

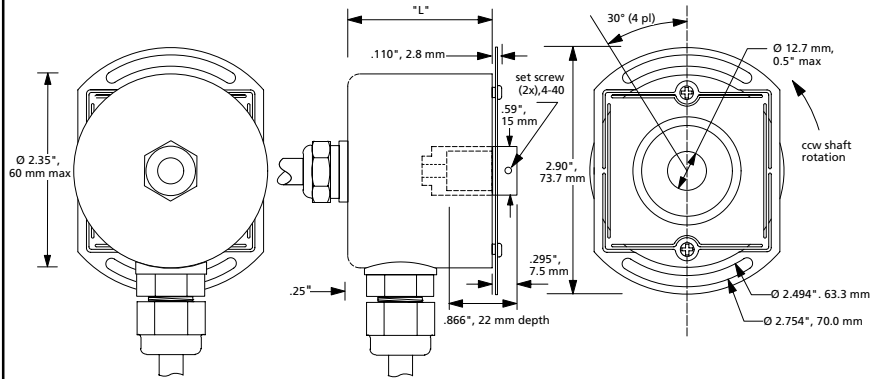


Description:

The CP-900 series size 25 is available as incremental encoder of up to 12,000 c/r (48,000 measuring steps) "direct read" or 384,000 c/r (1,536,000 measuring steps) interpolated. The absolute versions range from 14 bits Gray Code to 24 bits multi-turn programmable and "optical potentiometer" variations. The light source for all is a single light emitting diode, the sensor a monolithic diode array. Some versions are available with an integral fiberoptic link for noise-free transmission of the signals over long distances or in particularly noisy environments.

Options:

- custom linecounts and index configurations
- custom shaft configurations
- custom cable configurations
- connector options with rear and side exits
- shaft seals
- extended temperature range (-30 °C to +100°C)



Mechanical Data:

shaft diameter: 12.7 mm, 0.5" max
 shaft loading: 40 lbs. axial, 35 lbs. radial
 shaft runout: .0005" T.I.R.
 allowable host shaft movement: 0.05" axial, 0.005" radial
 starting torque: 1.5 oz in max @ 20°C
 shaft rotation: continuous, reversible
 slew speed: 160 RPS
 bearings: ABEC 7, shielded
 shaft material: 416 stainless
 housing material: aluminum
 cover material: aluminum
 bearing life: manufacturer's specs
 moment of inertia: 4.1×10^{-4} oz. in sec²
 weight: approx. 13 oz.

temperature: operating: -20°C to +90°C
 shock: 50 G's @ 11 ms
 vibration: 5-2000 Hz @ 20 G's
 humidity: 98% without condensation
 protection: IP 65

Standard connectors incremental:

DESIGNATION	10 pin conn.	7 pin conn.
chan. A	A	A
A inv.	G	n/a
chan. B	B	B
B inv.	H	n/a
index	C	C
index inv.	I	n/a
+5 Vdc	E	D
ground	F	F
frame	J	G

10 pin:
MS3102R-18-1P

7 pin:
MS3102R-16S-1P

Standard Linecounts:

96, 100, 110, 120, 128, 155, 192, 200, 210, 220, 240, 254, 256, 280, 288, 300, 310, 360, 384, 400, 480, 500, 576, 600, 720, 800, 850, 1000, 1100, 1250, 1800, 2000, 3600, 5000, 5625 c/r.

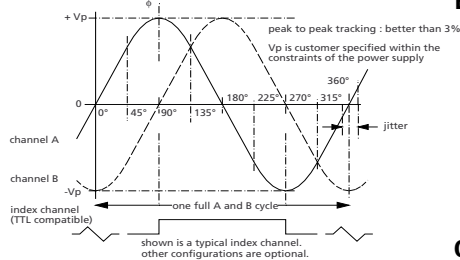
Ordering Information:

CP9XX-(linecount)-(1)
 (1): cable/connector designator A,B,C or D
 A=rear cable, B=side cable,
 C=rear connector, D=side connector

Standard connector absolute:

19 pin KPT00A-14-19P, designations indicated with individual units.

