



HS30F Optical Kit Encoder

A, B, Z Channel Quadrature TTL Outputs



Features

- Two channel quadrature TTL compatible outputs with index channel
- Optional output type (both of voltage and line driver)
- 100 ~ 5000 cycles per resolution (PPR)
- Widely operating environment temperature from -40°C ~100°C , -40°C ~115°C(option)
- Intelligent mounting design
- Compact size appearance
- Cost-effective
- Single 5V DC supply
- RoHS compatible

Description

The newly launched HS30F encoder module features comprehensive upgrades in mechanical design and user experience, delivering enhanced stability and ease of assembly.

The HS30F adopts a high-quality snap-fit structure, providing a more solid locking feel and improved assembly feedback. It is equipped with A, B, and Z channels, and also offers high-temperature resistant options to meet the demands of harsh operating environments.

One of the key highlights of this product is the newly added screw-locking holes on the base (optional), allowing the encoder to be more securely mounted onto the motor end face. This not only reinforces structural stability but also helps ensure more stable signal output.

The HS30F's base and cover are made of PC material, manufactured in-house using proprietary molds and injection molding equipment. This provides excellent impact resistance to protect the internal components effectively. The uniquely designed slide-in sensor module is securely fastened with screws, enabling repeated assembly and disassembly without affecting signal accuracy. Output cables can also be customized according to customer requirements.

The HS30F encoder module combines precise optical performance, robust structural design, and a user-friendly assembly mechanism, making it an ideal choice for motor feedback and precision control applications.



HS30F Optical Kit Encoder

A, B, Z Channel Quadrature TTL Outputs

Electrical

Electrical Characteristics

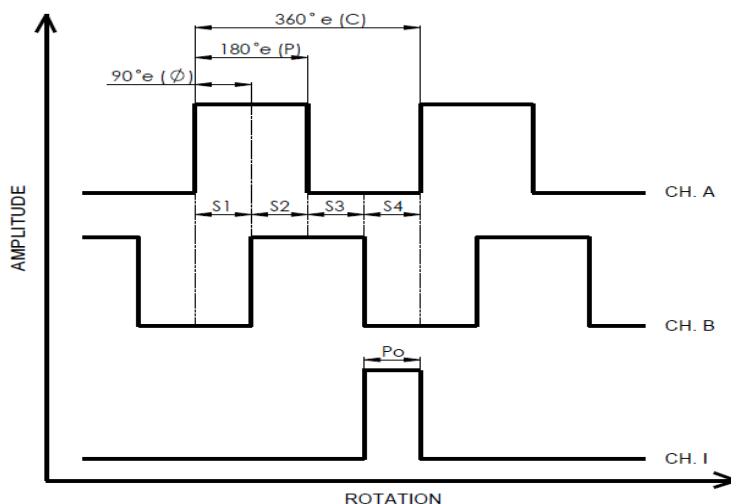
Parameter	Min.	Typ.	Max.	Units
Storage Temperature	- 40		100(115)*	°C
Operating Temperature	- 40		100(115)*	°C
Supply Voltage	4.5	5.0	5.5	V
Supply Current		57(20**)	85	mA
Output Current Per Channel	-5		5	mA
High Level Output Voltage	2.4			V
Low Level Output Voltage			0.4	V

* 115°C option

** 20mA at resolution ≥ 2000 PPR.

Resolution	100~1024	2000~2500	4000~5000	PPR
Count Frequency	100	500	1000	kHz

Output Waveform



Encoding Characteristics (Resolution 100~1024 ppr)

Parameter	Sym.	Min.	Typ.	Max.	Units
Cycle Error	ΔC		6	12	°e
Pulse Width Error	ΔP		10	45	°e
State Width Error	ΔS		10	45	°e
Phase Error	$\Delta \phi$		2	15	°e
Index Pulse Width	P_o	50	90	130	°e



