

LINARIX LINEAR SENSORS



**Robust Draw Wire Displacement Measurement**

## LINARIX LINEAR SENSORS

### Repeatable Length Measurement



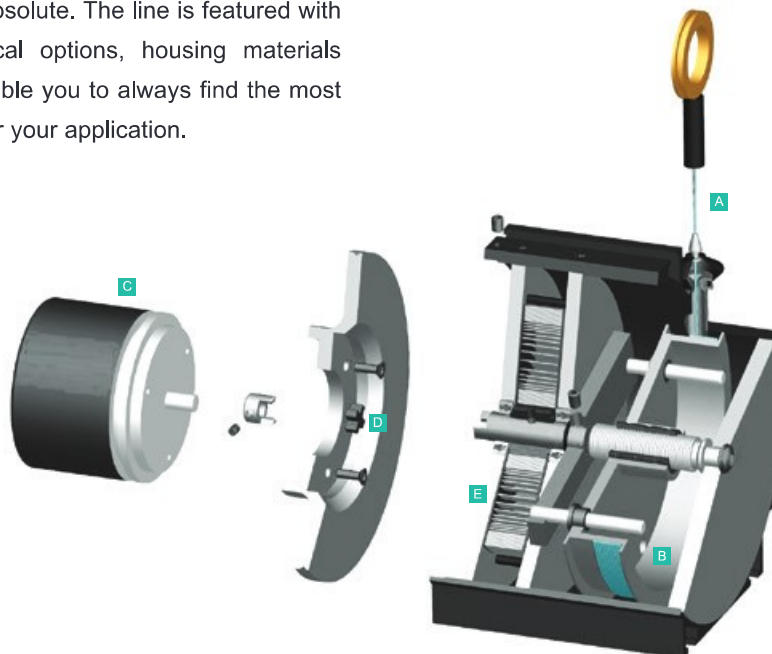
#### Technology

POSITAL's LINARIX draw wire sensors measure linear motion by displacing a stainless steel wire **A** wound around a wire drum **B** that actuates the rotary encoder **C** coupled to it via coupling **D**. A spring **E** is used to retract the wire in the housing. The encoder provides a proportional output. Measurements are highly accurate, reliable and the systems have very long lifetime.

The LINARIX line offers a wide range of measurement lengths ranging from 1 m to 30 m [3 to 98 ft] and position output in almost every available industrial interface both analog and digital as well as incremental and absolute. The line is featured with different mechanical options, housing materials and springs to enable you to always find the most suitable product for your application.

Compared to conventional linear pots and linear measurement systems using multiple gears and encoders LINARIX line are more durable and can be used to replace them directly avoiding common problems of slippage and wear. Draw wire sensors from POSITAL provide extremely precise measurements because of inherent accuracy of encoders while rugged construction ensures reliable performance even under extreme conditions.

POSITAL products listed below are classified according to interfaces and draw wire mechanics. Please use our online Product Finder to access entire data sheets.



