



SI Optical
encoder

SMART INCREMENTAL

光学编码器

Optical Encoder

读数头/光栅尺系列
Readhead/Optical Scale Series

深圳市思特光学科技股份有限公司
Scanner Optics Co., Ltd.

www.scanneroptics.cn
NO. 2026-03

产品特点

FEATURES

思特光学的Smart Incremental系列是一种开放式非接触通用光栅尺系统。

读数头紧凑小巧, 内置安装用的LED指示灯, 输出低至32nm分辨率的数字量指示信号并内置集成光学Index mark感应探头。

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.



标准银读数头
Standard Silver Readhead



标准黑读数头
Standard Black Readhead



超薄银读数头
Ultrathin Silver Readhead



超薄黑读数头
Ultrathin Black Readhead



圆弧型读数头
Arc-shaped Readhead



转接头
Connector



圆形光栅尺
Rotary Optical Scale



直线光栅尺
Linear Optical Scale

技术参数

TECHNICAL PARAMETERS

温度 Temperature	湿度 Humidity
操作 Operating: - 20°C - 70°C	操作 Operating: 10% to 90% RH, 非凝结 non condensing
贮存 Storage: - 20°C - 85°C	存储 Storage: Up to 85% RH, 非凝结 non condensing
加速 Acceleration	振动 Vibration
50g; EN60068-2-7	10g, 55 Hz - 2 KHz; EN60068-2-6
信号水平 Signal Output	
A/B/I (差分 differential) : RS-422	
A/B/I (单端 single-end, 无负载 no load) : 高电平 Voh max>3VDC, 低电平 Voh min<0.2 VDC	
Sin/Cos: 1 Vpp 跨接 Across 120Ω 负载 esistor	

系统规格 Technical Parameters		
读数头尺寸	Readhead dimensions (mm)	标准 standard: 36×13.5×10.2; 超薄 ultrathin: 40×15×6.4
信号输出	Output	Differential 1Vpp sin/cos and Index Index signal or Differential A-quad-B and Index Index signal
分辨率(数字型)	Resolution(Digital output)	直线 Linear: 4um - 32 nm 圆形 Rotary: Up to 8,000,000cpr
直线精度等级	Linear accuracy	+/-3um (短玻璃光栅 the glass scale ≤135mm) +/-5um (长玻璃光栅 the glass scale >135mm, ≤680mm) < +/-3μm /米(两点线性化 Two points linearity) < +/-50μm/米(斜坡 Slope)
圆形精度等级	Rotary accuracy	≤ ±2.1arc-sec
电源	Power supply	5VDC±5% @165mA (120Ω across A, B, I) 5VDC±5% @105mA (120Ω across Sin/Cos, I)
最大速度	Maximum velocity	10m/s
Index信号	Index Signal	1/4Pitch period(Differential 1Vpp sin/cos output) 1LSB(Differential A-quad-B output)
状态指示灯	Signal status indicator	There are
操作环境	Operating Environment	Atmosphere
栅距	Pitch	≤256 μm and other options
重复精度	Repeatability	1 LSB(>50nm resolution) ; 72nm(≤50nm resolution)
典型细分精度误差	Typical cyclical error (SDE)	72 nm
重量	Mass	<18g (读数头 Readhead) , <100g/m (电缆线 Cable)

最大速度 Maximum Velocity (数字量输出型 Digital output)												
分辨率(um) Resolution 实际读数头A/B的 最大输出频率(MHz) Max A/B output frequency of the readhead	8	4	2	1	0.5	0.2	0.1	0.08	0.064	0.05	0.04	0.032
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

* 支持其它分辨率的设置, 细节请与当地技术支持工程师联系。Other resolution options are supported.

* 在10米/秒以内的运行速度, 最大运行速度(米/秒)=分辨率(μm)*4*最高频率(MHz)。

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

例如0.1μm分辨率, 最高频率为4MHz, 则0.1*4*4=1.6米/秒。

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

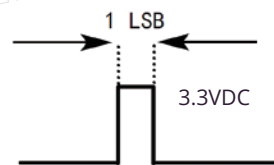
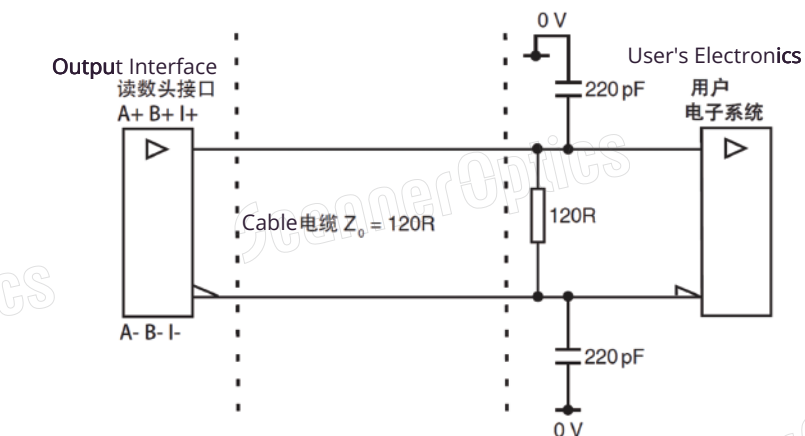
* 上面的频率仅指A相或B相波形的最高频率。The frequency above is that of the A or B signal.

