# CTS
Electrocomponents ®

Commercial Miniature 16mm Size Rotary Encoder

Features

* Robust Construction
* 2-bit Incremental or 4-bit Absolute Encoder
* Optional Momentary Switch
* Available with 16 Detents
* Continuous Rotation
* Bushing Mount
* Solder Lug or PCB Terminals
* RoHS Compliant
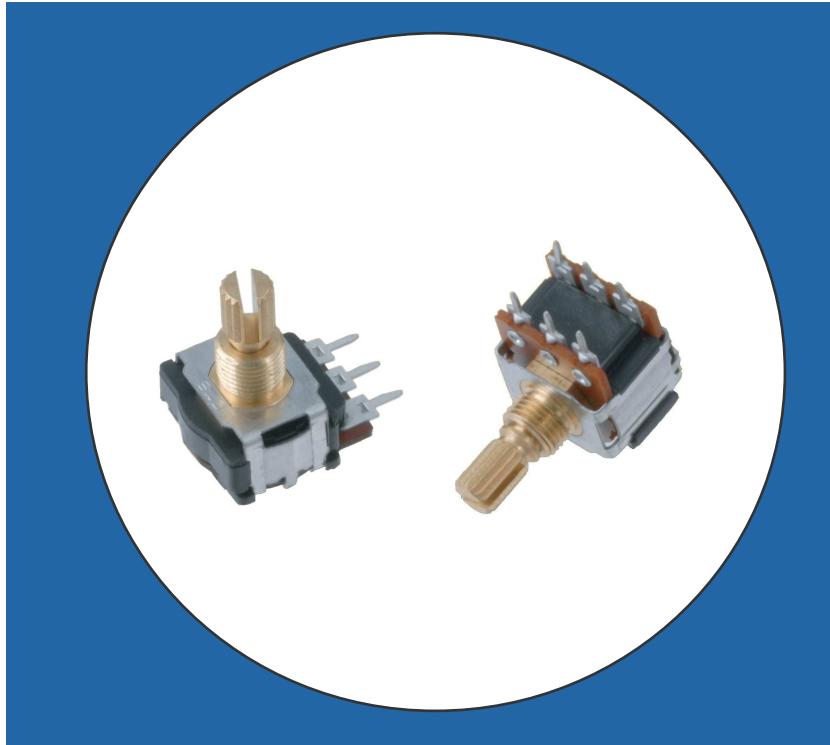
Electrical and Mechanical Specifications

Encoder:

Contact Resistance
500Ω maximum

Voltage Rating
5 VDC @ 0.5mA maximum

Detent Points
16 detents available

Rotational Life
50,000 cycles

Resolution
2-bit: 4, 6, 8,10 or 12 pulses in 360°
4-bit: 16 combinations in 360°

Insulation Resistance
10MΩ minimum at 50 VDC

Temperature Range
Operating: -25°C to +100°C
Storage: -30°C to +100°C

Rotational Torque
No Detent: 36 - 216 gf.cm
With Detent: 100 - 500 gf.cm

Solder Heat Resistance
260°C for 5 seconds

**Push-Pull Strength of Shaft**
8 kg minimum for 10 seconds

Special
Consult CTS for customized or features not listed, including other detent points, resolution, torque and mounting style.

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Electrical and Mechanical Specifications (continued)

Optional Momentary Switch:

Switch Contact Resistance
Initial: 100mΩ maximum
After Life Cycles: 200mΩ maximum

Switch Rating
16 VDC @ 20mA maximum

Switch Bounce
5 milliseconds maximum

Switch Operating Force
350 ± 150 g (12.3 ± 5.3 oz.)

Switch Life
15,000 operations

Switch Travel
0.5mm (.020")

Truth Table

2 BIT BINARY CODE

DENOTES CONTACT CLOSURE TO COMMON																				
B	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1		0	1	1
A	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0		1	1	0
POS. NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		46	47	48

4 BIT GRAY CODE

POS. NO.	DENOTES CONTACT CLOSURE TO COMMON			
	A	B	E	F
1	0	0	0	0
2	0	0	0	1
3	0	0	1	1
4	0	0	1	0
5	1	0	1	0
6	1	0	1	1
7	1	1	1	1
8	1	1	1	0
9	0	1	1	0
10	0	1	1	1
11	0	1	0	1
12	0	1	0	0
13	1	1	0	0
14	1	1	0	1
15	1	0	0	1
16	1	0	0	0