# LINARIX LINEAR SENSORS

## Product Overview – Linear Sensors

CE		Measuring Range in m [in]	Accuracy in [±%FSO]	Wire Diameter in mm [in]	Wire Material	Max. Extension Force in N	Min. Retraction Force in N	Linear Resolution in µm	Drum Circumference in mm [in]	Optical Encoder	Magnetic Encoder
	<ul style="list-style-type: none"> <li>&gt; Plastic</li> <li>&gt; Compact Design</li> <li>&gt; Enclosure: N</li> </ul>	1.25 [49]	0.05	0.36 [0.014]	Coated Polyamide Stainless Steel	1.50	1.00	31	125 [4.9]		■
	<ul style="list-style-type: none"> <li>&gt; Machined Metal</li> <li>&gt; Cylindrical</li> <li>&gt; Enclosure: P</li> </ul>	1.74 [69]	0.02	0.45 [0.017]	Coated Polyamide Stainless Steel	5.00	3.50	36	149 [5.9]	■	■
	<ul style="list-style-type: none"> <li>&gt; Machined Metal</li> <li>&gt; Rectangular</li> <li>&gt; Enclosure: C</li> </ul>	2.00 [79]	0.02	0.45 [0.017]	Plastic Coated Stainless Steel	2.00	1.20	24	100 [3.9]		■
	<ul style="list-style-type: none"> <li>&gt; Plastic</li> <li>&gt; Compact Design</li> <li>&gt; Enclosure: M</li> </ul>	2.10 [83]	0.05	0.45 [0.017]	Coated Polyamide Stainless Steel	5.00	3.50	52	215 [8.5]		■
	<ul style="list-style-type: none"> <li>&gt; Machined Metal</li> <li>&gt; Rectangular</li> <li>&gt; Enclosure: D</li> </ul>	3.00 [118]	0.01	0.87 [0.034]	Plastic Coated Stainless Steel	3.00	2.50	49	200 [7.9]	■	■
	<ul style="list-style-type: none"> <li>&gt; Extruded Metal</li> <li>&gt; Compact Design</li> <li>&gt; Enclosure: F</li> </ul>	3.00 [118]	0.02	0.80 [0.031]	Coated Polyamide Stainless Steel	10.0	5.0	63	260 [10.2]	■	■
	<ul style="list-style-type: none"> <li>&gt; Extruded Metal</li> <li>&gt; Practical Mounting</li> <li>&gt; Enclosure: G</li> </ul>	5.00 [197]	0.02	1.00 [0.039]	Nylon Coated Stainless Steel	16.0	4.0	77	315 [12.4]	■	■
	<ul style="list-style-type: none"> <li>&gt; Machined Metal</li> <li>&gt; Rectangular</li> <li>&gt; Enclosure: E</li> </ul>	6.00 [236]	0.01	0.54 [0.021]	Stainless Steel	8.00	3.0	40	200 [7.9]	■	■
	<ul style="list-style-type: none"> <li>&gt; Plastic</li> <li>&gt; Compact Design</li> <li>&gt; Enclosure: W</li> </ul>	7.50 [295]	0.05	0.45 [0.017]	Coated Polyamide Stainless Steel	13.00	7.0	81	333 [13.0]	■	■
	<ul style="list-style-type: none"> <li>&gt; Extruded Metal</li> <li>&gt; Long Lifetime</li> <li>&gt; Enclosure: H</li> </ul>	10.00 [394]	0.01	1.00 [0.039]	Nylon Coated Stainless Steel	21.0	8.0	77	315 [12.4]	■	■
	<ul style="list-style-type: none"> <li>&gt; Extruded Metal</li> <li>&gt; Practical Mounting</li> <li>&gt; Enclosure: R</li> </ul>	15.00 [591]	0.01	1.00 [0.039]	Nylon Coated Stainless Steel	21.0	25.0	77	315 [12.4]	■	■

