanical travel	42 mm max.
Bearing type	Sleeve bearing
Mounting type	“2 faces” mounting (drilled flange - 2 x 2 holes for 2 M3 screws) + M5 at the end of shaft (threaded option only)
Weight	26 g $\pm$ 1 g (“no spring” configuration)
Actuation force	0.2 N max. (spring option: from 1.3 N to 7 N along stroke - typical)

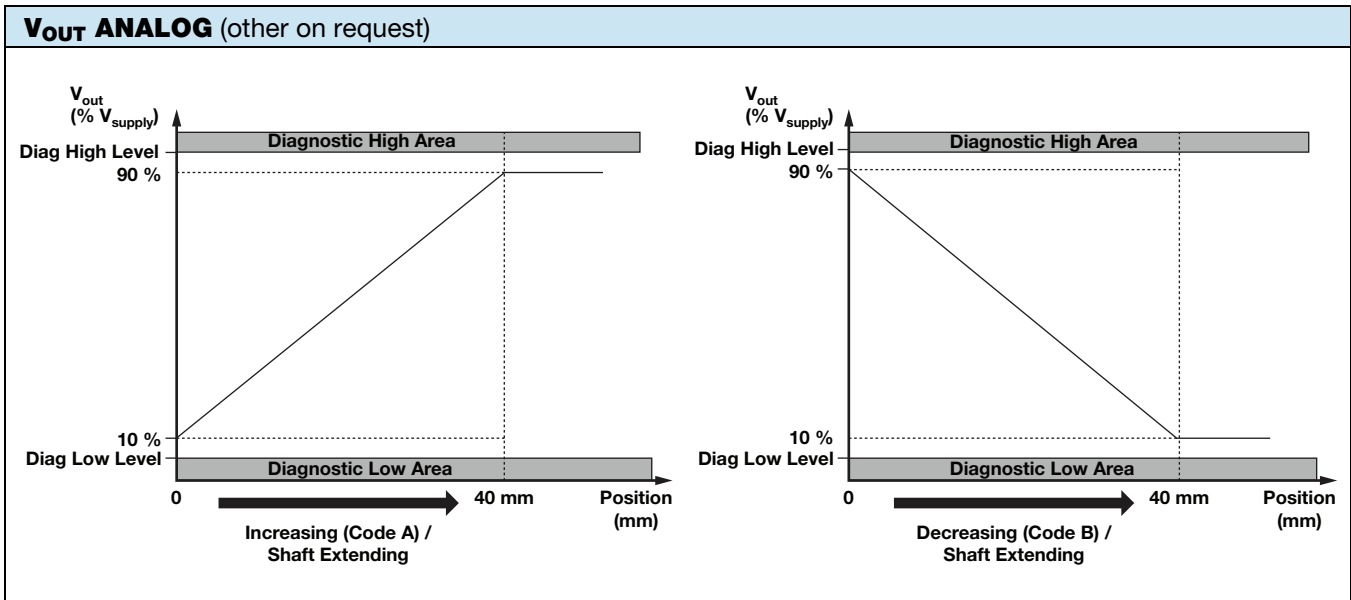


ORDERING INFORMATION/DESCRIPTION							
40 LHE	1	A	W	A	1T54	xxxx	e1
MODEL	FEATURES	LINEARITY	OUTPUT TYPE	OUTPUT SIGNAL	SHAFT TYPE	SPECIAL REQUEST	LEAD FINISH
	1: spring return 2: without spring	X: ± 2 % A: ± 1 %	W: wires Z: custom	A: analog increasing <sup>(1)</sup> B: analog decreasing <sup>(1)</sup> C: PWM increasing <sup>(1)</sup> D: PWM decreasing <sup>(1)</sup>	1: Ø 5 mm 9: special P: plain T: threaded M5 x 9.8 mm Z: Other type Shaft length from mounting face 54 mm (fully extended) / 87 mm (spring option)		

