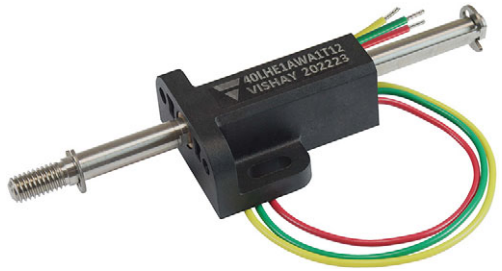
Linear Position Sensor in Hall Effect Technology (0 mm to 40 mm Max.)



FEATURES

- Accurate linearity down to: ± 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

RoHS COMPLIANT

LINKS TO ADDITIONAL RESOURCES

3D Models

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: ± 1 % (at $V_{max.}$ = 0.5 m/s) / ± 2 % (at $V_{max.}$ = 1 m/s) PWM output: ± 1 % (at $V_{max.}$ = 0.4 m/s) / ± 2 % (at $V_{max.}$ = 0.8 m/s)
Resolution (40 mm stroke)	12 µm
Supply voltage	5 V_{DC} ± 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 kΩ 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 ± 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 (1) **B**: analog decreasing (1) **C**: PWM increasing (1) **D**: PWM decreasing (1)	**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)		

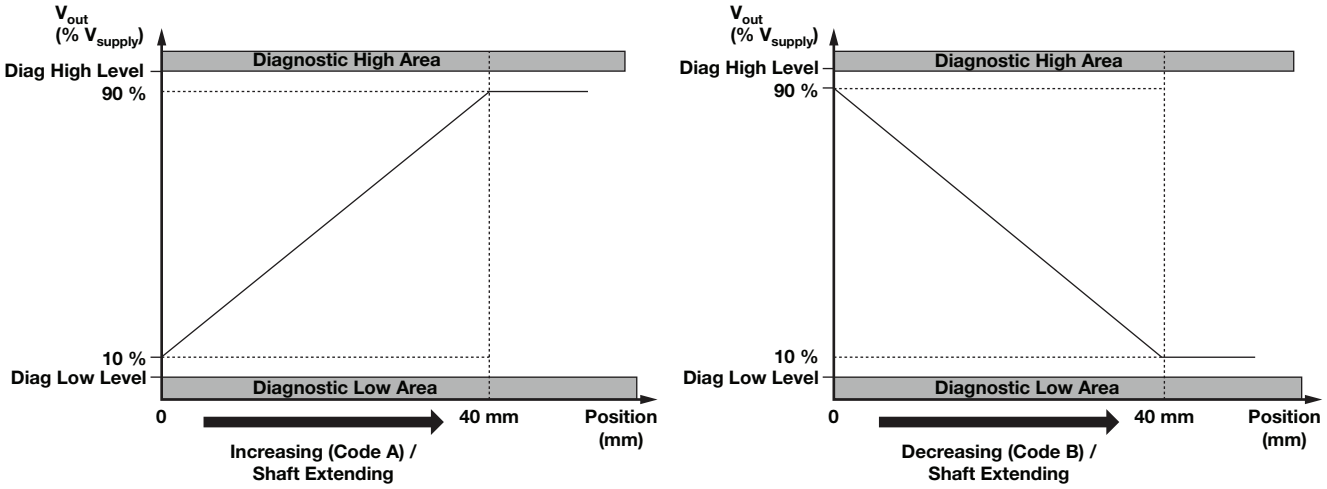
Note

(1) Shaft extending

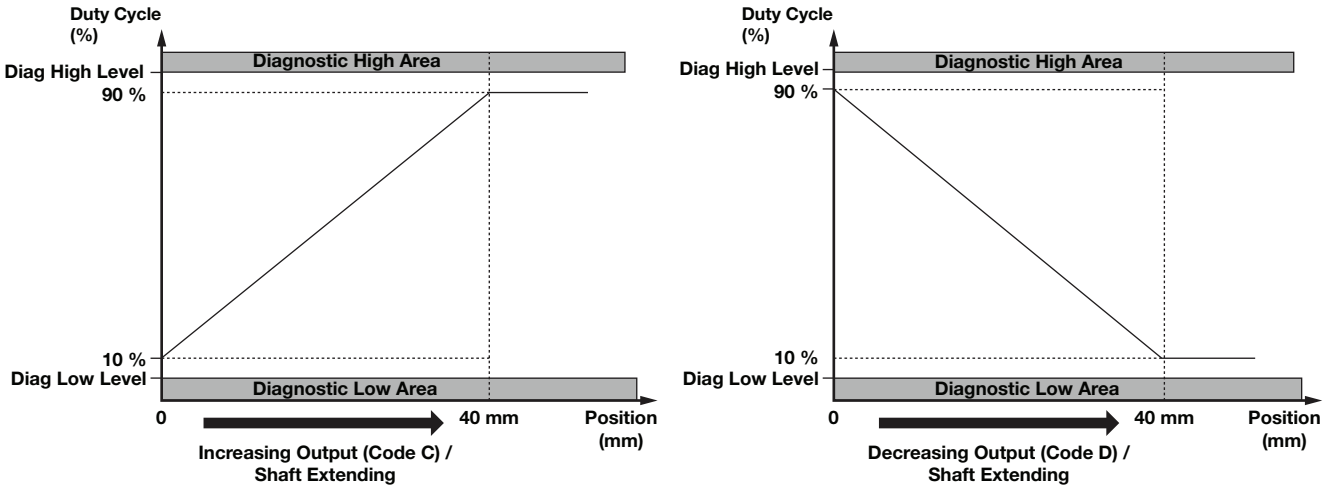
SAP PART NUMBERING GUIDELINES