输出信号

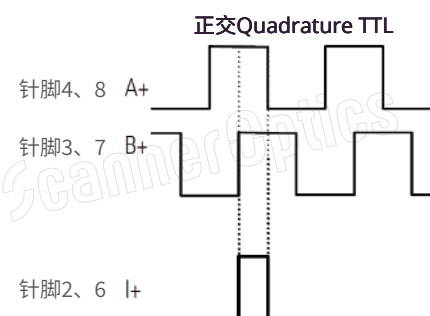
Signal Output

数字量输出

Digital Output



▲ Index 信号 Signal

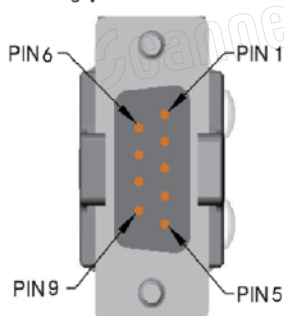


正交Quadrature TTL

针脚4、8 A+

针脚3、7 B+

针脚2、6 I+



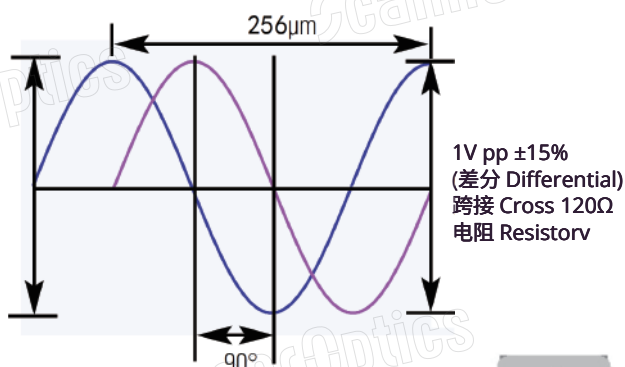
▲ D-SUB9 公头 Male

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

▲ 针脚定义 Pin Map

模拟量输出

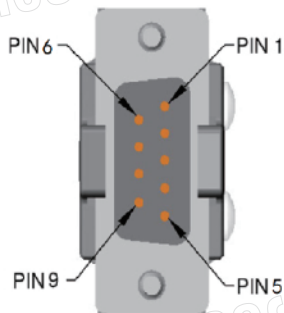
Analog Output



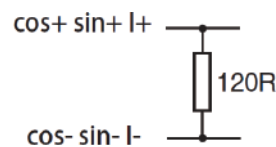
1V pp ±15%
(差分 Differential)
跨接 Cross 120Ω
电阻 Resistor

64µs (直线 Linear)

5VDC



▲ D-SUB9 公头 Male



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

▲ 针脚定义 Pin Map

订购代码

Order Code

SI	A	B	05	A	2
					最高频率 Max Frequency
					0=12.5MHz 1=6.25MHz 2=4MHz 3=3MHz 4=2.5MHz 5=2MHz 6=1.5MHz 7=1MHz 空 Empty=Analog 1Vpp
					连接器 Connector
					A - D-SUB9 公插头 Male D - D-SUB15 公插头 Male C - 用户指定 Custom
					电缆线长度 Cable Length
					05 - 0.5米 10 - 1米 15 - 1.5米 20 - 2米 30 - 3米 50 - 5米 C - 定制 Customized
					输出 Output
					B - analogue 1 Vpp
					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
					子系列 Subseries
					A - 标准银 Silver B - 标准黑 Black C - 超薄银 Ultrathin Silver D - 超薄黑 Ultrathin Black E - 圆弧型 Classic F - 经典款 Classic

读数头系列

Readhead Series

* 选型示意: SIAY30A2 指标准款银色读数头, 输出为0.1μm, 频率4MHz, 电缆线长度3米, D-SUB9公插头。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
						直线光栅背胶 Double-side Adhesive Tape
						T - 带双面胶 with adhesive tape
						圆光栅内径 Rotary Scale ID
						62(对应外径 OD85) 85(对应外径 OD108) 102(对应外径 OD85) 145(对应外径 OD175) 无 There is no(当类型为直线时 Linear scale)
						直线光栅长度 Linear Scale Length
						130 325 680 无 There is no(当类型为圆形时 Rotary scale)
						类型 Movement Type
						L - 直线式 Linear R - 圆形 Rotary
						材质 Material
						G - 玻璃 Glass (直线 Linear≤680mm) S - 金属 Metal (直线 Linear ≤3m)

玻璃光栅系列

Scale Series

* 选型示意: STSL130-T 指光栅系列金属直线光栅尺长度为130mm带背胶; STGR62 指玻璃圆光栅内径62mm外径85mm。
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.