# LINARIX LINEAR SENSORS

## Product Selection Guide – Incremental Linear Sensors



### 1 Technology

**U**  $\leq 0.09^\circ$  (Magnetic)

### 2 Communication Interface

**IPT** Programmable HTL/TTL, Default RS422 (TTL)

**IPH** Programmable HTL/TTL, Default Push-Pull (HTL)

### 3 Pulses per Revolution

**XXXXX** Programmable: Choose Any Pulse Count 1 to 16384

#### Default:

**01000** 1000 Pulses: Corresponds to 1 pulse per 100  $\mu\text{m}$

**01250** 1250 Pulses: Corresponds to 1 pulse per 100  $\mu\text{m}$

**01500** 1500 Pulses: Corresponds to 1 pulse per 100  $\mu\text{m}$

**02000** 2000 Pulses: Corresponds to 1 pulse per 100  $\mu\text{m}$

**02150** 2150 Pulses: Corresponds to 1 pulse per 100  $\mu\text{m}$

**03333** 3333 Pulses: Corresponds to 1 pulse per 100  $\mu\text{m}$

### 4 Draw Wire

Please See Technical Drawings on Page 81

### 5 Protection Class Encoder

**A** IP54

**0** IP65

### 6 Connection Type

**CAW** Cable: Axial 1 m

**2AW** Cable: Axial 2 m

**5AW** Cable: Axial 5 m

**AAW** Cable: Axial 10 m

**CRW** Cable: Radial 1 m

**2RW** Cable: Radial 2 m

**5RW** Cable: Radial 5 m

**ARW** Cable: Radial 10 m

**PAM** Connector: Axial M12, 5 pin

**PAL** Connector: Axial M23, 12 pin

**PRM** Connector: Radial M12, 5 pin

**PRQ** Connector: Radial M12, 8 pin

**PRL** Connector: Radial M23, 12 pin

**PRD** Connector: Radial MIL MS14

**PRE** Connector: Radial MIL MS16

**PRF** Connector: Radial MIL MS18



### > UBIFAST Configuration Tool

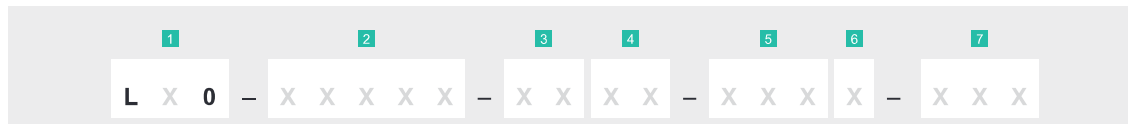
- Compact Housing with WLAN to Create Hotspot
- Connects to Smart Phone/ Tablets/ Notebooks
- Web Browser Based Simple Programming
- Configuration Data Sent Back to POSITAL via E-mail
- Parameters to Program: PPR, Resolution, Number of Turns, Direction

> Learn More



# LINARIX LINEAR SENSORS

## Product Selection Guide – Analog and Parallel Linear Sensors



### 1 Accuracy (Technology)

- U** ≤ 0.09° (Magnetic)
- D** ≤ 0.022° (Optical)

### 2 Communication Interface

- AV001** Analog Voltage: 0 to 5 V
- AV002** Analog Voltage: 0 to 10 V
- AV003** Analog Voltage: 0.5 to 4.5 V
- AV004** Analog Voltage: 0.5 to 9.5 V
- AC005** Analog Current: 4 to 20 mA
- AC006** Analog Current: 0 to 20 mA
- AVP01** Analog Voltage: 0 to 5 V w. Pushbuttons
- AVP02** Analog Voltage: 0 to 10 V w. Pushbuttons
- AVP03** Analog Voltage: 0.5 to 4.5 V w. Pushbuttons
- AVP04** Analog Voltage: 0.5 to 9.5 V w. Pushbuttons
- ACP05** Analog Current: 4 to 20 mA w. Pushbuttons
- ACP06** Analog Current: 0 to 20 mA w. Pushbuttons
- PPA1B** Parallel Binary
- P1A1B** Parallel Preset Binary
- PPA1G** Parallel Gray
- P1A1G** Parallel Preset Gray
- PP00E** Parallel Excess Gray
- P100E** Parallel Preset Excess Gray

### 3 Revolution

- 00** Singleturn
- 04** Multiturn: 4 bit (16 rev)
- 07** Multiturn: 8 bit (128 rev)
- 08** Multiturn: 8 bit (256 rev)
- 12** Multiturn: 12 bit (4096 rev)
- 14** Multiturn: 14 bit (16384 rev)

### 4 Resolution

- AA** 9 bit (512 Steps / 0.7°) Parallel only
- 12** 12 bit (4096 Steps / 0.088°)
- 13** 13 bit (8192 Steps / 0.044°)
- 16** 16 bit (65536 Steps / 0.005°)

### 5 Draw Wire

Please See Technical Drawings on Page 81

### 6 Protection Class

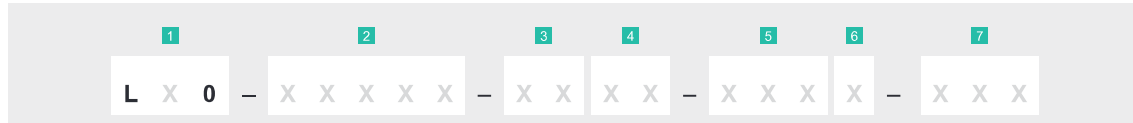
- A** IP54
- 0** IP64/IP65

### 7 Connection Type

- CAW** Cable: Axial 1 m
- 2AW** Cable: Axial 2 m
- 5AW** Cable: Axial 5 m
- AAW** Cable: Axial 10 m
- CRW** Cable: Radial 1 m
- 2RW** Cable: Radial 2 m
- 5RW** Cable: Radial 5 m
- ARW** Cable: Radial 10 m
- PAM** Connector: Axial M12, 5 pin (Analog)
- PAP** Connector: Axial M23, 16 pin (Parallel)
- PAT** Connector: Axial M27, 26 pin (Parallel)
- PRM** Connector: Radial M12, 5 pin (Analog)
- PRP** Connector: Radial M23, 16 pin (Parallel)
- PRT** Connector: Radial M27, 26 pin (Parallel)

