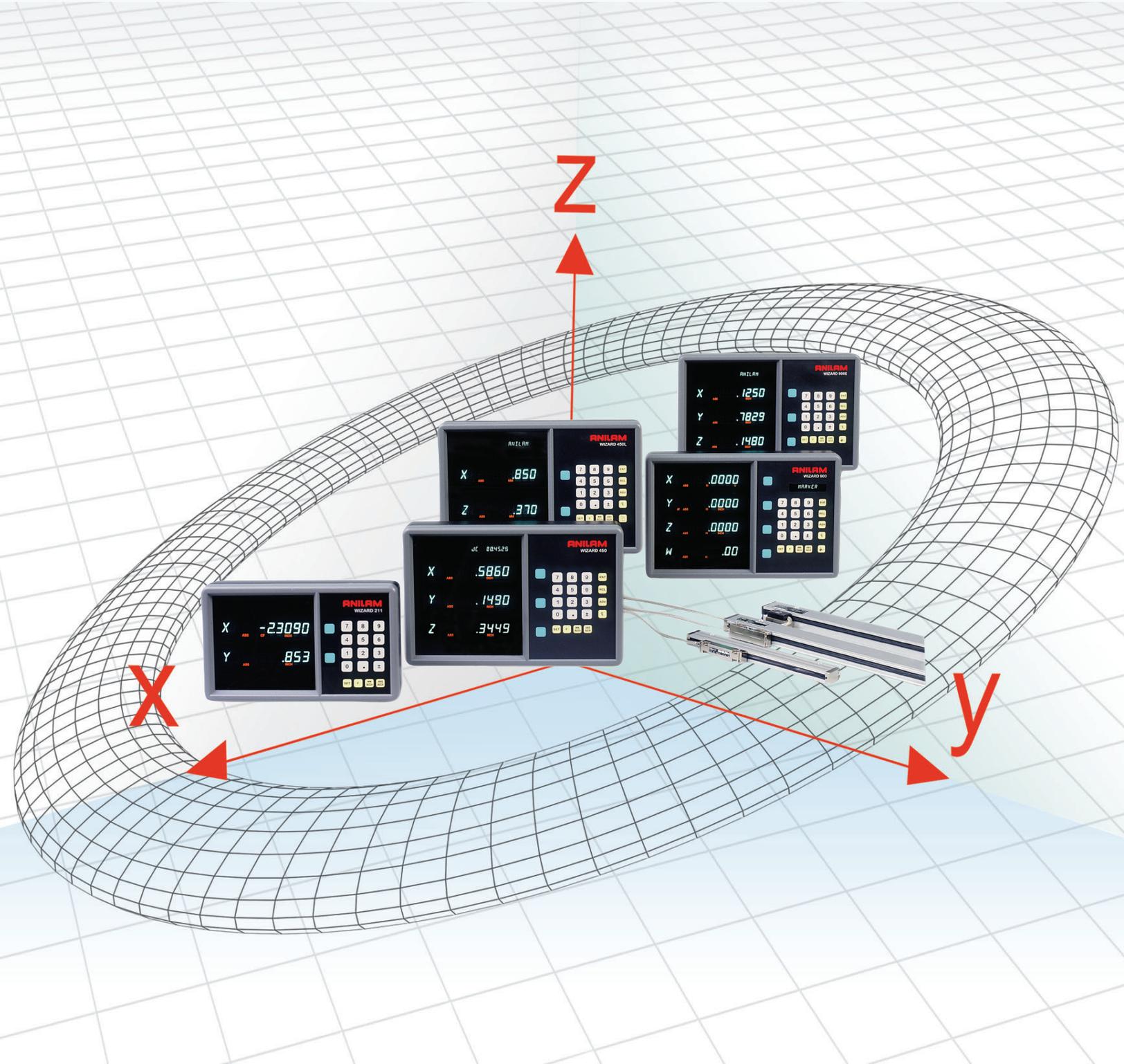


Wizard Digital Readouts



ANILAM®



A World Leader in Digital Readout Innovation

ANILAM's pioneering history of innovation and leadership in the metalworking industry began in the late 1960's when the company became the first to offer an affordable digital readout package for knee-type milling machines. At the time, TTL was the novel technology that made the difference. A rotary encoder on the ballscrew was used for the position measurement. Within a short time, ANILAM invented the endless-tape encoder and began to offer precision glass scale encoders, thereby improving accuracy and reliability significantly. ANILAM quickly became a world leader in the digital readout market.