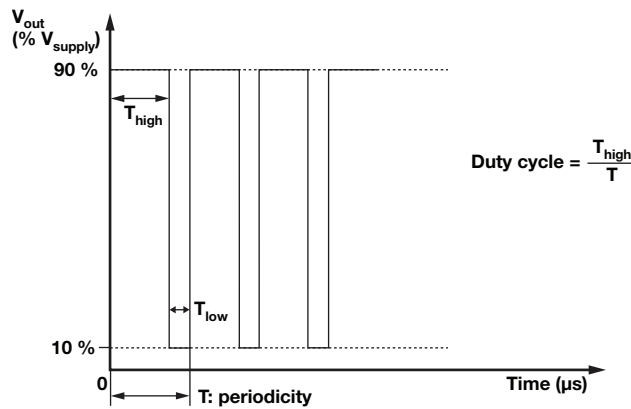
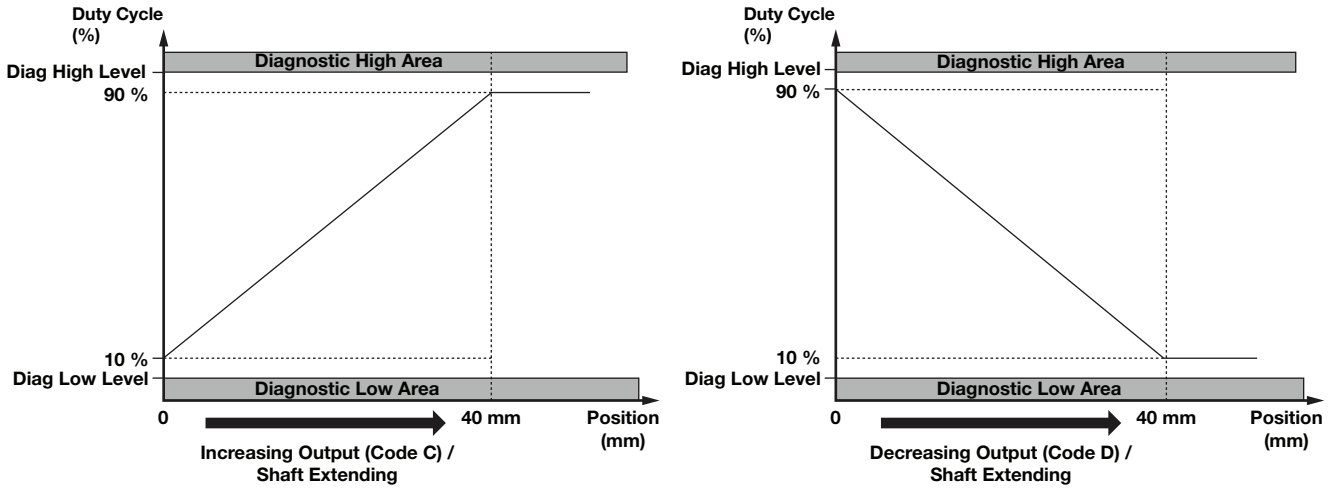
**Note**

<sup>(1)</sup> Shaft extending

SAP PART NUMBERING GUIDELINES						
40LHE	2	X	Z	C	1T54	xxxx
MODEL	FEATURES	LINEARITY	OUTPUT TYPE	OUTPUT SIGNAL	SHAFT TYPE	SPECIAL REQUEST
	Without spring return system	± 2 %	“Custom”	PWM increasing	M5 - 54 mm length	

