



SMART INCREMENTAL READHEAD/OPTICAL SCALE SERIES

Exposed Reflective Linear and Rotary Encoder



Scanner Optics Co.,Ltd.

Building B2&B10, Taohuayuan Science and Technology Innovation Park,
Xixiang Street, Bao'an District, Shenzhen City, Guangdong Province, China.

www.scanneroptics.cn / www.scanneroptics.com
0755-2304 1055
hansscanner@hanslaser.com

Scanner Optics Co., Ltd.

www.scanneroptics.cn
NO. 2025-05

Brief Introduction

Smart Incremental Series is the non-contact open linear optical encoder system

The reading head is compact and has a built-in LED indicator for installation. The resolution of the digital output is up to 32nm. The index detector is integrated in the readhead.



Standard Silver Readhead



Standard Black Readhead



Ultrathin Silver Readhead



Ultrathin Black Readhead



Arc-shaped Readhead



Connector



Rotary Optical Scale



Linear Optical Scale

Operating Specification

Temperature

Operating: -20°C - 70°C

Storage: -20°C - 85°C

Humidity

Operating: 10% to 90% RH, non condensing

Storage: Up to 85% RH, non condensing

Acceleration

50g: EN60068-2-7

Vibration

10g, 55 Hz - 2 KHz; EN60068-2-6

Signal Output

A/B/I (differential) : RS-422

A/B/I (single-ended, no load) : Voh max>3VDC, Voh min<0.2 VDC

Sin/Cos: 1 Vpp Across 120Ω resistor

Technical Parameters

Name	Parameter
Readhead dimensions (mm)	standard: 36×13.5×10.2; ultrathin: 40×15×6.4
Output	Differential 1Vpp sin/cos and Index Index signal or Differential A-quadr-B and Index Index signal
Resolution(Digital output)	Linear: 4μm - 32 nm Rotary: Up to 8,000,000cpr
Linear accuracy	+/-3μm (the glass scale ≤135mm) +/-5μm (the glass scale >135mm, ≤680mm) < +/-3μm /m(Two points linearity) < +/-50μm/m(Slope)
Rotary accuracy	≤ ±2.1 arc-sec
Power supply	5VDC±5% @165mA (120Ω across A, B, I) 5VDC±5% @105mA (120Ω across Sin/Cos, I)
Maximum velocity	10m/s
Index Signal	1/4Pitch period(Differential 1Vpp sin/cos output) 1LSB(Differential A-quadr-B output)
Signal status indicator	There are
Operating Environment	Atmosphere
Pitch	≤256 μm and other options
Repeatability	1 LSB(>50nm resolution) ; 72nm(≤50nm resolution)
Typical cyclical error (SDE)	72 nm
Mass	<18g (Readhead) , <100 g/m (Cable)

Maximum Velocity (Digital output)

resolution (μm)	8	4	2	1	0.5	0.2	0.1	0.08	0.064	0.05	0.04	0.032
Max A/B output frequency of the readhead(MHz)												
12.5	10	10	10	10	10	10	5	4	3.2	2.5	2	1.6
6.25	10	10	10	10	10	5	2.5	2	1.6	1.25	1	0.8
4	10	10	10	10	8	3.2	1.6	1.28	1.024	0.8	0.64	0.512
3	10	10	10	10	6	2.4	1.2	0.96	0.768	0.6	0.48	0.384
2.5	10	10	10	10	5	2	1	0.8	0.64	0.5	0.4	0.32
2	10	10	10	8	4	1.6	0.8	0.64	0.512	0.4	0.32	0.256
1.5	10	10	10	6	3	1.2	0.6	0.48	0.384	0.3	0.24	0.192
1	10	10	8	4	2	0.8	0.4	0.32	0.256	0.2	0.16	0.128

* Other resolution options are supported.

* Within 10m/s moving speed, the max moving speed (m/s)=resolution (μm)*4*the max output frequency.

e.g. The resolution is 0.1μm, and the max output frequency is 4MHz, then 0.1*4*4=1.6m/s.

* The frequency above is that of the A or B signal.