ANILAM once again lead the way when it became the first company to offer a programmable readout in 1977. This was the original Wizard readout, the first readout featuring a microprocessor and internal memory. Shortly thereafter, ANILAM broke new ground with its first contaminant protected precision glass scale encoder. Because of the linear encoders enormous success with proven accuracy, reliability and consistency, and with the contaminant risk reliably eliminated, ANILAM focused on "glass scale" technology and has remained with it ever since.

In 1992, ANILAM introduced the VDRO series readouts. These used a high visibility Vacuum Fluorescent Display (VFD) and featured a separate dialogue display prompting operators for input. Feedrate display was first introduced in the VDRO series. Ease of use in combination with high performance has always been the hallmark of ANILAM.

Now, with more than 30 years in the field, ANILAM is pleased to introduce an entire new line of digital readout systems to the market, the next generation of machine measurement equipment.

The story of ANILAM's new Wizard line of digital readout systems is compelling. We wanted to make it easy for everyone, regardless of application and requirements, to find the right system for their needs and make it easy to choose. Emphasizing user friendliness and performance, we structured the new line into a complete range of readouts and transducers with something for everyone. There are general purpose readouts for any application and special purpose readouts for lathes and EDM. There are basic readouts with basic functions, readouts with advanced features for further operator support, and there are programmable readouts for up to four axes.

ANILAM's new Wizard line offers two types of linear encoders, both guaranteed resistant to contaminants. PGS-P is the basic version, one of the most reliable transducers ANILAM has ever offered. A more sophisticated linear encoder is the RBS and its miniature version RBM. These have rollerbearing guided readerheads providing improved measuring performance and higher alignment tolerance.

ANILAM also introduces the new feature EverTrack™ with the RBS and RBM encoders. EverTrack™ is a permanent position tracking concept that provides an absolute measurement and eliminates any need for awkward battery back-up solutions.

ANILAM's new Wizard line of digital readouts and linear encoders bring the next generation to the market, more user friendly and with more benefits. With ANILAM, you share technology at its very best.

How You Benefit From A Digital Readout System

THE BASIC FUNCTION OF A DRO SYSTEM is to measure position accurately and make it available in an easy-to-read format, so operators do not have to read graduations and count revolutions of the dials. A readout system comprises one linear encoder per axis, to track the position, and a readout console for data collection, processing and presentation. Some readouts have advanced features to assist the operator with geometric calculations and some are programmable for even higher yield.

THE RESULT is significant improvements in accuracy, productivity, quality and versatility.

Accuracy

With a digital readout system the position is accurately given by the display right in front of the operator, all the way down to 0.00005" (1 micron) depending on the linear encoder chosen. The linear encoder only registers actual machine movement, effectively eliminating backlash from the positioning process. No more guesswork!

ANILAM's precision glass scale encoders are by far the most accepted transducers in the market, easily out-performing other technologies due to their accuracy and repeatability. The finer the measuring grid, the more precise the measurement!

Quality

By using a Wizard readout system, the possibility of mis-positioning is efficiently removed. With easy-to-use routines in the console software, even complicated and time consuming calculations are done for you-- quickly and correctly. The result is less errors and less scrap. This means higher quality, higher throughput with lower costs!

Versatility

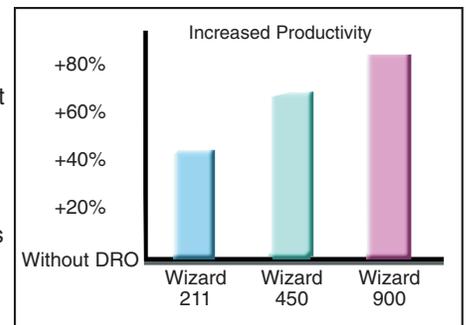
A Wizard readout owner will quickly reach the expected gains in productivity and quality. Soon, it becomes clear that the versatility of the machine has increased with the access to a variety of software features assisting the operator. Parts that could only be made with great effort before, can now be readily machined. The available market expands with the increased versatility of the machine tool. More jobs to go for and more choice to select from when picking the most profitable ones!

