

# NEWALL



# NEWALL

## Linear Encoders

Summary

# NEWALL

## Linear Encoders

### Company Profile

Newall, founded in Peterborough in 1968 and now a wholly owned subsidiary of BEI Technologies Inc. a Schneider Electric Company, has dedicated itself to providing the automation, machine tool and other machinery and production industries with leading edge technologies that increase productivity and machine tool efficiency.

In 1973, continuous design and development of Newall's technologies gave rise to the reliable and highly accurate Spherosyn™ and Microsyn™ Linear Encoders. The range now also includes incremental and absolute versions, available with industry standard output signals which can be interfaced with all major CNC, NC, PLC and OC products.

The latest SHG and MHG Linear Encoders incorporate a truly unique design in that none of the electrical or measuring components are exposed to harsh workshop environments and they will continue to provide accurate and reliable readings even when fully submerged in water, oil or coolant. For this reason all of the Newall linear encoder range carry an IP67 (NEMA 6) environmental rating.

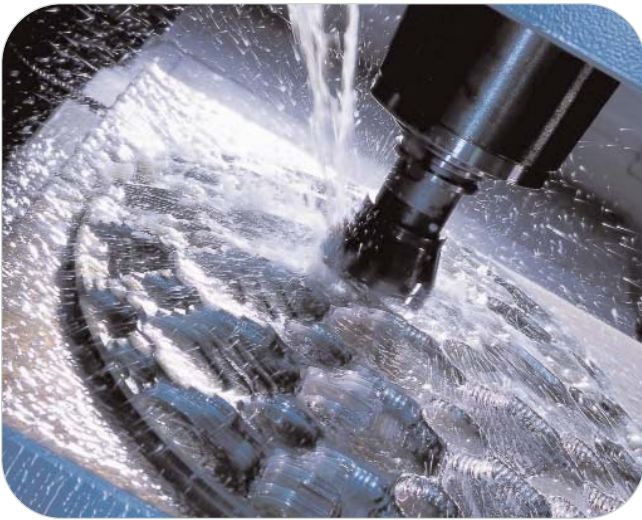
Newall's products range also includes a wide range of Digital Readout systems; each specifically designed and dedicated to increasing machine productivity. The Digital Readout range has developed to become the most advanced readouts available today and combined with the Spherosyn™ and Microsyn™ technology encoders, is one of the reasons why the Newall range are market leaders..

Over 85% of its products are exported, with distribution and service outlets in over 63 countries. Newall actively supports these markets with a worldwide network of fully trained sales and service personnel. In addition offices are located in Europe and the United States. Newall conforms to ISO 9001 and, in 1998, it was awarded the prestigious Queen's Award for Export Achievement.

### Linear Encoder Overview

The recent advancements of Digital Signal Processors (DSPs) alongside high-speed analogue to digital conversion ICs has allowed the Spherosyn® technology to provide feedback for a wide range of signal protocols. This allows all Newall encoders to carry an IP67 (NEMA 6) environmental rating and will continue to provide accurate and reliable readings even when fully submerged in water, oil or coolant. No other linear encoder can equal the durability and reliability of the Newall encoders. Newall encoders can interface with all major CNC, NC, PLC and PC products.

- **IP67 rating (NEMA Type 6)**
- **Withstands dust, dirt, oil and other harsh environmental conditions**
- **No mechanical wear characteristics**
- **Requires no cleaning or maintenance**
- **High tolerance to shock and vibration**



## Incremental

Newall Incremental Encoders provide sine-cosine or quadrature square wave feedback signals that allow for direct integration to servo driven applications.

## Absolute

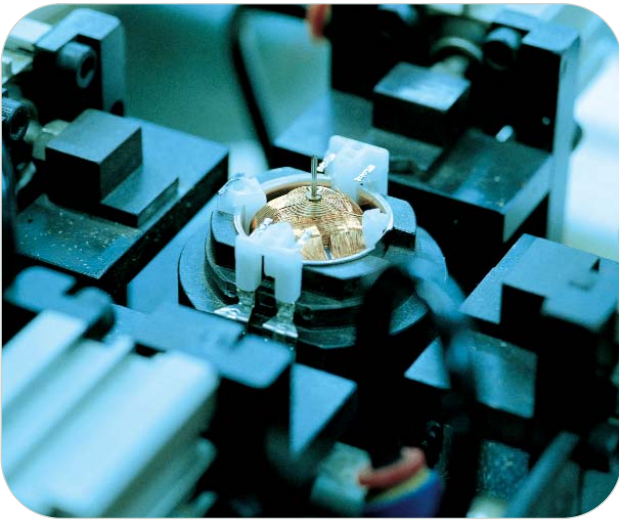
Newall Absolute Encoders provide a true absolute position immediately upon power-up. The encoder does not use batteries or static memory to retain the positional data. True position can be re-acquired once power is applied, regardless of duration or power-off movements.