# LINARIX LINEAR SENSORS

## Product Selection Guide – SSI/SSI+Incremental Linear Sensors



### 1 Accuracy (Technology)

- U** ≤ 0.09° (Magnetic)
- D** ≤ 0.022° (Optical)

### 2 Communication Interface

- S101B** SSI Binary
- SLF1B** SSI Binary Fast
- S101G** SSI Gray
- S101E** SSI Excess-Gray
- SHPPP** Programmable SSI+Incr. Push-Pull (HTL) 4.75 to 30 VDC
- SRPPP** Programmable SSI+Incr. RS422 (TTL) 8 to 30 VDC
- SSPPP** Programmable SSI+Incr. RS422 (TTL) 5 VDC
- SHxxB** SSI+Incr. Binary + A/B/Z (Push-Pull) 4.75 to 30 VDC
- SRxxB** SSI+Incr. Binary + A/B/Z (RS-422) 8 to 30 VDC
- SSxxB** SSI+Incr. Binary+ A/B/Z (RS-422) 5 VDC
- SHxxG** SSI+Incr. Gray + A/B/Z (Push-Pull) 4.75 to 30 VDC
- SRxxG** SSI+Incr. Gray + A/B/Z (RS-422) 8 to 30 VDC
- SSxxG** SSI+Incr. Gray + A/B/Z (RS-422) 5 VDC
- S401B** SSI Binary w. Pushbuttons
- S401G** SSI Gray w. Pushbuttons
- S3xxG** SSI Gray+Incr. A/B/Z (RS-422)
- S3xxB** SSI Binary+Incr. A/B/Z (RS-422)
- S5xxB** SSI Binary+Incr. A/B/Z (RS-422)
- S6xxB** SSI Binary+Incr. A/B/Z (Push-Pull)
- S5xxG** SSI Gray+Incr. A/B/Z (RS-422)
- S6xxG** SSI Gray+Incr. A/B/Z (Push-Pull)

### 3 Revolution

- 00** Singleturn
- 04** Multiturn: 4 bit (16 rev)
- 08** Multiturn: 8 bit (256 rev)
- 12** Multiturn: 12 bit (4096 rev)
- 13** Multiturn: 13 bit (8192 rev)
- 14** Multiturn: 14 bit (16384 rev)
- 16** Multiturn: 16 bit (65536 rev)
- 20** Multiturn: 20 bit (1048576 rev)
- PP** Programmable, Default 12 bit (4096 rev)

### 4 Resolution

- 12** 12 bit (4096 Steps / 0.088°)
- 13** 13 bit (8192 Steps / 0.044°)
- 16** 16 bit (65536 Steps / 0.005°)
- PP** Programmable, Default 13 bit (8192 Steps / 0.044°)

### 5 Draw Wire

Please See Technical Drawings on Page 81

### 6 Protection Class

- A** IP54
- 0** IP64/IP65

### 7 Connection Type

- CAW** Cable: Axial 1 m
- 2AW** Cable: Axial 2 m
- 5AW** Cable: Axial 5 m
- AAW** Cable: Axial 10 m
- CRW** Cable: Radial 1 m
- 2RW** Cable: Radial 2 m
- 5RW** Cable: Radial 5 m
- ARW** Cable: Radial 10 m
- PAQ** Connector: Axial M12, 8 pin
- PAL** Connector: Axial M23, 12 pin
- PAP** Connector: Axial M23, 16 pin
- PRQ** Connector: Radial M12, 8 pin
- PRL** Connector: Radial M23, 12 pin
- PRP** Connector: Radial M23, 16 pin

# LINARIX LINEAR SENSORS

## Product Selection Guide – Bus-Interface Linear Sensors



### 1 Accuracy (Technology)

- U** ≤ 0.09° (Magnetic)
- D** ≤ 0.022° (Optical)