CP-900, Incremental, Sine/Cosine



Electrical Data:

power supply: + 5Vdc @ 50 mA max,
 ± 12 Vdc @ 50 mA max.
 code: incremental
 cycles per revolution: up to 4000
 output format: A and B channel in quadrature, Index TTL 084 op-amp
 output: flat up to 75 kHz
 frequency response: absolute accuracy of zero-crossings: ± 12 arcseconds typ.
 overall length: $L_{max} = 2.5"$

Ordering Information:

please contact factory

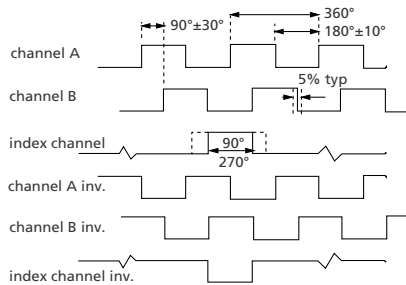
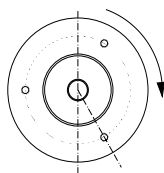
Wire Color Assignments:

channel A: white / orange stripe
 channel B: blue / white stripe
 index channel: green / white stripe
 + 5 Vdc: white / gray stripe
 ground: gray / white stripe
 +12 Vdc: brown / white stripe
 - 12 Vdc: white / brown stripe
 frame: cable shield

Standard Linecounts:

96, 100, 110, 120, 128, 155, 192, 200, 210, 220, 240, 254, 256, 280, 288, 300, 310, 360, 384, 400, 480, 500, 576, 600, 720, 800, 850, 1000, 1024, 1100, 1250, 1800, 2000, 3600, 5000, 5625, 6000 c/r.

CP-950, Incremental, Digital



Electrical Data:

power supply: + 5Vdc ± 10% @ 100 mA max (no load)
 output format: incremental
 linecount (c/r): 16, 32, 50, 96, 100, 110, 120, 128, 155, 192, 200, 210, 220, 240, 254, 256, 280, 288, 300, 310, 360, 384, 400, 480, 500, 508, 512, 560, 576, 600, 720, 768, 800, 850, 960, 1000, 1152, 1200, 1440, 1700, 2000, 2048, 3600, 4000, 4096, 5000, 7200, 8192, 10000, 11250, 12000, 16384
 frequency response: 300 kHz min. @ 85 °C
 linedriver output: 26LS31, EIA std. RS 422 and DIN 66259 compatible
 TTL output: 74LS04
 overall length: $L_{max} = 2.5"$

Wire Color Assignments:

channel A: white/orange stripe
 A inv.: orange/white stripe
 channel B: blue/white stripe
 B inv.: white/blue stripe
 index: green/white stripe
 index inv.: white/green stripe
 + 5 Vdc: white/gray stripe
 ground: gray/white stripe
 frame: cable shield

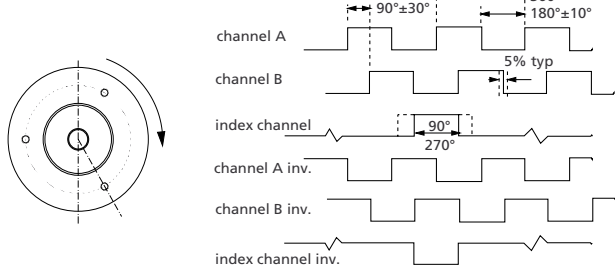
Ordering Information:

CP-950-(linecount)-(1)-(2)
 (1): linedriver=L, TTL=T
 (2): cable/connector designator A,B,C or D

CP-900 Series Hollow Shaft Encoders

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CP-970, Incremental, Linedriver 8V to 30V



Electrical Data:

power supply: +8 Vdc to 30 Vdc @ 150 mA
 max (no load)
 output format: incremental
 cycles/revolution: see CP-950
 frequency response: 300 kHz min. @ 85 °C
 EIA std. RS 422 and DIN 66259
 output: (part 3) compatible
 output @ Vin=4.75V: V_{OL} = 0.5 V@20 mA sink
 V_{OH} = 2.5 V@20 mA source
 output @ Vin=30 V: V_{OL} = 0.5 V@20 mA sink
 V_{OH} = 27 V@20 mA source
 overall length: L_{max} = 2.5"

Wire Color Assignments:

channel A white/orange stripe
 A inv. orange/white stripe
 channel B blue/white stripe
 B inv. white/blue stripe
 index green/white stripe
 index inv. white/green stripe
 +5 Vdc white/gray stripe
 ground gray/white stripe
 frame cable shield

