Schmitz Engineering Liaison

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500 series, hollow shaft encoders

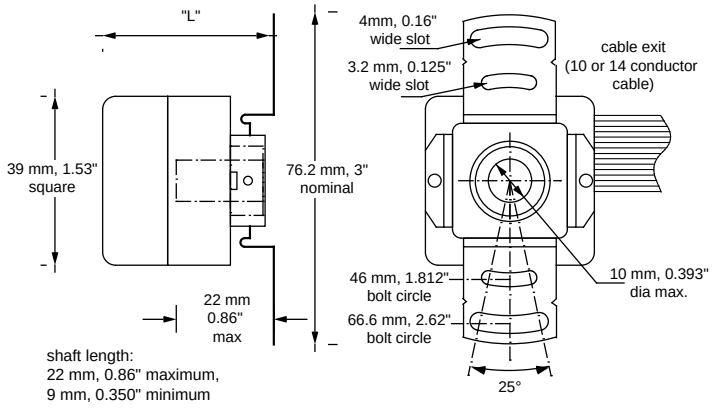
Description:

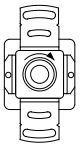
The 500 series hollow shaft encoder is a small, rugged device, with a package form factor of that of a 39 mm stepper motor. Maximum possible shaft size is 10mm. The commutating versions are specifically designed to commutate brushless DC motors.
The encoder light source is a single light emitting diode, servo controlled for constant light output over time and temperature, the sensor is a monolithic silicon array.

The package supports a wide variety of electronics: incremental, incremental with three bits absolute, as well as 8 and 10 bits absolute. The sine/cosine versions allow a high degree of interpolation because of the low distorsion waveform for extremely accurate positioning and speed control.

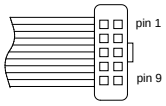
Options

- custom linecounts, pole counts and index configurations
- custom cable configurations & other flex mounts available
- the 550, 550-08GC and 560 support a shaft extension through the back, end slotted.



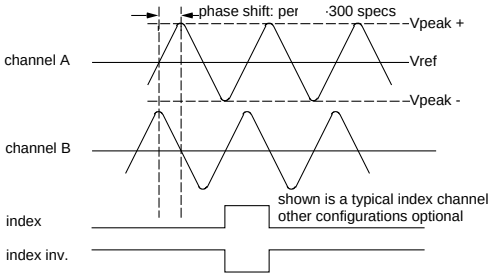


all waveforms shown for cw rotation



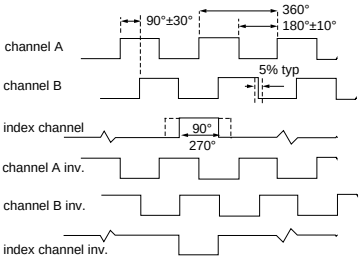
shaft inner diameter:	10 mm, .393" max.
shaft loading:	20 N axial , 40 N radial (4 lbs and 8 lbs resp.)
starting torque:	0.1 Ncm @ 20°C max
shaft rotation:	continuous,reversible
slew speed:	160 rev/sec [2]
bearings:	ABEC 5
shaft material:	416 stainless
housing material:	aluminum
cover:	aluminum
bearing life:	manufacturer's specs
moment of inertia:	1.7 gcm [2]
weight:	approx. 0.2 kg
temperature:	operating: -20°C to+125°C measured at spring
shock:	50 G's @ 11 ms
vibration:	5-2,000 Hz @ 20 G's
humidity:	98% without condensation
protection:	IP 64 optional

500, incremental, sinusoidal



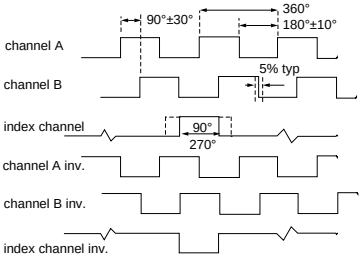
electrical data		pin assignments
power supply:	± 12 Vdc @ 60 mA max (standard)	1 ground
LED supply:	AGC driven (constant light over time and temperature)	2 channel A 3 n/c 4 - 12 Vdc
code:	incremental	5 n/c
cycles per revolution:	360, 500, 600, 1000, 1024 c/r standard	6 channel B 7 n/c
output format:	A and B channel in quadrature+ Index	8 + 12 Vdc 9 Vreference (servo ground input)
output:	TIL 084 op-amp	10 index (red stripe on cable)
frequency response:	flat up to 75 kHz	
absolute accuracy of zero-crossings:	± 25 arcseconds typ.	**ordering information:** Vcc, Vref and Vpeak are customer specified and depend on the controller cicuitry used. Contact factory for best configuration.
overall length:	L_{max} = 40 mm	