### 2 Communication Interface

- DPC1B** Profibus (Optical, Magnetic)
- CA01B** CANopen (Magnetic)
- CAA1B** CANopen (Optical)
- CTx1B** CANopen+Incr. RS422 (TTL)
- CHx1B** CANopen+Incr. Push-Pull (HTL)
- CL00B** CANopen Lift (Magnetic)
- C900B** SAE J1939
- D2B1B** DeviceNet (Optical)
- IBA1B** Interbus (Optical)

### 3 Revolution

- 00** Singleturn
- 12** Multiturn: 12 bit (4096 rev)
- 13** Multiturn: 13 bit (8192 rev)
- 14** Multiturn: 14 bit (16384 rev)
- 15** Multiturn: 15 bit (32768 rev)

### 4 Resolution

- 12** 12 bit (4096 Steps / 0.088°)
- 13** 13 bit (8192 Steps / 0.044°)
- 16** 16 bit (65536 Steps / 0.005°)

### 5 Draw Wire


Please See Technical Drawings on Page 81

### 6 Protection Class

- A** IP54
- 0** IP64/IP65

### 7 Connection Type


- CAW** Cable: Axial 1 m
- 2AW** Cable: Axial 2 m
- 5AW** Cable: Axial 5 m
- AAW** Cable: Axial 10 m
- CRW** Cable: Radial 1 m
- 2RW** Cable: Radial 2 m
- 5RW** Cable: Radial 5 m
- ARW** Cable: Radial 10 m
- PAM** Connector: Axial M12, 5 pin (CANopen, CANopen Lift)
- PAV** Connector: Axial M12, 5 pin, Status LED (CANopen, CANopen Lift)
- PAM** Connector: Axial 3 x M13 (Profibus)
- PRM** Connector: Radial M12, 5 pin
- PAQ** Connector: Axial M12, 8 pin (CAN+Incr.)
- PRV** Connector: Radial M12, 5 pin, Status LED (CANopen, CANopen Lift)
- PRQ** Connector: Radial M12, 8 pin (CAN+Incr.)
- PRI** Connector: Radial 2 x M23, 9 pin (Interbus)
- H3P** Connection Cap: 3 Cable Glands
- H1B** Connection Cap: 1 x M12 Connector
- H2B** Connection Cap: 2 x M12 Connectors
- H72** Connection Cap: 3 x M12 Connectors
- H1C** Connection Cap: 1 x M23 Connector (DeviceNet)
- H2M** Connection Cap: 2 x M20 Cable Glands
- HCC** Without Connection Cap



**> Rugged Connectors and Cables**

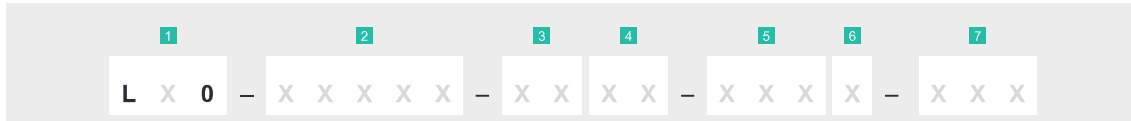
- Reliable Electrical Connections
- M12 & M23 Data, Bus and Signal Connectors
- Straight and Angled Versions
- Variety of Cable Material and Lengths
- Shielded for Protection Against Noise and Interference

**> Learn More**



# LINARIX LINEAR SENSORS

## Product Selection Guide – Ethernet Linear Sensors



### 1 Accuracy (Technology)

- U** ≤ 0.09° (Magnetic)
- D** ≤ 0.022° (Optical)

### 2 Communication Interface

- EIB1B** Profinet
- EEA1B** EtherNet/IP
- E2A2B** Powerlink
- EC00B** EtherCAT
- EM00B** Modbus/TCP + TCP/IP

### 3 Revolution

- 00** Singleturn
- 12** Multiturn: 12 bit (4096 rev)
- 14** Multiturn: 14 bit (16384 rev)

### 4 Resolution

- 13** 13 bit (8192 Steps / 0.044°)
- 16** 16 bit (65536 Steps / 0.005°)