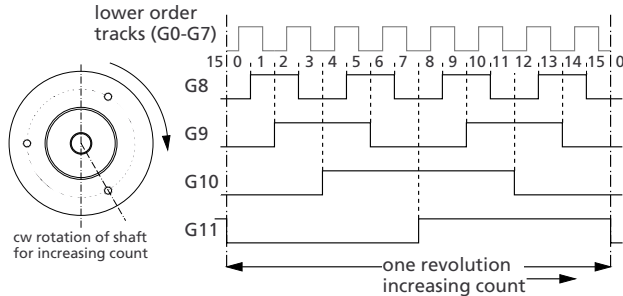
Standard Linecounts:

16,32,50,96,100,110,120,128,155,192,200,210,220,240,254,256,
 280,288,300,310,360,384,400,420,480,500,508,512,560,576,
 600,720,768,800,850,960,1000,1024,1152,1200,1440,1700,
 2000,2048,3600,4000,4096,5000,7200,8192,10000,11250,12000

Ordering Information:

CP-970-(linecount)-(1)
 (1): cable/connector designator
 A,B,C or D

CP-950-12GC, Absolute, 12 bit Gray Code



Electrical Data:

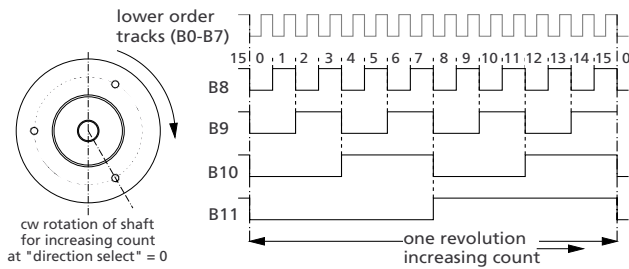
power supply: +5Vdc ± 10% @ 100 mA
 max (no load)
 output format: 12 bit parallel, Gray code
 frequency response: 100 kHz min. wordrate
 output: TTL compatible
 overall length: L_{max} = 2.5"

Ordering Information:

CP-950-12GC-(1)
 (1): cable/connector designator
 A,B,C or D

Signal	Conn. Pin	Wire Color
G0	A	black/white
G1	B	brown/white
G2	C	red/white
G3	D	orange/white
G4	E	yellow/white
G5	F	green/white
G6	G	blue/white
G7	H	violet/white
G8	J	grey
G9	K	white
G10	M	orange
G11	N	yellow
+5 Vdc	V	red
ground	T	black
frame	S	green

CP-950-12NB, Absolute, 12 bit Binary



Electrical Data:

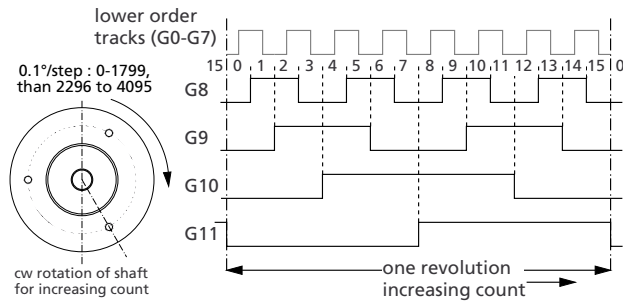
power supply: +5Vdc ± 10% @ 100 mA
 max (no load)
 output format: 12 bit parallel, natural
 frequency response: binary
 output: 100 kHz min. wordrate
 dir. control input: TTL compatible
 overall length: TT/CMOS (5V)
 L_{max} = 2.5"

Ordering Information:

CP-950-12NB-(1)
 (1): cable/connector designator
 A,B,C or D

Signal	Conn. Pin	Wire Color
B0	A	black/white
B1	B	brown/white
B2	C	red/white
B3	D	orange/white
B4	E	yellow/white
B5	F	green/white
B6	G	blue/white
B7	H	violet/white
B8	J	grey
B9	K	white
B10	M	orange
B11	N	yellow
dir.select	L	green
+5 Vdc	V	red
ground	T	black
frame	S	shield

CP-950-12GC/3600, Absolute, 0.1° Step



Electrical Data:

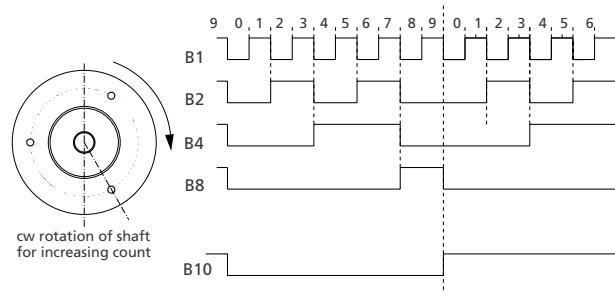
power supply: +5Vdc ± 10% @ 100 mA
 max (no load)
 output format: 12 bit parallel, Gray code
 12 bit excess 248
 frequency response: 100 kHz min. wordrate
 output: TTL compatible
 overall length: L_{max} = 2.5"