HS30F Optical Kit Encoder

A, B, Z Channel Quadrature TTL Outputs

Encoding Characteristics (Resolution 1250~2500 ppr)

Parameter	Sym.	Min.	Typ.	Max.	Units
Cycle Error	ΔC		17	30	$^{\circ}e$
Pulse Width Error	ΔP		20	30	$^{\circ}e$
State Width Error	ΔS		15	25	$^{\circ}e$
Phase Error	$\Delta \phi$		20	30	$^{\circ}e$
Index Pulse Width	P_o	72	90	108	$^{\circ}e$

Encoding Characteristics (Resolution 4000~5000 ppr)

Parameter	Sym.	Min.	Typ.	Max.	Units
Cycle Error	ΔC		36	60	$^{\circ}e$
Pulse Width Error	ΔP		21	45	$^{\circ}e$
State Width Error	ΔS		17	45	$^{\circ}e$
Phase Error	$\Delta \phi$		12	25	$^{\circ}e$
Index Pulse Width	P_o	65	90	115	$^{\circ}e$

Count (N):

The total amount of the count (bar and window) as a pair among per rotation.

Cycle (C):

It indicates the fully one cycle of the electrical degrees measured as 360 $^{\circ}e$ degree.

Cycle Error (ΔC):

The deviation in the electrical degree among the pulse width against its ideal value. It's the symbol of the uniform cycle.

Pulse Width (P):

Normally it refers to the "HIGH" number of electrical of the output during the one cycle.

Pulse Width Error (ΔP):

The deviation in the electrical degree among the pulse width against its ideal value about 180 $^{\circ}e$ degree.

State Width (S):

The number of electrical degree between Channel A and Channel B as a result of the transition in the output state. There are 4 states per cycle from the output of Channel A and Channel B. For each states nominated at 90 $^{\circ}e$ (S1-S4).



HS30F Optical Kit Encoder

A, B, Z Channel Quadrature TTL Outputs

State Width Error (ΔS):

The deviation in electrical degree among each of states width upon the ideal 90 °e.

Index Pulse Width (P_o):

The number of electrical degrees representing the index high pulse during one full rotation.

Phase (ϕ):

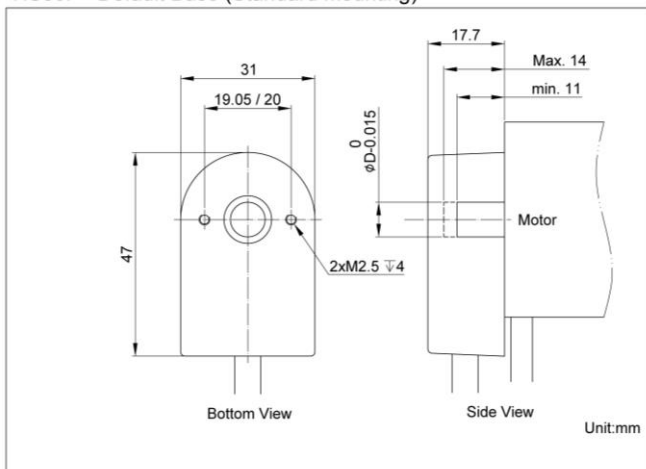
The number of electrical degrees between the centre of the high state on channel A and the centre of the high state on channel B. This value is nominally 90 °e (the signals A and B can be used for quadrature).

Phase Error ($\Delta\phi$):

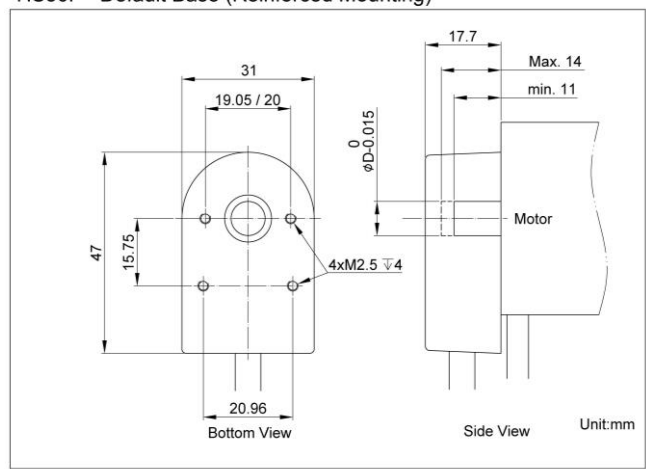
The deviation in electrical degrees of the phase from its ideal value of 90 °e.