## Distance-Coded

Newall Distance-Coded linear encoder reference markers allow the controller to acquire absolute position by moving the encoder systems across two uniquely spaced reference markers.

By using its internal absolute position count the encoder can mimic the Distance-Coded index marks that are generated by glass scales. An index pulse is generated at uniquely spaced intervals in the range of 10mm, varying by 20-micron increments.

TYPE	Incremental	Incremental	Incremental	Distance-Coded	Absolute
Product Group	SHG-T&V	MHG-T&V	MAG-TS & TT	SHG-TC	SHG-A*
Protection	IP67	IP67	IP67	IP67	IP67
Accuracy Grade $\mu\text{m}/\text{m}$	$\pm 10$	$\pm 5, 10$	$\pm 25 + (20\mu\text{m}/\text{m})$	$\pm 3, 5, 10$	$\pm 3, 5, 10$
Maximum Traverse Speed	2MHz (2m/s at 1 $\mu\text{m}$ resolution)	2MHz (2m/s at 1 $\mu\text{m}$ resolution)	250KHz (4m/s at 10 $\mu\text{m}$ resolution)	8MHz (8m/s at 1 $\mu\text{m}$ resolution)	30m/s
Shock Vibration	100g (IEC 69-2-6) 30g (IEC 68-2-27)				



## Encoder Selection Guide

	Application / Usage	Measuring / Accuracy /m	Resolution Range	Measuring Length	Output Signal	Model-Code
FULL SIZED ENCODERS	For long measuring lengths	$\pm 10\mu\text{m}$	0.5-10 $\mu\text{m}$	Single Scale 11m Modular to 30m	~11Vpp	SHG-VP
					~1Vpp with Single Point Reference	SHG-VS
					11 $\mu\text{App}$	SHG-VM
					~1Vpp	SHG-VV
					TTL	SHG-TT
					TTL with Single Point Reference	SHG-TS
SLIMLINE ENCODERS	For high accuracy with limited space	$\pm 5\mu\text{m}$	0.1-10 $\mu\text{m}$	Up to 1m	TTL	MHG-TT
	For long lengths with low accuracy requirements	$\pm 25\mu\text{m}$	10 $\mu\text{m}$	Up to 32m	~1Vpp	MHG-VP/VV/VM
FULL SIZED ENCODERS	For absolute position measurement	$\pm 3, 5, 10\mu\text{m}$	0.5-10 $\mu\text{m}$	Up to 6.5m	TTL with Distance Coded Reference	SHG-TC
					RS485	SHG-A4
					SSI Gray or Binary	SHG-AG or AB
					RS232	SHG-A2
					Fanuc	SHG-AF
					Gray & Parity	SHG-AS



## Measuring Lengths in mm

Further lengths are available on all products with SHG-A Range lengths available up to 11000mm, please contact Newall for further information

MHG	MHG-TT, VM, VP & VW	
Measuring length (travel)	Mounted BOTH ends	Single End Mount - please specify this option when ordering
	Total Mechanical Length	
5	184	124
10	189	129
25	204	144
50	229	169
75	254	194
100	279	219
150	329	269
200	379	319
250	429	369
300	479	419
350	529	469
400	579	
450	629	
500	679	
550	729	
600	779	
650	829	
700	879	
750	929	
800	979	
850	1029	
900	1079	
Dimensions	Reader Head: 35mm x 75mm x 4.75mm Scale Diameter: 15.25mm	