Ordering Information:

CP-950-12GC3600-(1)
 (1): cable/connector designator
 A,B,C or D

Signal	Conn. Pin	Wire Color
G0	A	black/white
G1	B	brown/white
G2	C	red/white
G3	D	orange/white
G4	E	yellow/white
G5	F	green/white
G6	G	blue/white
G7	H	violet/white
G8	J	grey
G9	K	white
G10	M	orange
G11	N	yellow
+5 Vdc	V	red
ground	T	black
frame	S	green

CP-950-12BD, Absolute, BCD Output



Electrical Data:

power supply: +5Vdc ± 10% @ 100 mA
 max (no load)
 output format: parallel BCD
 frequency response: 100 kHz min. wordrate
 output: standard TTL/CMOS
 overall length: L_{max} = 2.5"

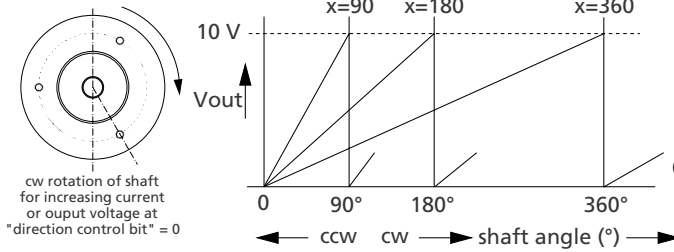
Ordering Information:

CP-950-12BD-(1)-(2)
 (1): cable/connector designator
 A,B,C or D
 (2): steps/revolution, e.g. 360=360 steps/rev.

Signal	Conn. Pin	Wire Color
B1	A	white+black
B2	B	green+black
B4	C	blue+black
B8	D	yellow+black
B10	F	brown+black
B20	G	orange+black
B40	H	white+red
B80	J	green+red
B100	K	blue+red
B200	L	yellow+red
B400	M	brown+red
B800	N	orange+red
B1000	P	yellow+green
B2000	R	brown+green
B4000	U	blue+green
direction	L	green+white
ground,+5V	T,V	black+red pair
frame	S	cable shield

CP-900 Series Hollow Shaft Encoders

CP-950-12ANx, Absolute, Analog



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: 4 - 20 mA (optional)
 resolution: 12 bits (4096 steps)
 stability: ± 0.02 %
 direction control input: TTL/CMOS (5 V)
 overall length: L_{max} = 2.5"

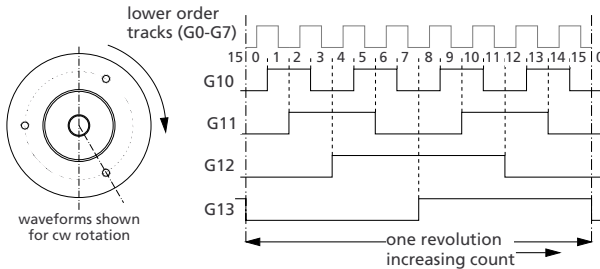
Signal	Conn. Pin	Wire Color
I out	A	blue/white
I out return	B	white/blue
V out	C	orange/white
V out return	D	white/orange
dir. input	E	green/white
+15 Vdc	F	white/grey
ground	G	grey/white
frame	H	cable shield

Ordering Information:
 CP-950-12AN(x)-(1)-(2)
 (1): cable/connector designator A,B,C or D
 (2): V=V_{out} only, I=I_{out} and I_{in}

Options	x = 90	x = 180	x = 360
Rotation	90°	180°	360°
Resolution	5.28 arcmin	5.28 arcmin	5.28 arcmin
mV/step	9.77 mV	4.88 mV	2.44 mV

connector: MS3102R-16S-1P. The connector output supports either voltage or current out, cable out both.