### 5 Draw Wire

Please See Technical Drawings on Page 81

### 6 Protection Class

- A** IP54
- 0** IP64/IP65

### 7 Connection Type

- PRM** Connector: Radial 2 x M12 (Modbus)
- PRM** Connector: Radial 3 x M12
- PAM** Connector: Axial 3 x M12



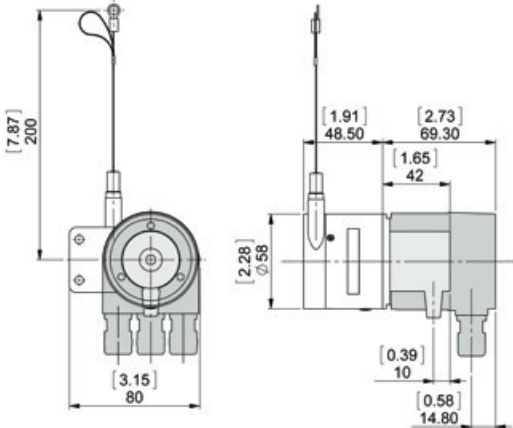
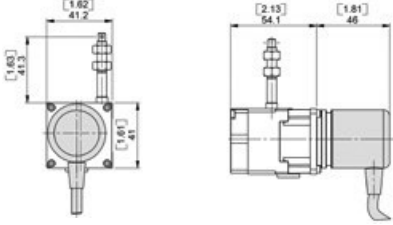
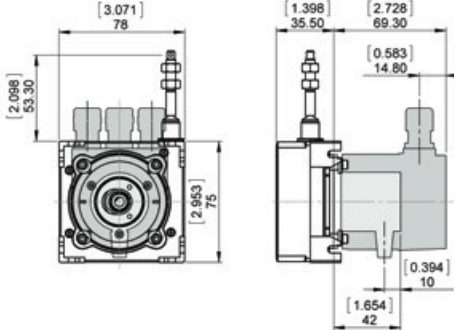
# LINARIX LINEAR SENSORS

## Technical Drawings

	Type Key	Encoder Connection Orientation	Max. Measurement Length m [in]	Enclosure Draw Wire
	<p>1N0</p> <p>1N3</p> <p>1N6</p> <p>1N9</p>	<p>0</p> <p>3</p> <p>6</p> <p>9</p>	<p>1.25 [49]</p> <p>1.25 [49]</p> <p>1.25 [49]</p> <p>1.25 [49]</p>	<p>Plastic</p> <p>Plastic</p> <p>Plastic</p> <p>Plastic</p>
	<p>2M0</p> <p>2M3</p> <p>2M6</p> <p>2M9</p>	<p>0</p> <p>3</p> <p>6</p> <p>9</p>	<p>2.10 [83]</p> <p>2.10 [83]</p> <p>2.10 [83]</p> <p>2.10 [83]</p>	<p>Plastic</p> <p>Plastic</p> <p>Plastic</p> <p>Plastic</p>
	<p>7W0</p> <p>7W3</p> <p>7W6</p> <p>7W9</p>	<p>0</p> <p>3</p> <p>6</p> <p>9</p>	<p>7.50 [295]</p> <p>7.50 [295]</p> <p>7.50 [295]</p> <p>7.50 [295]</p>	<p>Plastic</p> <p>Plastic</p> <p>Plastic</p> <p>Plastic</p>

# LINARIX LINEAR SENSORS

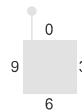
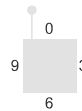
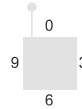
## Technical Drawings

	Type Key	Encoder Connection Orientation	Max. Measurement Length m [in]	Enclosure Draw Wire
	<p>2P0</p> <p>2P2</p> <p>2P4</p> <p>2P6</p> <p>2P8</p> <p>2PA</p>	<p>0</p> <p>2</p> <p>4</p> <p>6</p> <p>8</p> <p>A</p>	<p>1.74 [69]</p> <p>1.74 [69]</p> <p>1.74 [69]</p> <p>1.74 [69]</p> <p>1.74 [69]</p> <p>1.74 [69]</p>	<p>Machined Metal</p> <p>Machined Metal</p> <p>Machined Metal</p> <p>Machined Metal</p> <p>Machined Metal</p> <p>Machined Metal</p>
	<p>2C0</p> <p>2C3</p> <p>2C6</p> <p>2C9</p>	<p>0</p> <p>3</p> <p>6</p> <p>9</p>	<p>2.00 [79]</p> <p>2.00 [79]</p> <p>2.00 [79]</p> <p>2.00 [79]</p>	<p>Machined Metal</p> <p>Machined Metal</p> <p>Machined Metal</p> <p>Machined Metal</p>
	<p>3D0</p> <p>3D3</p> <p>3D6</p> <p>3D9</p>	<p>0</p> <p>3</p> <p>6</p> <p>9</p>	<p>3.00 [118]</p> <p>3.00 [118]</p> <p>3.00 [118]</p> <p>3.00 [118]</p>	<p>Machined Metal</p> <p>Machined Metal</p> <p>Machined Metal</p> <p>Machined Metal</p>