外形尺寸图

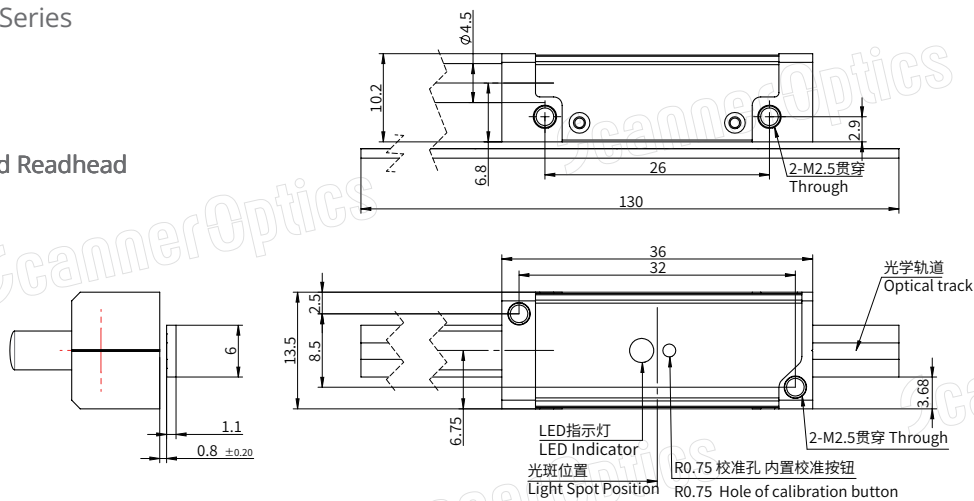
Dimintions

STGL130 读数头系列

STGL130 Readhead Series

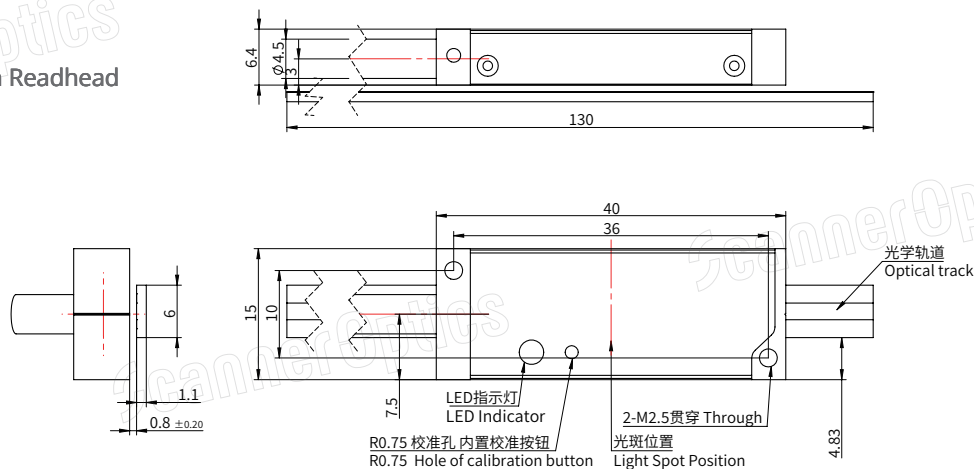
STGL130 配标准读数头

STGL130 with Standard Readhead



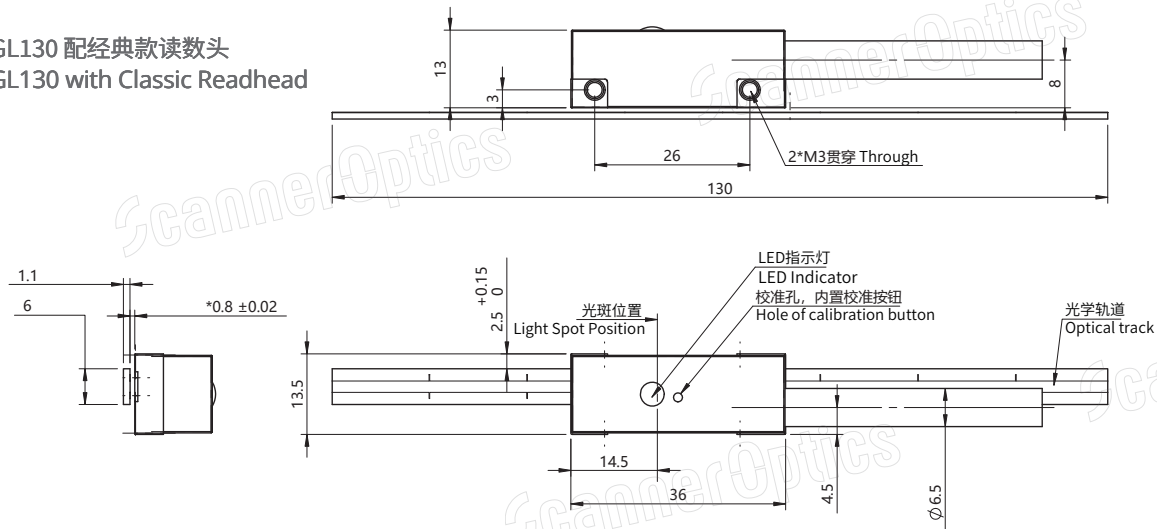
STGL130 配超薄读数头

STGL130 with Super Thin Readhead



STGL130 配经典款读数头

STGL130 with Classic Readhead



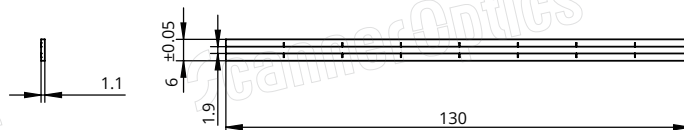
STGL 光栅尺系列

STGL Scale Series

STGL130 光栅尺

STGL130 Scale

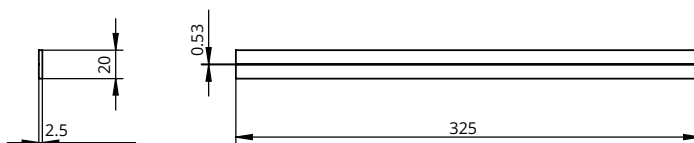
STGL130 玻璃光栅尺长度范围20-130mm,可裁剪。
STGL130 Glass scale length from 20 to 130mm Can be cut arbitrarily.



STGL325 光栅尺

STGL325 Scale

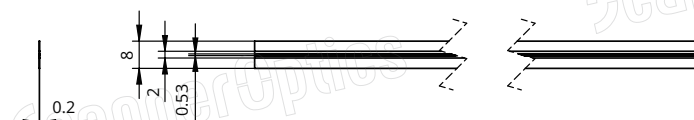
STGL325 玻璃光栅尺长度范围20-680mm,可裁剪。
STGL325 Glass scale length from 20 to 680mm Can be cut arbitrarily.