Signal Output

Digital output

Pin number	Description
1	n.c.
2	I+
3	B+
4	A+
5	+5VDC
6	I-
7	B-
8	A-
9	0V

▲ Index signal

▲ Pin map

Analog output

Pin number	Description
1	n.c.
2	Z+
3	Cos+
4	Sin+
5	+5VDC
6	Z-
7	Cos-
8	Sin-
9	0V

▲ Pin map

Order Code

SI A B 05 A 2

Max frequency
 0=12.5MHz 1=6.25MHz 2=4MHz
 3=3MHz 4=2.5MHz 5=2MHz
 6=1.5MHz 7=1MHz Empty=Analog 1Vpp

Connector
 A - D-SUB9 Male D - D-SUB15 Male C - Custom

Cable length
 05 - 0.5米 10 - 1米 15 - 1.5米 20 - 2米 30 - 3米 50 - 5米 C - Customized

Output
 B - analogue 1Vpp
 T - 8µm D - 4µm E - 2µm X - 1µm Z - 0.5µm W - 0.2µm Y - 0.1µm
 F - 80nm G - 64nm H - 50nm J - 40nm K - 32nm

Subseries
 A - Silver B - Black C - Ultrathin Silver D - Ultrathin Black E - Classic F - Classic

Readhead Series

Smart Incremental

* Order code example: SIAY30A2 refers to the silver readhead, with 0.1µm output, 4MHz frequency, 3m cable length, and D-SUB9 male plug.

ST G L 130 62 - T

Double-side Adhesive tape
 T - with adhesive tape

Rotary scale ID
 62(OD85) 85(OD108)
 102(OD85) 145(OD175)
 There is no(Linear scale)

Linear scale length
 130 325 680 There is no(Rotary scale)

Movement type
 L - Linear R - Rotary

Material
 G - Glass(Linear≤680mm) S - Metal (Linear ≤3m)

Scale series

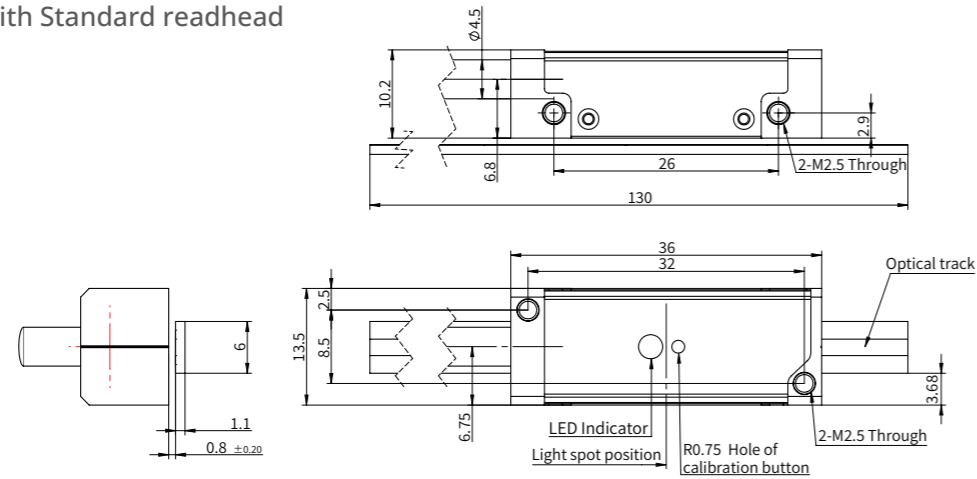
ST

* Order code example: STSL130-T refers the metal linear optical scale that the length is 130mm with adhesive backing.
 STGR62 refers to glass rotary optical scale with the inner diameter of 62mm and outer diameter of 85mm.