SHG	SHG - A2, A4, AB, AF, AG, AS, TC, TS, & VS	SHG-TT, VM, VP & VV
Measuring length (travel)	Absolute, Distance-Coded and Single-Point	Incremental
	Total Mechanical Length	
50	310.5	314
75	335.5	339
100	361.5	365
150	411.5	415
200	462.5	466
250	513.5	517
300	564.5	568
350	615.5	619
400	665.5	669
450	704.5	708
500	767.5	771
550	805.5	809
600	869.5	873
650	907.5	911
700	958.5	962
750	1008.5	1012
800	1059.5	1063
850	1109.5	1113
900	1159.5	1163
950	1212.5	1216
1000	1262.5	1266
1140	1402.5	1406
Dimensions	Reader Head: 53.5mm x 131mm x 28.5mm Scale Diameter: 15.25mm	



## Encoder Outputs

Signal Type Ordering Code	Signal Type	Description	Available on:
TT	Incremental TTL	TTL, RS422 differential quadrature output	SHG, MHG, MAG
TC	Incremental TTL-DC	TTL, Distance Coded	SHG
TS	Incremental TTL-SP	TTL Single Point	SHG, MAG
VM	Incremental 11 $\mu$ App	11 Micro Amp	SHG, MHG
VP/VV	Incremental $\sim$ 1Vpp	1 Volt Peak to Peak	SHG, MHG
VS	Incremental $\sim$ 1Vpp-SP	1 Volt Peak to Peak - Single Point	SHG
A2	Absolute - RS232	RS232	SHG
A4	Absolute - RS485	RS485	SHG
AB	Absolute - SSI-Binary	Synchronous Serial Interface - Binary Code	SHG
AF	Absolute - Fanuc	Fanuc Interface Protocol	SHG
AG	Absolute - SSI-Gray	Synchronous Serial Interface - Gray Code	SHG
AS	Absolute - Gray & Parity	Siemens Interface Protocol	SHG

TT - TTL Output Signal - Differential Quadrature

TS & VS - Single Point

TC - Distance-Coded

VM - 11  $\mu$ App Sinusoidal

VV -  $\sim$ 1Vpp Sinusoidal

VP -  $\sim$ 1Vpp Sinusoidal

A2 - RS232

A4 - RS485

AB - Absolute SSI-Binary

AG - Absolute SSI-Gray

AF - Absolute Fanuc

## Further Products

### Universal Mounting Kits

Standard Mounting Kits are available for the range of encoders.

SHG Scale Mounting Kit - Part Number 600-80120

SHG Readerhead Mounting Kit - Part Number 600-65620

MHG Scale Mounting Kit - Part Number MHBKITSTD

MHG Readerhead Mounting Kit - Part Number 600-81890

### Extension Cables

There is a selection of extension cables available for the range of encoders. Please refer to the full Linear Encoder brochure for further details.

### Digital Readout Systems

Newall's large range of Digital Readout Systems (DROs) contain two cabinets which interface with the digital Linear Encoder ranges (SHG-TT, MHG-TT & MAG-TS) and other manufacturers linear encoders with a TTL (RS422) output signal. Please refer to the Digital Readout brochure for further information.

## Contact details

### Head office - UK and Rest of the World

Newall Measurement Systems Ltd  
Technology Gateway  
Cornwall Road  
South Wigston  
Leicester  
LE18 4XH  
United Kingdom

Tel: +44 (0) 116 264 2730

Fax: +44 (0) 116 264 2731

Email: [sales@newall.co.uk](mailto:sales@newall.co.uk)

Web: [www.newall.com](http://www.newall.com)

### The Americas

Newall Electronics Inc  
1778 Dividend Drive  
Columbus  
OH 43228  
USA

Tel: +1 614 771 0213

Fax: +1 614 771 0219

Email: [sales@newall.com](mailto:sales@newall.com)

Web: [www.newall.com](http://www.newall.com)

# NEWALL

Newall Measurement Systems Ltd. Technology Gateway, Cornwall Road, South Wigston, Leicester, LE18 4XH, UK  
TEL +44 (0) 116 264 2730 • FAX +44 (0) 116 264 2731 • EMAIL [sales@newall.co.uk](mailto:sales@newall.co.uk) • WEB [www.newall.co.uk](http://www.newall.co.uk)

**BEI** *NEWALL MEASUREMENT SYSTEMS*  
*BEI TECHNOLOGIES, INC.*