Mechanical Specification

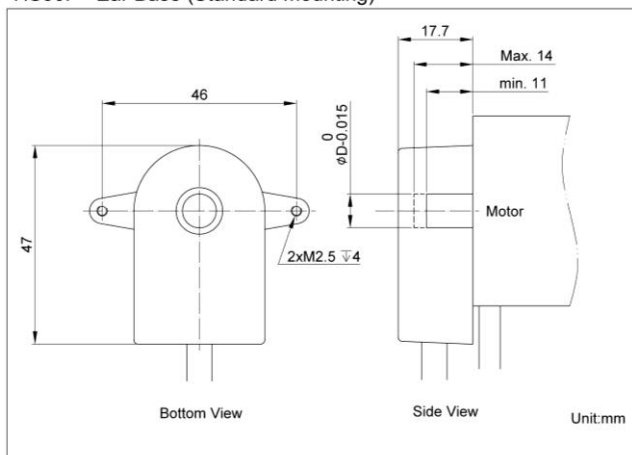
HS30F - Default Base (Standard Mounting)



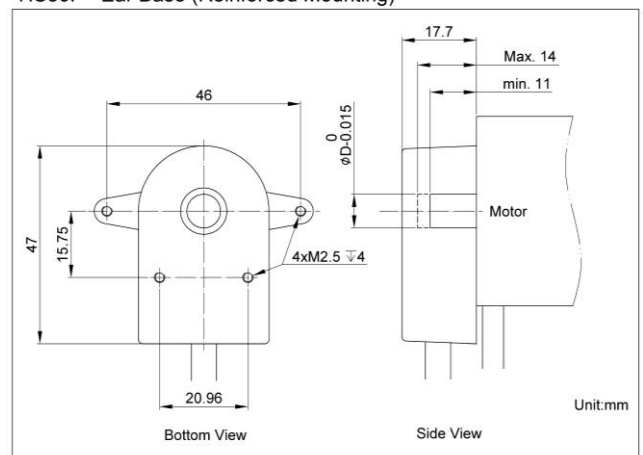
HS30F - Default Base (Reinforced Mounting)



HS30F - Ear Base (Standard Mounting)



HS30F - Ear Base (Reinforced Mounting)



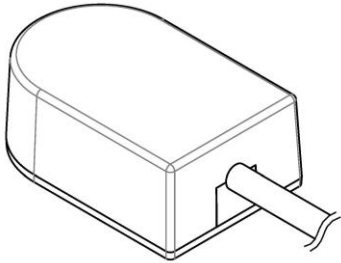


HS30F Optical Kit Encoder

A, B, Z Channel Quadrature TTL Outputs

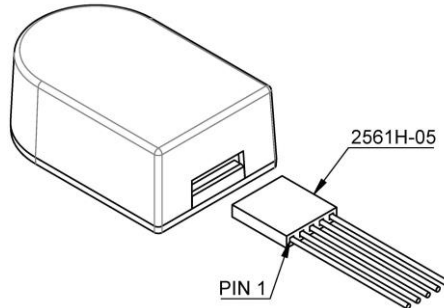
Pin-out Description

Voltage Output / Open collect
(Cable Type)