550, incremental



electrical data:		pinout linedrivers:	pinout TTL:
power supply:	+ 5Vdc ± 10% @ 50 mA max (no load)	1 + 5Vdc 2 + 5Vdc	channel A + 5 Vdc
output format:	incremental	3 channel A inv.	ground
cycles/revolution:	100, 200, 256, 360, 500, 600, 1000 and 1024 std.	4 channel A 5 channel B inv.	ground ground
freqency response:	150 kHz min. @ 85 °C	6 channel B 7 index channel	ground + 5 Vdc
linedriver output:	26LS31,EIA std. RS 422 and DIN 66259 compatible	8 ground 9 index channel inv.	channel B n/c
TTL output:	74LS04	10 ground	index channel
open collector output:	LM 339, 6 mA max. sink		
overall length:	L_{max} = 40 mm	**ordering information:** 550-(linecount)-(1)-(2) (1): linedriver=L,TTL=T,open collector=O (2): through-shaft with slot=X	

560, incremental linedriver 5V to 30V



electrical data:		pinout complementary:	single:
power supply:	V_{in} =+ 4.75 Vdc to 30 Vdc @ 50 mA max (no load)	1 + V_{in} 2 channel A	channel A + V_{in}
output format:	incremental	3 channel A inv.	ground
cycles/revolution:	100, 200, 256, 360, 500, 600, 1000 and 1024 std.	4 channel B 5 channel B inv.	ground ground
freqency response:	150 kHz min. @ 85 °C	6 index channel 7 index channel inv.	ground + 5 Vdc
output:	EIA std. RS 422 and DIN 66259 (part 3) compatible	8 ground 9 n/c	channel B n/c
output @ Vin=4.75V:	V_{lo} ≥ 0.5 V@20 mA sink V_{hi} ≤ 2.5V@20 mA source	10 n/c	index channel
output @ Vin=30 V:	V_{lo} ≥ 0.5 V@20 mA sink V_{hi} ≤ 27 V@20 mA source	**ordering information:** 560-(linecount)-(1)-(2) (1): single-ended=S, complementary=C (2): through-shaft with slot=X	
overall length:	L_{max} = 40 mm		

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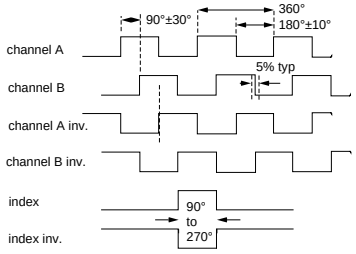
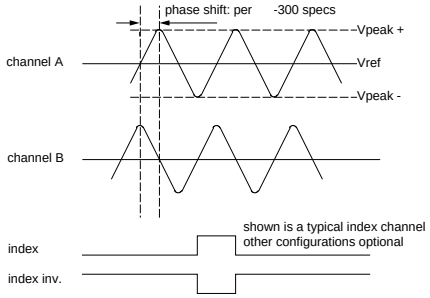
555,565 & 505, incremental,commutating

555/ 565 A,B and Index output:



505 A,B and Index output:



electrical data:

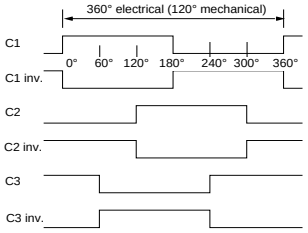
power supply 555:	+ 5Vdc±10% @ 130 mA max (no load)
power supply 565:	+ 5Vdc through + 30 Vdc
power supply 505:	± 12 Vdc±10% nominal @ 60 mA max (no load)
output format:	incremental + absolute
cycles/revolution:	1000, 1024, 2048 +6 pole commutation, 1024 + 4 pole, 1024 + 8 pole
freqency response:	150 kHz min. @ 85 °C
linedriver output:	26LS31,EIA std. RS 422 and DIN 66259 compatible
505 A and B out:	per 500 specs

overall length: L_{max} = 45 mm

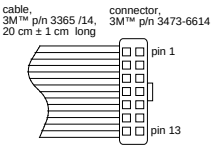
pinout (14 pin connector)

pin #	555,565	505
1	+ Vcc	+ Vcc
2	ground	ground
3	C3 inv.	C3 inv
4	C3	C3
5	C2	C2
6	C2 inv	C2 inv
7	ch. A	- Vcc
8	ch. A inv.	ch. A (sin)
9	index.	index
10	index inv.	index inv.
11	C1	C1
12	C1 inv.	C1 inv.
13	ch. B inv.	ch. B (cos)
14	ch. B	V ref