Productivity

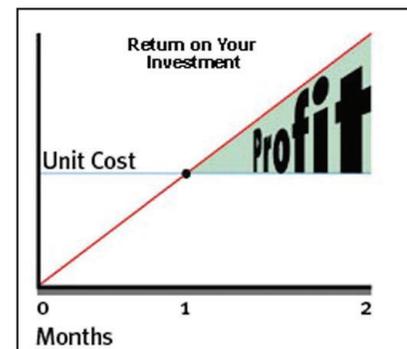
With no guesswork involved in the positioning process and with the position clearly available in the display, the work can be done much faster. The Wizard consoles are full of features that will save even more time resulting in even more productivity gain, as e.g. bolthole circle calculation, taper checking, electronic notepad and much more. And with EverTrack™, ANILAM's new position protection feature, the system always knows where it is.

Increased productivity immediately translates into return on investment.

Depending on how advanced a system is chosen, the conversion of non-productive time into productive time varies.



THE RETURN on investing in a DRO system begins immediately. Since ANILAM's Wizard systems are so easy to learn and use, the gain in productivity pays for the investments in only a few weeks. The pay-back time is effectively independent of the level of system because the higher investment is compensated by the higher productivity gain. After those initial couple



Digital Readouts

ALL ANILAM WIZARD READOUTS have a die-cast housing-- rugged, tight and fully EMC compliant. VFD display technology provides bright, large and easily read digits. Axis designations can be selected individually, eliminating any confusion. The audible keys are large and have improved positive hit feel.

THE WIZARD LINE is easy to learn and use. The Digital Readouts are loaded with features, well-proven through the years, in addition to many new and exciting features. There is a version for everybody depending on which features are needed--- basic, advanced or programmable.

General Purpose

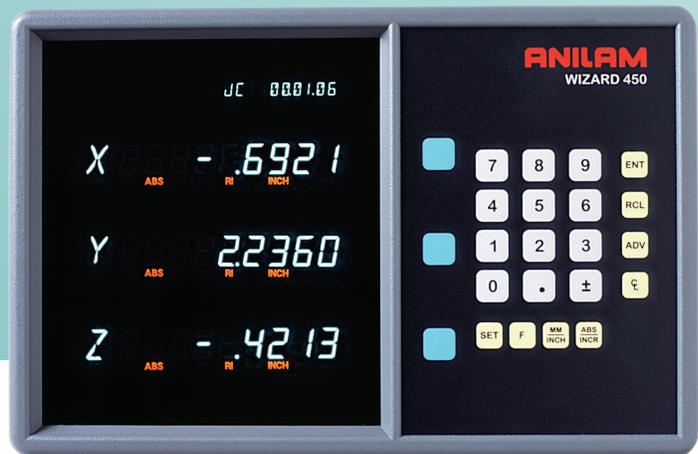
Wizard 211

This is our highly durable economy console -the perfect choice for any machine tool application when basic DRO functions are required. With features like reset, preset, absolute/incremental mode, inch/metric conversion, radius/diameter mode, machine error compensation and many others, it will meet your basic needs and more.



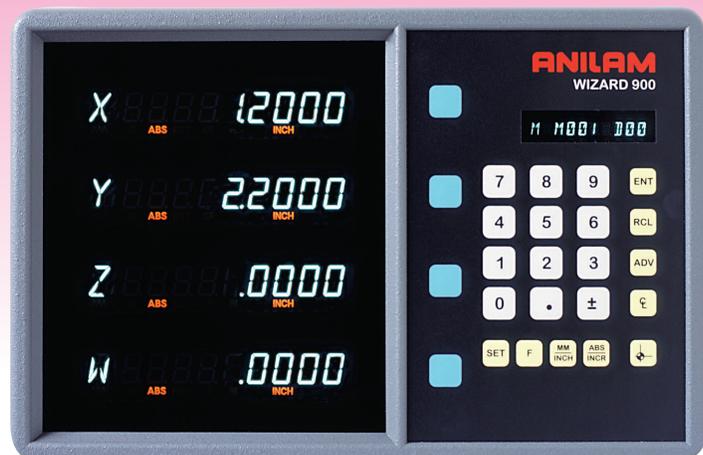
Wizard 450

In Wizard 450 several advanced features have been added, e.g. calculation of linear and frame hole patterns, full and partial circular bolthole patterns and much more. A job clock is included for timing. Wizard 450 comes with the popular ANILAM interactive message display, operating like a setup wizard by prompting for inputs. It will calculate and display feed-rate, a unique and highly appreciated feature



Wizard 900

The Wizard 900 is the choice for any application when advanced programming capabilities are required, or when 4 axes are monitored. It features 500 memory locations. The readout has all the functionality of Wizard 450 and Wizard 450L plus features like skew compensation, mirror imaging and more. Constant surface speed (CSS) is available as an option as well as spindle speed display (SSD).