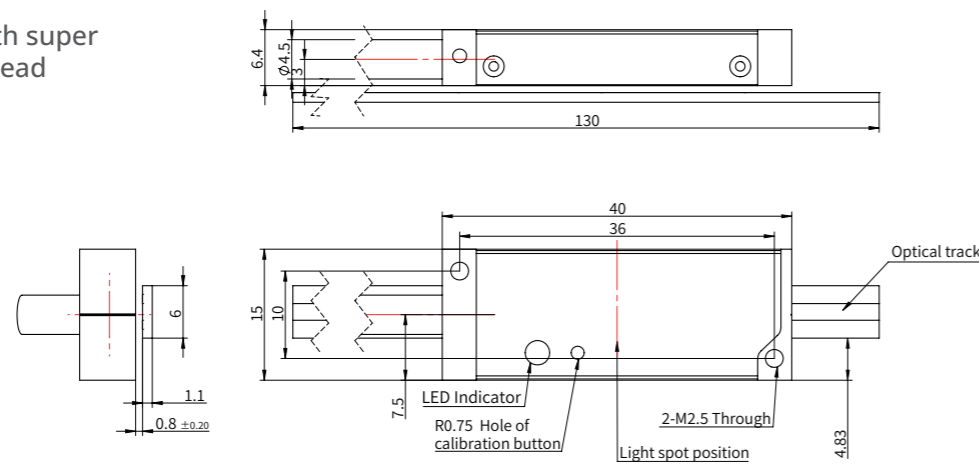
Dimensions

STGL130 Readhead series

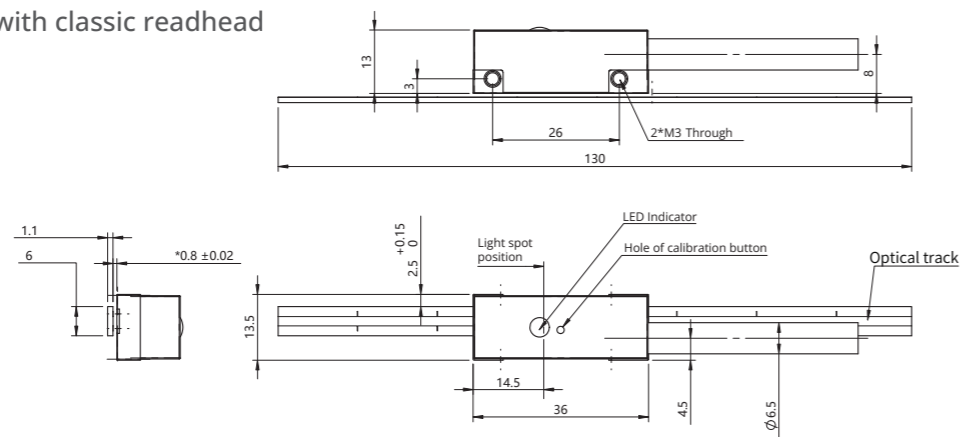
STGL130 working with Standard readhead



STGL130 Working with super thin readhead

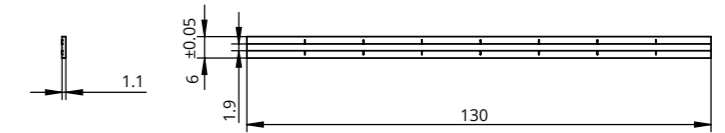


STGL130 Working with classic readhead

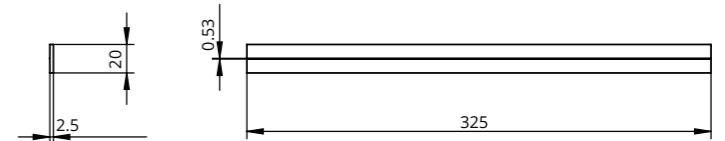


STGL Scale series

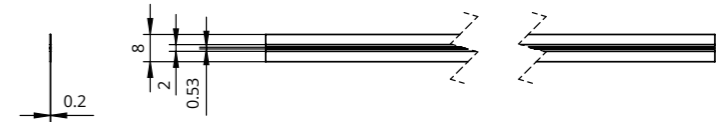
STGL130 Scale
STGL130 Glass scale length from 20 to 130mm
Can be cut arbitrarily



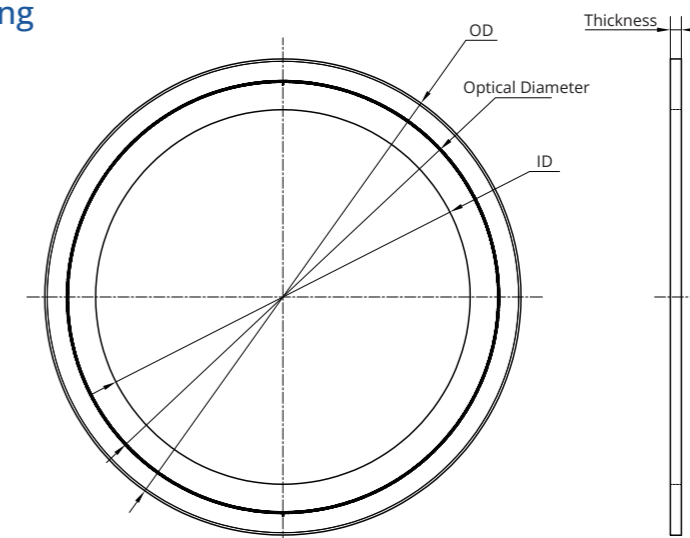
STGL325 Scale
STGL325 Glass scale length from 20 to 680mm
Can be cut arbitrarily



STSL Meta scale
STSL Glass scale length from 20 to 1140mm
Can be cut arbitrarily



Rotary scale drawing



Glass rotary scale dimensions

Model	STR8562	STR10885	STR145115	STR175145	STR200150
Line count	900	1200	1600	2000	2400
ID(mm)	85+0.2	108+0.2	145+0.2	175+0.2	200+0.2
OD(mm)	62+0.1	85+0.1	115+0.13	145+0.13	150+0.13
Diameter(mm)	73.34	97.79	130.38	162.97	195.97
Thickness(mm)	2.29+0.1	2.5+0.1	3+0.1	3+0.1	3+0.1