STSL 金属光栅尺

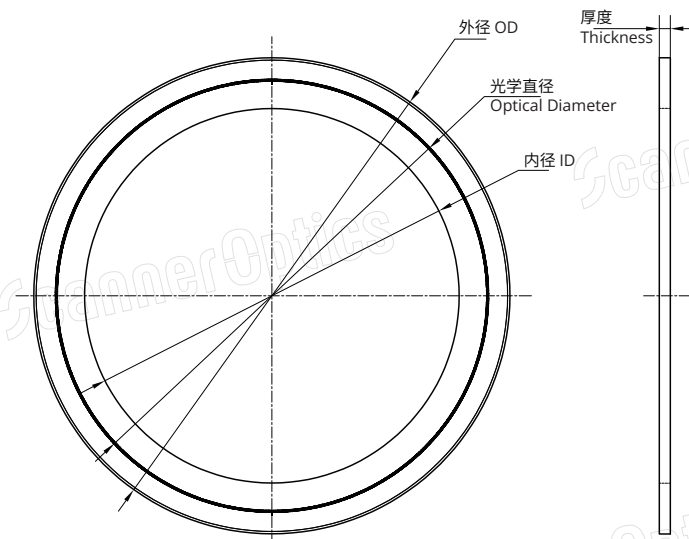
STSL Meta Scale

STSL 金属光栅尺长度范围20-1140mm,可裁剪。
STSL Glass scale length from 20 to 1140mm Can be cut arbitrarily.



玻璃圆光栅通用图

Rotary scale drawing



玻璃圆光栅尺寸

Glass Rotary Scale Dimensions

型号	Model	STR8562	STR10885	STR145115	STR175145	STR200150
栅格周期数	Line count	900	1200	1600	2000	2400
外径	IDmm)	85+0.2	108+0.2	145+0.2	175+0.2	200+0.2
内径	OD(mm)	62+0.1	85+0.1	115+0.13	145+0.13	150+0.13
光学直径	Diameter(mm)	73.34	97.79	130.38	162.97	195.97
厚度	Thickness(mm)	2.29+0.1	2.5+0.1	3+0.1	3+0.1	3+0.1



深圳市思特光学科技股份有限公司
Scanner Optics Co., Ltd.

广东省深圳市宝安区西乡街道桃花源科技创新园B2&B10栋
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
+86-0755-2304 1055
scanner@scanneroptics.com