EverTrack™, ANILAM's new position protection feature, is available in all Wizard's when combined with RBS- or RBM-type linear encoders.

Quick Selection Chart

	Basic	Advanced		Programmable	
	Wizard 211 1 to 3 axis	Wizard 450 1 to 3 axis	Wizard 450L 2 to 3 axis	Wizard 900 2 to 4 axis	Wizard 900E 3 axis
Milling	✓	✓		✓	
Drilling	✓	✓		✓	
Boring	✓	✓		✓	
Grinding	✓	✓		✓	
Turning	✓		✓	✓	
EDM		✓			✓
Other Machines	✓	✓	✓	✓	

Special Purpose



Wizard 450L

The Wizard 450L is a special lathe version with turning features including, tool length offsets and taper checking. With the axis coupling feature, two parallel axes can move independently and the true position be summed up. Wizard 450L also has constant surface speed control (CSS) as an option.



Wizard 900E

This is ANILAM's new programmable readout for EDM machines- a special version of the Wizard 900. The Wizard 900E also features spark out, for perfect finish, input for first spark detection, and the three Z-axis mode- showing the most pertinent data during the spark cycle. Our new safety feature SparkArrest™ makes the Wizard 900E a stand out in the industry.

Wizard Selected Features Guide

Wizard 900, 900E

Wizard 450, 450L

Wizard 211

EverTrack™

Additional precision grating on the RBS and RBM linear encoders ensure permanent position tracking. The position will never be lost due to power interruptions.

Radius/Diameter Mode

The console can display the position either as a radius or diameter, an invaluable feature for lathes.

Machine Error Compensation

Machine mechanics are never exact. A correction factor can be set for each axis independently. Just move the axis a known distance, input what it should have been and the wizard will automatically make the necessary correction. Correction is linear in Wizard 211 and can vary over four segments in other models.

Absolute/Incremental Mode

This feature allows positioning using either an absolute datum or the last position as reference for subsequent moves. Selectable with a single key stroke.

Interactive Message Display

The Wizard will calculate actual feed-rate and display here, or the job clock can be read. Also in this display, the Wizard will prompt for data input, making the most demanding operations easy to set up. With the built in help utility, the Wizard will tell the operator what the proper F-codes are.

Bolthole Patterns

Bolthole patterns are often symmetric. The Wizard 450 will automatically calculate all the positions for circular, linear, array or frame patterns, from a minimum of data entry. Only the centerpoint, diameter and number of holes are required for a full circular hole pattern with up to 360 holes.

Tool Length Offsets

The Wizard 450L will keep track of tool length offsets, so there is no need to redatum tools.

Axis Coupling

When there are two slides on the same axis, the Wizard 450L will couple the two positions together. The operator can use the slides independently and the Wizard 450L will automatically calculate the true tool position.

Programmability

The Wizard 900 and Wizard 900E store programs like in an electronic notepad. There are up to 500 locations available. The memory can keep many programs in store, independently labeled.

Skew Compensation

Instead of wasting productive time for setting up jobs, use skew compensation and the Wizard will automatically modify the position coordinates to compensate for the part misalignment.

Mirroring

Reduce tool changes and key strikes by using the mirror image feature. When a job needs repeated mirroring, the Wizard will automatically generate the mirrored locations for a stored program.

Three Z-Axis Mode

At the position of the first spark, Wizard 900E can be switched from the normal x, y, z display to show the only values of interest during the cycle, i.e. distance to go to target depth, the target depth and the actual position of the tool. This mode can be automatically triggered if a first spark detector is connected.

Spark Out

The Wizard will dwell at the target depth enough to create the desired quality finish.