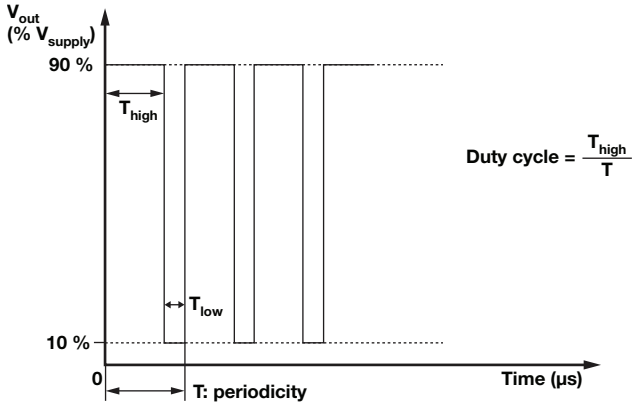
40LHE	2	X	Z	C	1T54	xxxx
MODEL	FEATURES	LINEARITY	OUTPUT TYPE	OUTPUT SIGNAL	SHAFT TYPE	SPECIAL REQUEST
	Without spring return system	**± 2 %**	**"Custom"**	PWM increasing	M5 - 54 mm length	

V_{OUT} ANALOG (other on request)



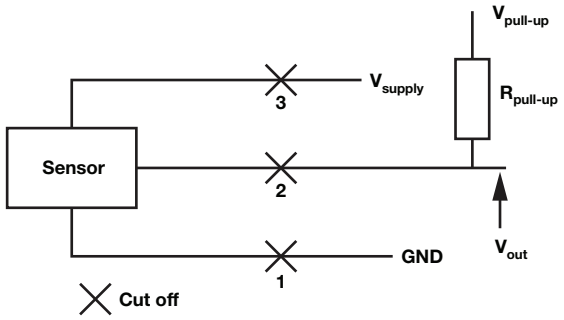
PWM OUTPUT (duty cycle / V_{OUT} - active high)





DIAGNOSTIC MODES

FAILURE	V_{out} ANALOG $R_{pull-up}$	V_{out} ANALOG $R_{pull-down}$	V_{out} PWM $R_{pull-up}$ = 1 kΩ $V_{pull-up}$ = V_{supply} = 5 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 V	Diagnostic high area	Diagnostic low area	> 97 % V_{supply} without modulation
Under voltage V_{supply} < 2.7 V	Diagnostic high area	Diagnostic low area	> 97 % V_{supply} without modulation



$V_{pull-up}$ can be independent to V_{supply}

ENVIRONMENTAL SPECIFICATIONS	
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_{AC} RMS, 50 Hz, 1 min IEC 60393-1
Insulation resistance	> 50 MΩ IEC 60393-1