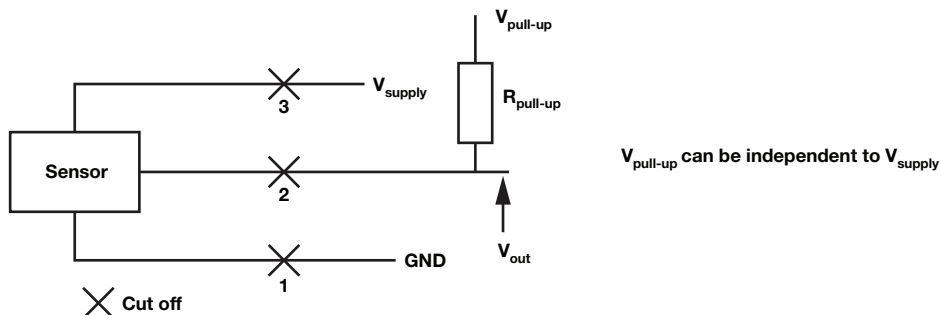


**PWM OUTPUT** (duty cycle /  $V_{OUT}$  - active high)



**DIAGNOSTIC MODES**

FAILURE	$V_{out}$ ANALOG $R_{pull-up}$	$V_{out}$ ANALOG $R_{pull-down}$	$V_{out}$ PWM $R_{pull-up} = 1\text{ k}\Omega$ $V_{pull-up} = V_{supply} = 5\text{ V}$
1: Broken GND	Diagnostic high area	Diagnostic low area	> 97 % $V_{supply}$ without modulation
2: Broken $V_{out}$	Diagnostic high area	Diagnostic low area	> 97 % $V_{supply}$ without modulation
3: Broken $V_{supply}$	Diagnostic high area	Diagnostic low area	> 97 % $V_{supply}$ without modulation
Over voltage $V_{supply} > 7\text{ V}$	Diagnostic high area	Diagnostic low area	> 97 % $V_{supply}$ without modulation
Under voltage $V_{supply} < 2.7\text{ V}$	Diagnostic high area	Diagnostic low area	> 97 % $V_{supply}$ without modulation





<b>ENVIRONMENTAL SPECIFICATIONS</b>	
Life	> 10M of cycles
Sealing	Electronics: IP67 / shaft bearing: IP47 Others on request
Vibrations	20 g from 10 Hz to 2000 Hz
Shocks	3 shocks/axis; 50 g half a sine 11 ms
Operating temperature range	-40 °C; +85 °C
Relative humidity range	40 % to 60 %
Electrostatic discharges	Contact discharges: ± 4 kV Air discharges: ± 8 kV EN 61000-4-2
Immunity to power frequency magnetic field	200 A/m 50 Hz / 60 Hz EN 61000-4-8
Immunity to radiated electromagnetic disturbances	200 V/m 150 kHz/1 GHz IEC 62132-2 part 2 (level A)
Radiated electromagnetic emissions	At 3 meters 30 MHz to 230 MHz < 50 dBµV/m 230 MHz to 1 GHz < 57 dBµV/m  At 10 meters 30 MHz to 230 MHz < 40 dBµV/m 230 MHz to 1 GHz < 47 dBµV/m  EN 61000-6-4
Immunity to radiated RF field	10 V/m 80 MHz to 1 GHz EN6100-4-3
Immunity to radiated electromagnetic disturbances	200 V/m 150 kHz to 1 GHz IEC 62132-2 part 2 (level A)
Dielectric strength	500 V <sub>AC</sub> RMS, 50 Hz, 1 min IEC 60393-1
Insulation resistance	> 50 MΩ IEC 60393-1

<b>MATERIALS</b>	
Housing	Thermoplastic housing
Shaft	Stainless steel
Output wires	19 stranded silver-plated copper core + PVC insulating sleeve 3 lead wires (AWG 22) Length: 300 mm
Spring (option)	Stainless steel