SparkArrest™

Wizard 900E provides a unique safety feature, SparkArrest™. This feature will block sparks if the electrode exceeds a certain distance from the workpiece, eliminating the risk of

Digital Readout Specifications

	Wizard 211	Wizard 450	Wizard 450L	Wizard 900	Wizard 900E
Number of axes (linear or polar)	1,2,3	1,2,3	2,3	2,3,4	3
Housing	die cast	die cast	die cast	die cast	die cast
Display technology	Vacuum Fluorescent Display (VFD)				
Diagnostics	•	•	•	•	•
Basic					
Configurable axis designation	•	•	•	•	•
Display resolution	.0005/.0001	.0002/.0005/.001	.001	.002/.005/.01/.02	mm
EverTrack™ (req. RBS or RBM encoders)	•	•	•	•	•
Support inch-grating encoders	•	•	•	•	•
Inch/Metric conversion	•	•	•	•	•
Reset	•	•	•	•	•
Preset	•	•	•	•	•
Absolute/Incremental mode	•	•	•	•	•
Radius/Diameter mode	•	•	•	•	•
Machine error compensation	linear	4-point lin.	4-point lin.	4-point lin.	4-point lin.
Mid-point calculation	•	•	•	•	•
Approaching zero warning	.5inch/10mm	selectable	selectable	selectable	selectable
Add/Subtract calculator	•	•	•	•	•
Advanced					
Interactive message display		VFD	VFD	VFD	VFD
Help function	•	•	•	•	•
Feed-rate display	•	•	•	•	•
Job clock	•	•	•	•	•
Edge finder input	•	•	•	•	•
Linear/Array bolthole patterns (10)	•	999 holes	999 holes	999 holes	999 holes
Frame bolthole patterns (10)	•	999 holes	999 holes	999 holes	999 holes
Circular bolthole patterns (10) (full or partial)	•	360 holes	360 holes	360 holes	360 holes
Multiple datum points	•	99	99	99	99
Tool length offsets	•	•	99	99	99
Taper calculation	•	•	•	•	•
Axis coupling	•	•	•	•	•
Programmable					
Memory				500	500
Skew compensation	•	•	•	•	•
Mirror imaging	•	•	•	•	•
Three Z-axis mode	•	•	•	•	•
First spark zeroing (req. spark sensor & I/O-opt.)	•	•	•	•	•
Spark out	•	•	•	•	•
SparkArrest™	•	•	•	•	•
Options*					
Input/Output (I/O) module		•	•	•	std.
Constant surface speed (req. I/O-option)	•	•	•	•	•
Spindle speed display (for 2- and 3-axis only)	•	•	•	•	•

- *I/O** The Input/Output (I/O) module includes:
- DE15 output connector with Zero output for each axis, approaching zero, 2 relay outputs
 - DAC signal for CSS (0-10V/10mA, 12 bit)
 - DE9 input connector with zero each axis, recall, store, print, spark detector
 - DE9 connector for RS232 serial communication

***CSS** This option provides a DAC output for open loop control of spindle speed.

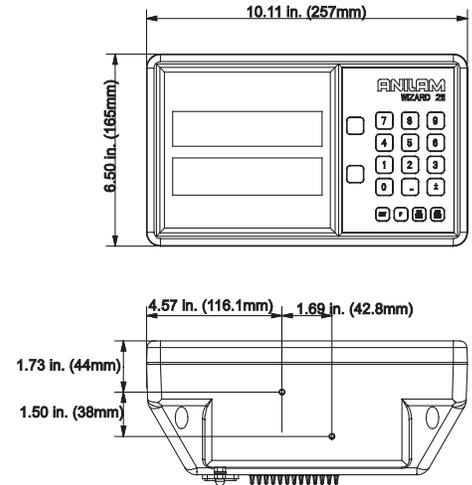
***SSD** This option will display the spindle speed. Spindle encoder is required.



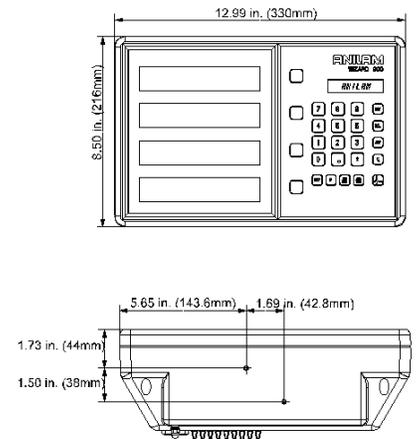
The Wizard readouts use VFD (Vacuum Fluorescent Display) technology for best readability. The axis designation is configurable. A set of indicators are provided for reference.