Cable length: 500mm

Voltage Output / Open collect

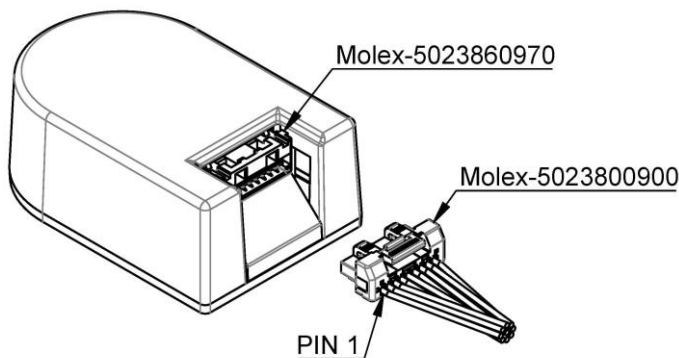


Wire length: 200mm

Voltage output (5 pin)

Pin	Color	Description
1	Black	Ground
2	Yellow	Index
3	White	Channel A
4	Red	DC +5V
5	Green	Channel B

Line Driver



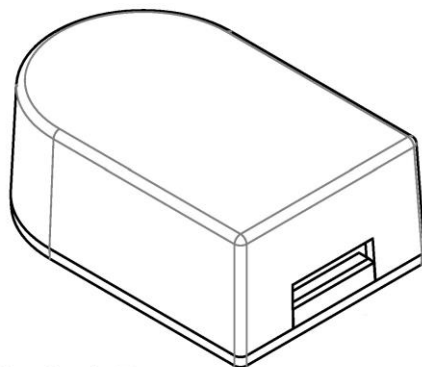
Cable length: 500mm

Line driver (9 pin)

Pin	Color	Description
1	Red	DC +5V
2	Black	Ground
3	White	Channel A+
4	Whi/Bla	Channel A-
5	Green	Channel B+
6	Gre/Bla	Channel B-
7	Yellow	Index+
8	Yel/Bla	Index-
9	Blue	Shield

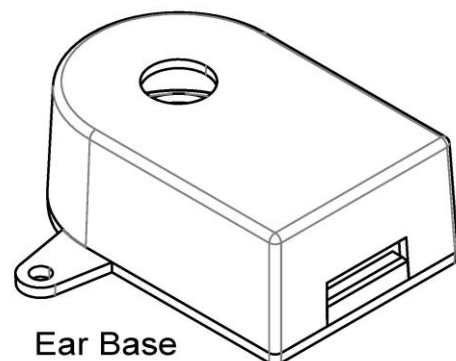
Housing Feature

Closed Cover



Default Base

Hole Cover



Ear Base



HS30F Optical Kit Encoder

A, B, Z Channel Quadrature TTL Outputs

Ordering Information

HS30F -		P -		A -				
	<u>Resolution</u>		<u>Shaft Diameter</u>				<u>Cover</u>	
	100 : 100 PPR		3 : 3mm				H : Hole on cover	
	200 : 200 PPR		4 : 4mm				C : Closed cover	
	256 : 256 PPR		5 : 5mm					
	360 : 360 PPR		6 : 6mm					
	400 : 400 PPR		6.35 : 6.35mm			<u>Base type</u>		<u>Temp.</u>
	500 : 500 PPR		8 : 8mm			DS : Default standard		None : -40°C ~100°C
	512 : 512 PPR					DR : Default reinforced		T : -40°C ~115°C
	1000 : 1000 PPR					ES : Ears standard		
	1024 : 1024 PPR					ER : Ears reinforced		
	1250 : 1250 PPR							
	2000 : 2000 PPR					<u>Output vs Wire type</u>		
	2048 : 2048 PPR					SD : Single ended + Dupont wire		
	2500 : 2500 PPR					SC : Single ended + Cable		
	4000 : 4000 PPR					LC : Line driver + Cable		
	4096 : 4096 PPR							
	5000 : 5000 PPR							
				<u>Hub</u>				
				A : Aluminum				

※ Single ended = Voltage out / Open collect

※ High Temp. version (115°C) only for ≥ 1000 PPR.