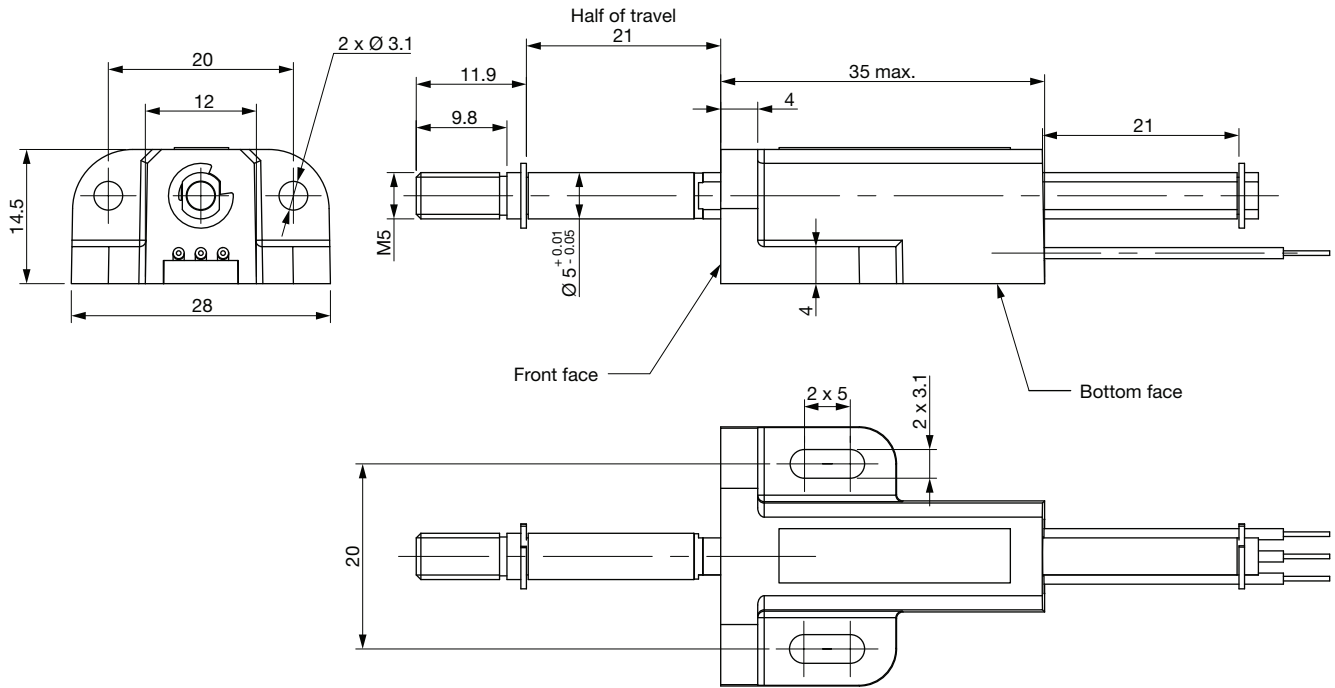
**Note**

- Nothing stated herein shall be construed as a guarantee of quality or durability

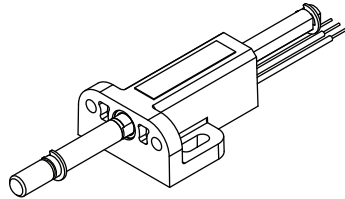
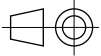


**DIMENSIONS** in millimeters

**WITHOUT SPRING RETURN**



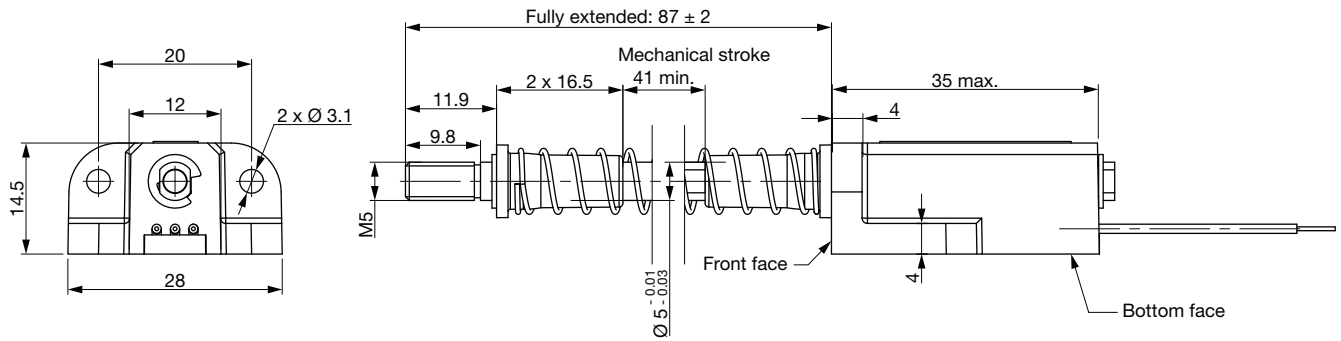
Gen. tol.:  
± 0.5 mm



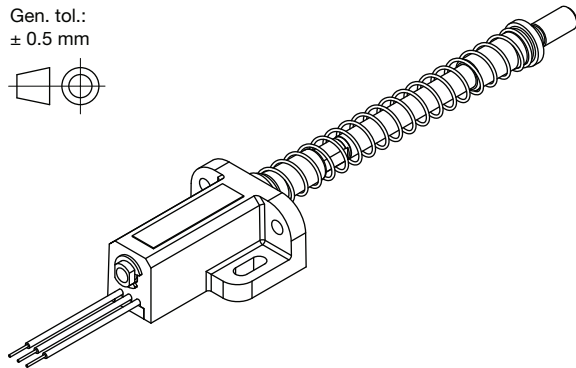
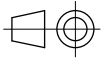
WIRE	
YELLOW	GND (-)
RED	SIGNAL
GREEN	V <sub>CC</sub> (+)



WITH SPRING RETURN



Gen. tol.:  
± 0.5 mm



WIRE	
YELLOW	GND (-)
RED	SIGNAL
GREEN	V <sub>cc</sub> (+)



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