- WM** Indicates when display resolution is set coarser than the encoder resolution
- ∅** Diameter mode
- ABS** Absolute mode
- RST** Reset mode
- CF** Correction factor active for compensation
- RI** Reference index mode for EverTrack™ and marker pulses
- MM** Metric mode
- INCH** Inch mode
- ←** Edge sensor
- Approaching zero, directional

Dimensional Drawing Wizard 211



Dimensional Drawing Wizard 450, 450L, 900, and 900E



Precision Linear Encoders

LINEAR ENCODERS BASED ON GLASS SCALE TECHNOLOGY

are by far the most accepted transducers for machine tool applications. These use a sturdy ruler of glass outfitted with a highly durable

Accuracy and Repeatability

Accuracy, repeatability and reliability are the well-proven reasons for ANILAM offering precision glass scale (PGS) technology transducers.

With the very high precision grating applied, the transducer actually reads what the operator wants to measure. It effectively counts its position digitally rather than relying on complicated interpolation of analog signals, typical of inductive technologies.

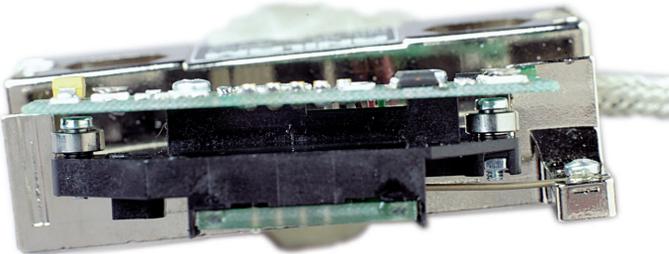
The precision of the PGS grating and the rigidity of the metal extrusion ensure that the same position can be repeated within 1.5 micron (.00006"), significantly higher accuracy than other technologies. The low expansion coefficient of glass ensures less sensitivity to temperature fluctuations that may occur during machining.

The PGS encoders are highly resistant to magnetism and electro-magnetic fields since it uses glass as the grating bearer and opto-electronics for the reading. This has shown to be beneficial in the typical workshop where a lot of magnetic material gets all over the linear encoder and where electro-magnetic interference often is generated by high power consumption machinery.

Roller-Bearing Technology

As a unique design feature for retrofit applications, ANILAM utilizes roller bearing guided reader-heads in the RBS- and RBM-type linear encoders.

The advantages of this technique are manifold. First, it provides a stable position of the reader-head while scanning the scale grating, ensuring signal consistency and accuracy.



Close-up photo of the roller-bearing readerhead viewed from the scale position. The roller bearings guide the readerhead along the edge of the scale, very precisely and with minimum friction.

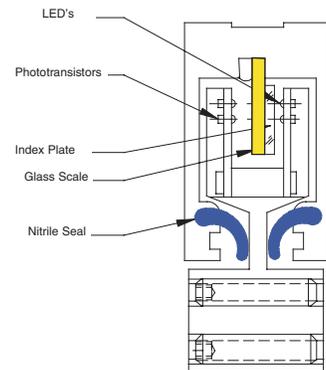
chrome grating and placed in a well protected metal encapsulation. A reader-head attached to the moving part monitors position and motion by opto-electronically scanning the grating on the scale.

Contaminant Resistance

ANILAM has offered PGS Linear Encoders for more than 25 years and presented the first contaminant protected encoder 20 years ago. Since then, protection has been further improved and extensively proven in field, even in the harshest environments. This is why ANILAM guarantees contaminant resistance for our linear encoders.

Contaminant protection is ensured by the way the encoder is built with the glass well protected by the extrusion and by ANILAM's exclusive lip seal made from Nitrile. Nitrile rubber seal has unique mechanical properties that provide the tight seal. Nitrile effectively resists absorption of shop chemicals making the seal very enduring.

Also, since ANILAM uses PGS technology, the encoders are non-magnetic and will not attract any swarf.



It dramatically minimizes hysteresis effects when motion is reversed to the opposite direction, bringing the reversal error to a minimum. Also, the alignment requirement between extrusion and reader-head becomes less critical, making installation easier.

All ANILAM readerheads have integrated signal processing electronics, minimizing signal degradation and resulting in excellent noise resistance.