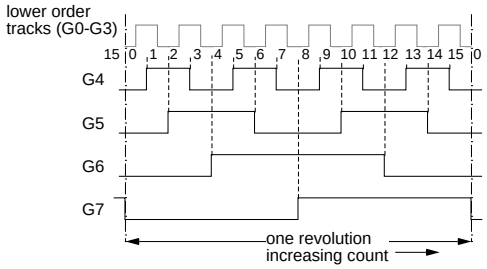
CP-505, 555 & 565 commutation channels (6 pole commutation shown):



ordering information:
square wave output:555-(1)-(2)
square wave output:565-(1)-(2)
sinewave output: 505-(1)-(2)
(1) linecount / rev.
(2) commutator information, consult factory



550-08GC, absolute, 8 bit Gray code



electrical data:

power supply:	+ 5Vdc ± 10% @ 50 mA max (no load)
	+ 24 Vdc ± 10 % @ 70 mA max (option)
output format:	8 bit parallel, Gray code
freqency response:	100 kHz min. wordrate
output:	LM 339, with pullup resistor, 6 mA max. sink

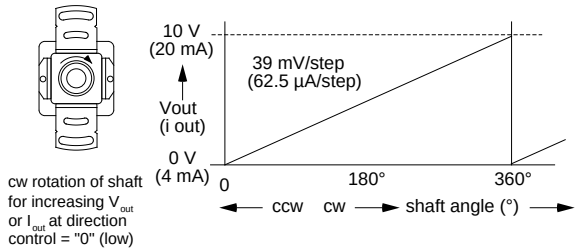
overall length: L_{max} = 40 mm

pinout :

1 G4
2 G6
3 G0 (lsb)
4 G3
5 ground
6 G2
7 + 5Vdc
8 G5
9 G7 (msb)
10 G1

ordering information:
550-08GC-(1)-(2)-(3)
(1): R= with pull-ups, blank if no pullups
(2): 5 = 5 Vdc. 24 = 24 Vdc power supply
(3): through-shaft with slot=X

550-8AN, absolute, analog



cw rotation of shaft for increasing V_{out} or I_{out} at direction control = "0" (low)

electrical data:

power supply V_{in}:	12.6 Vdc to 16.6 Vdc @ 100 mA max
voltage output V_{out}:	0 - 10 V standard,
current output I_{out}:	4 - 20 mA(optional)
resolution:	8 bits (256 steps)
stability:	± 0.2 %
direction control input:	TTL/CMOS (5 V)

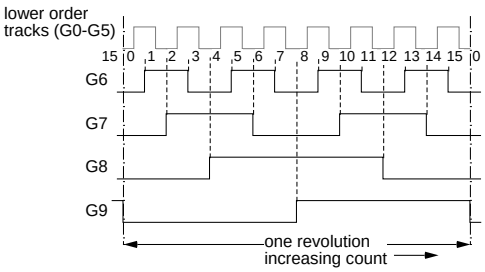
overall length: L_{max} = 45 mm

pinout:

1 n/c
2 + V_{in}
3 n/c
4 n/c
5 direction control
6 power ground
7 I_{out}
8 n/c
9 V_{out}
10 I_{out} return

ordering information:
550-08AN-(1)
(1) : blank=V_{out} only, I= V_{out} and I_{out}

550-10GC, absolute,10 bit Gray code



electrical data:

power supply:	+ 5Vdc ± 10% @ 100 mA max (no load)
output format:	10 bit parallel, Gray code,
freqency response:	50 kHz min. wordrate
output:	standard TTL/CMOS

overall length: L_{max} = 45 mm

pinout (14 pin connector):

1 G1
2 G8
3 G6
4 G7
5 ground
6 G5
7 + 5Vdc
8 G0 (lsb)
9 G9 (msb)
10 G3
11 G4
12 G2
13 n/c
14 G9 inverted

ordering information:
550-10GC