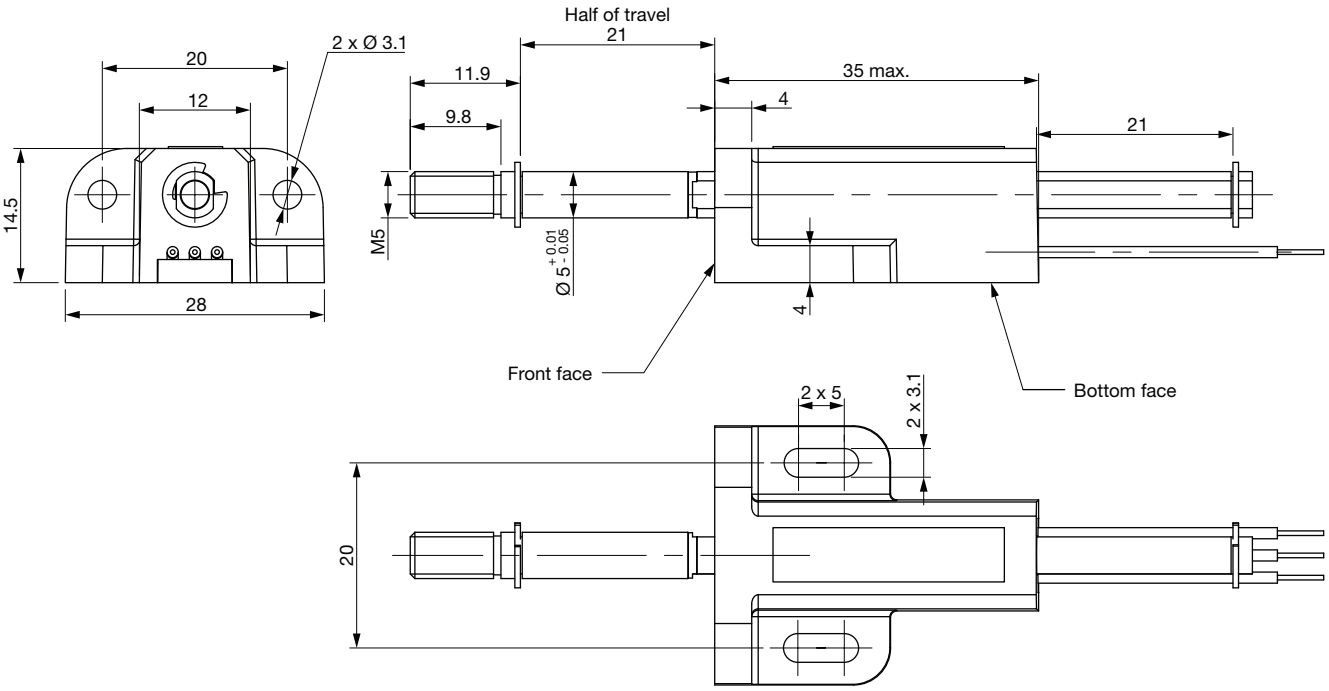
MATERIALS	
Housing	Thermoplastic housing
Shaft	Stainless steel
Output wires	19 stranded silver-plated copper core + PVC insulating sleeve 3 lead wires (AWG 22) Length: 300 mm
Spring (option)	Stainless steel

Note

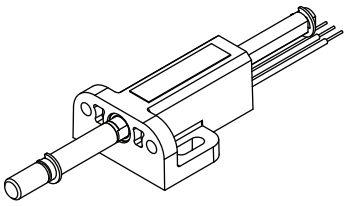
- Nothing stated herein shall be construed as a guarantee of quality or durability

DIMENSIONS in millimeters

WITHOUT SPRING RETURN

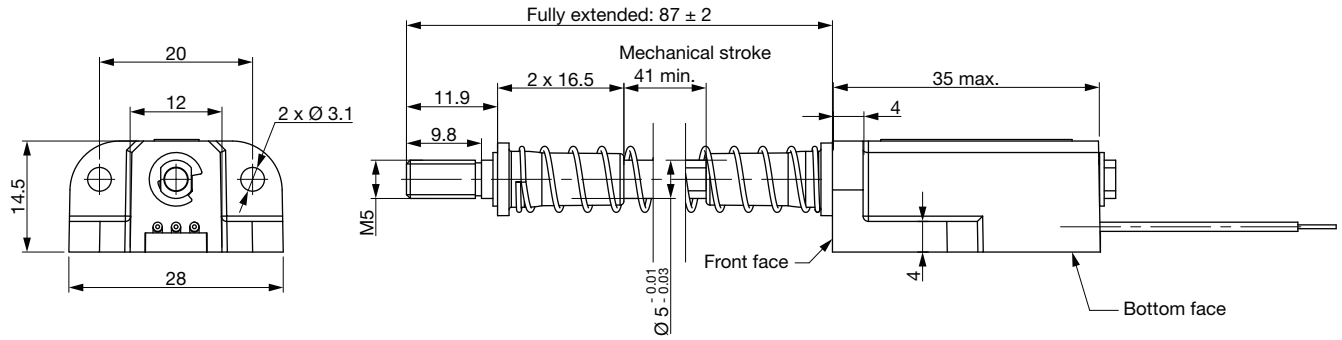


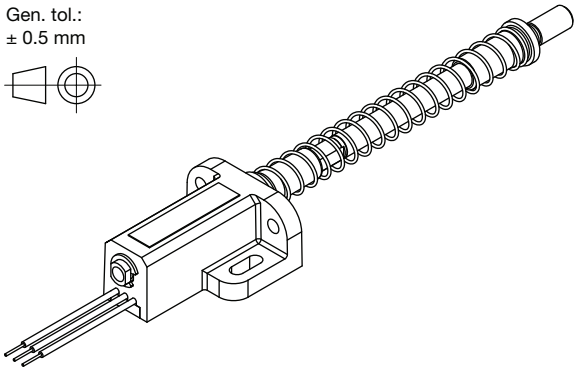
Gen. tol.:
± 0.5 mm



WIRE	
YELLOW	GND (-)
RED	SIGNAL
GREEN	V_{cc} (+)

WITH SPRING RETURN





WIRE	
YELLOW	GND (-)
RED	SIGNAL
GREEN	V_{cc} (+)

Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, “Vishay”), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Vishay products are not designed for use in life-saving or life-sustaining applications or any application in which the failure of the Vishay product could result in personal injury or death unless specifically qualified in writing by Vishay. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.