Precision Linear Encoders



PGS-P Linear Encoders

The standard for the ANILAM family of DRO's. This encoder is among the most consistent, reliable products ever produced at ANILAM. Its accuracy and repeatability consistently out-perform that of non-glass alternatives.



RBS-5T, RBS-1T Linear Encoders

ANILAM is the first to bring these high quality, rollerbearing-guided encoders to retrofit DRO applications. The RBS encoders feature the EverTrack™ system for permanent position tracking.

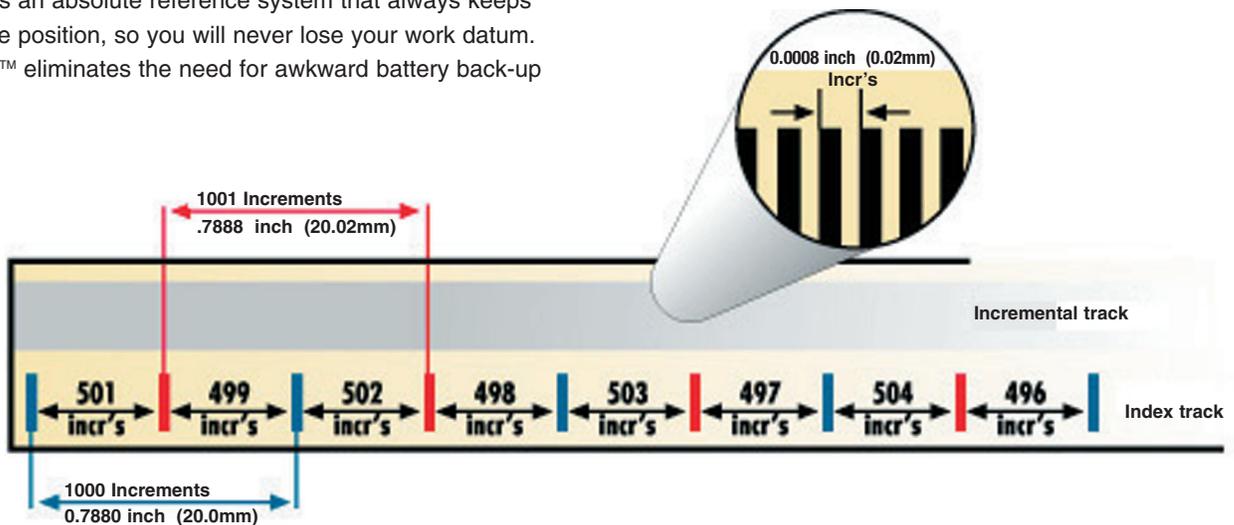


RBM-5T, RBM-1T Linear Encoders

The smaller-profile version of the RBS encoder is designed for application where there is less room for mounting. The RBM encoders also feature the EverTrack™ system.

EverTrack™

EverTrack™ is a new feature included in RBS- and RBM-type scales. It is an absolute reference system that always keeps track of the position, so you will never lose your work datum. EverTrack™ eliminates the need for awkward battery back-up solutions.

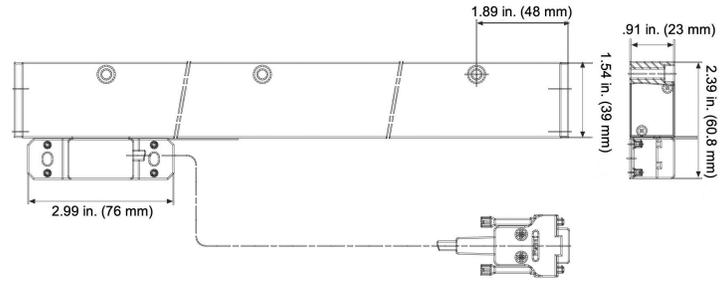


THE EVERTRACK™ feature is accomplished by a reference index track in addition to the regular incremental grating, which is a set of lines .02mm apart. The index track has two sets of marks, indicated by blue and red. The distance between consecutive blue marks is always 1000 increments and between red marks, 1001 increments. So, along the index track there is always a unique number of increments between

a blue and a red mark. By moving the part less than an inch (25 mm), the console knows exactly where it is in absolute measures. As part zero and other references are always stored, the operator can get back to work without resetting anything at all. It does not matter if the machine has been moved during a power outage or over night, EverTrack™ will give the right position every time.