CP-950-14GC, Absolute, 14 bit Gray Code



Electrical Data:
 power supply: + 5Vdc ± 10% @ 100 mA max (no load)
 output format: 14 bit parallel, Gray code
 frequency response: 100 kHz min. wordrate
 output: TTL compatible
 overall length: L_{max} = 2.5"

Signal	Conn. Pin	Wire Color
G0	P	green
G1	S	brown
G2	A	black/white
G3	B	brown/white
G4	C	red/white
G5	D	orange/white
G6	E	yellow/white
G7	F	green/white
G8	G	blue/white
G9	H	violet/white
G10	J	grey
G11	K	white
G12	M	orange
G13	N	yellow
+5 Vdc	V	red
ground	T	black

Ordering Information:
 CP-950-14GC-(1)
 (1): cable/connector designator A,B,C or D

CP-955-8192-8/YAS, Incremental, Commutating

CP-955-8192-8

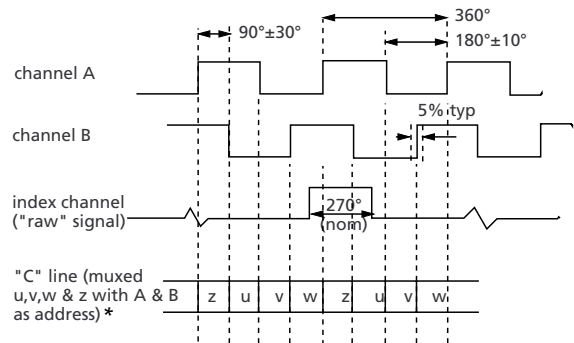
Electrical data:

power supply: + 5Vdc±10% @ 200 mA max (no load)
 incremental signals: complementary linedrivers
 "Z" channel (index): complementary linedriver
 linecount: 8192 cycles per revolution
 u,v & w signals: single-ended, LM 339 with 2.2k pullup
 frequency: 400 kHz min.
 absolute accuracy: 30 arcseconds
 temperature: operating -20° C to +100° C
 shock: 50 G's @ 11ms
 vibration: 5-2,000 Hz @ 20 G's
 humidity: 98% without condensation
 protection: IP 64 optional

Pinouts:

+ 5 V red
 ground black
 A ch. yellow
 A\ ch. orange
 B ch. green
 B\ ch. blue
 u violet
 v brown
 w white
 frame gray
 Z ch. white/brown
 Z\ ch. white/black

Incremental Signals and Index



CP-955-8192-8-YAS

Electrical data:

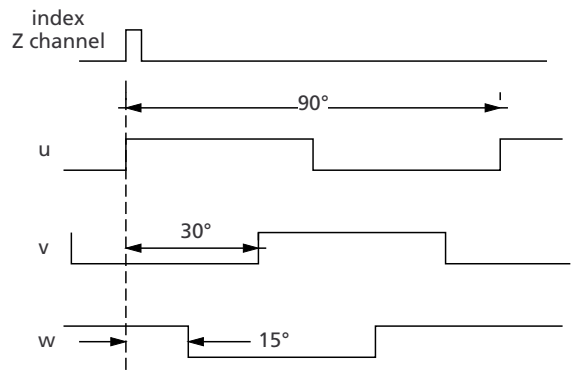
power supply: + 5Vdc±10% @ 200 mA max (no load)
 incremental signals: complementary linedrivers
 "C" channel (multiplexed) complementary linedriver
 "Z" channel (index): complementary linedriver
 linecount: 8192 cycles per revolution
 u,v & w signals: single-ended, LM 339 with 2.2k pullup
 frequency: 300 kHz min.
 temperature: operating -20° C to +100° C
 shock: 50 G's @ 11ms
 vibration: 5-2,000 Hz @ 20 G's
 humidity: 98% without condensation
 protection: IP 64 optional

Pinouts:

+ 5 V red
 ground black
 A ch. black/white
 A\ ch. brown/white
 B ch. red/white
 B\ ch. orange/white
 Z ch. yellow/white
 Z\ ch. green/white
 u white
 v orange
 w yellow
 frame green
 C ch. violet/white
 C\ ch. grey

Commutation Signals and Index Position

(mechanical degrees, 8 pole shown. The index signal coincides with the rising edge of C1)



*Temperature Considerations:

The commutating encoders are specifically designed to be mounted inside or on the endbell of brushless DC motors. When mounted inside, the encoders will work as specified up to a cavity temperature of 130°C, corresponding to a motor temperature of 110°C. Externally mounted encoders with aluminum covers will handle a motor temperature 125°C at 25°C ambient.
 MTBF: encoder @ 125°C = 15,000 hrs
 encoder @ 85°C = 150,000 hrs
 (internal encoder temperature)