# LINARIX LINEAR SENSORS

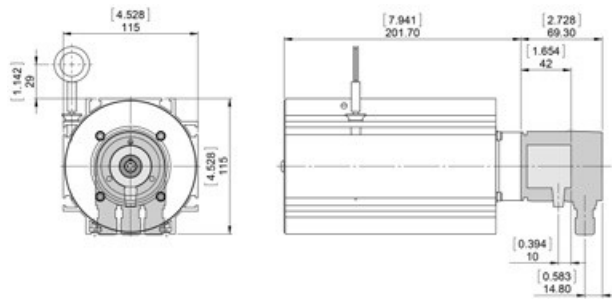
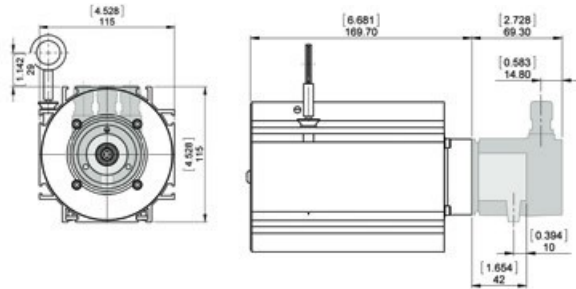
## Technical Drawings

		Type Key	Encoder Connection Orientation	Max. Measurement Length m [in]	Enclosure Draw Wire
<p>Front view dimensions: [3.346] 85, [1.634] 41.50, [4.921] 125</p> <p>Side view dimensions: [3.378] 85.80, [2.520] 64, [0.583] 14.80, [0.394] 10, [1.433] 36.40</p>	6E0	0	6.00 [236]	Machined Metal	
	6E3	3	6.00 [236]	Machined Metal	
	6E6	6	6.00 [236]	Machined Metal	
	6E9	9	6.00 [236]	Machined Metal	
<p>Front view dimensions: [3.78] 96, [2.05] 52, [3.78] 96</p> <p>Side view dimensions: [3.22] 81.70, [2.73] 69.30, [0.58] 14.80, [0.39] 10, [1.65] 42</p>	3F0	0	3.00 [118]	Extruded Metal	
	3F3	3	3.00 [118]	Extruded Metal	
	3F6	6	3.00 [118]	Extruded Metal	
	3F9	9	3.00 [118]	Extruded Metal	
<p>Front view dimensions: [1.29] 29, [4.53] 115, [115] 115</p> <p>Side view dimensions: [4.08] 103.7, [2.73] 69.30, [0.58] 14.8, [0.39] 10, [1.65] 42</p>	5G0	0	5.00 [197]	Extruded Metal	
	5G3	3	5.00 [197]	Extruded Metal	
	5G6	6	5.00 [197]	Extruded Metal	
	5G9	9	5.00 [197]	Extruded Metal	



# LINARIX LINEAR SENSORS

## Technical Drawings



	Type Key	Encoder Connection Orientation	Max. Measurement Length m [in]	Enclosure Draw Wire
	AH0	0	10.00 [394]	Extruded Metal
	AH3	3	10.00 [394]	Extruded Metal
	AH6	6	10.00 [394]	Extruded Metal
	AH9	9	10.00 [394]	Extruded Metal
	FR0	0	15.00 [591]	Extruded Metal
	FR3	3	15.00 [591]	Extruded Metal
	FR6	6	15.00 [591]	Extruded Metal
	FR9	9	15.00 [591]	Extruded Metal