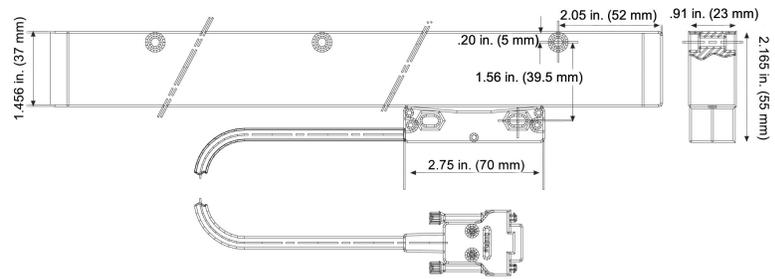
PGS-P Scale Specifications

Grating pitch	.0008 in (.02 mm)
Resolution	.0002 in (.005 mm)
Accuracy: at 20°C	(+/- 0.015 mm/m)
Repeatability	1.4 µm
Slew rate	1 meter/second
Shock	10 g at 11 ms
Vibration	4 g at 40-2000Hz
Operating temperature	32° to 122° F (0° to 50° C)
Storage temperature	-4° to 140° F (-20° to 60° C)
Operating humidity	5% -95% relative humidity
Storage humidity	5% -95% relative humidity
Required move force	2N maximum
Coefficient of linear expansion	10µm ² /meter
Reference marks (zero crossing)	none
CE mark	yes
Overall length = Measured length + 90 mm (3.543")	



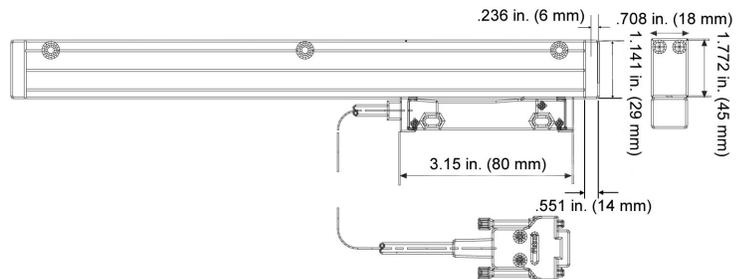
RBS-5T, RBS-1T Scale Specifications

Grating pitch	.0008 in (.02 mm)
Resolution	.0002 in/.00001 in (.005 mm / .001 mm)
Accuracy: at 20°C	+/- .0004 in/meter or +/- .0002 in/meter (+/- 0.01 mm/meter or +/- 0.005 mm/meter)
Repeatability	1.4 µm
Slew rate	1 meter/second
Shock	14 g at 11 ms
Vibration	4.5g at 40 - 2000Hz
Operating temperature	32° to 122° F (0° to 50° C)
Storage temperature	-4° to 158° F (-20° to 70° C)
Operating humidity	5% -95% relative humidity
Storage humidity	5% -95% relative humidity
Required move force	4N maximum
Coefficient of linear expansion	10µm ² /meter
Reference marks (zero crossing)	EverTrack™
CE mark	yes
Overall length = Measured length + 114 mm (4.488")	



RBM-5T, RBM-1T Scale Specifications

Grating pitch	.0008 in (.02 mm)
Resolution	.0002 in/.00001 in (.005 mm / .001mm)
Accuracy: at 20°C	+/- .0004 in/meter or +/- .0002 in/meter (+/- 0.01 mm/meter or +/- 0.005 mm/meter)
Repeatability	1.4 µm
Slew rate	1 meter/second
Shock	15 g at 11ms
Vibration	5g at 40 - 2000Hz
Operating temperature	32° to 122° F (0° to 50° C)
Storage temperature	-4° to 158° (-20° to 70° C)
Operating humidity	5% -95% relative humidity
Storage humidity	5% -95% relative humidity
Required move force	2N maximum
Coefficient of linear expansion	10µm ² /meter
Reference marks (zero crossing)	EverTrack™
CE mark	yes
Overall length = Measured + 132 mm (5.197")	



Cable length: on scale lengths up to 42" (1050mm), cable length is 13' (4m)
on scale lengths over 42" (1050mm), cable length is 19' (6m)

Long-travel Precision Scales

Long-travel Precision Scales above 3050mm measured length.

Please contact your ANILAM representative for details and information of Long-travel Precision Scales.

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