4 BIT HEXADECIMAL CODE

POS. NO.	DENOTES CONTACT CLOSURE TO COMMON			
	A	B	E	F
1	0	0	0	0
2	0	1	0	0
3	1	0	0	0
4	1	1	0	0
5	0	0	0	1
6	0	1	0	1
7	1	0	0	1
8	1	1	0	1
9	0	0	1	0
10	0	1	1	0
11	1	0	1	0
12	1	1	1	0
13	0	0	1	1
14	0	1	1	1
15	1	0	1	1
16	1	1	1	1

288X Typical 2-bit Encoder parallel to P.C. Board

10.2±0.4 / .402±.016
MTG. SURFACE
"L"± 0.8/.031
"A"± 0.4/.016
3/8-32UNEF-2A

18.0/.709 MAX.
8.5/.335 MAX.
7.9±0.13 / .311±.005
11.20/.441
12.50/.492
A C B
16.4/.646

10.00±0.05 / .394±.002
5.00±0.05 / .197±.002
MTG. SURFACE
6.83/.269
B C A
Ø1.40 (3) / .055

DIMENSION : mm / INCH
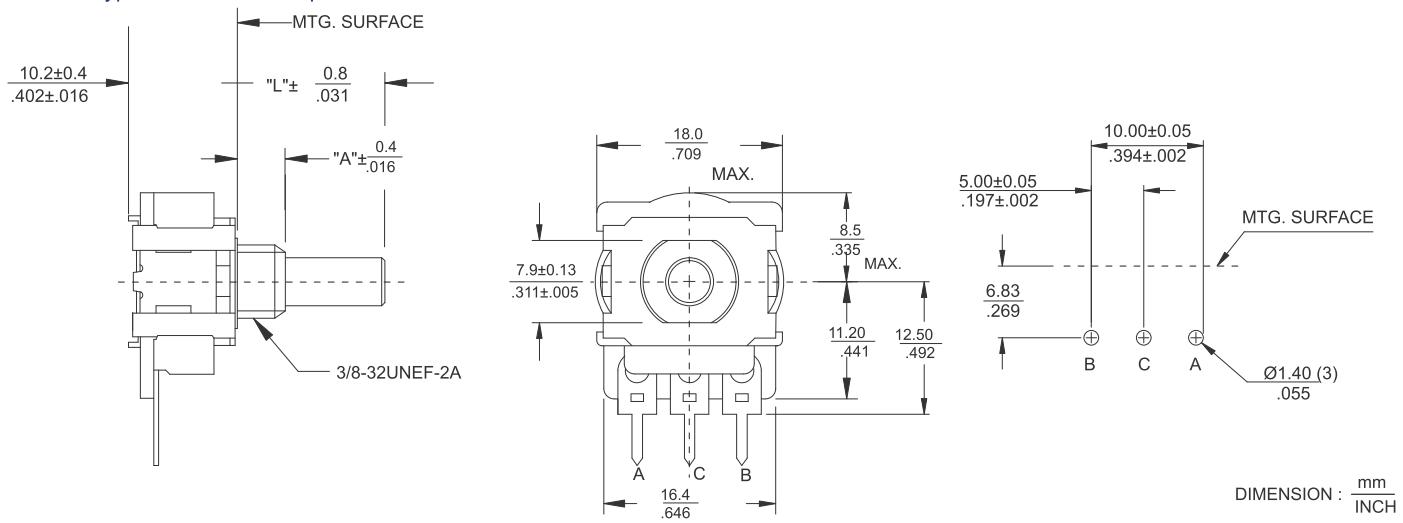
2-288X Typical 4-bit Encoder parallel to P.C. Board

MTG. SURFACE
3/8-32UNEF-2A
"A"± 0.4/.016
15.1±0.4 / .594±.016
"L"± 0.8/.031

18.0/.709 MAX.
8.5/.335 MAX.
7.9±0.13 / .311±.005
11.2/.441
12.5/.492
A C B
E D F
16.4/.646

MTG. SURFACE
3.68/.145 REF.
B C A
8.10±0.05 / .319±.002
F D E
Ø1.40 (6)HL'S. / .055
5.00±0.05 / .197±.002
10.00±0.05 / .394±.002

DIMENSION : mm / INCH

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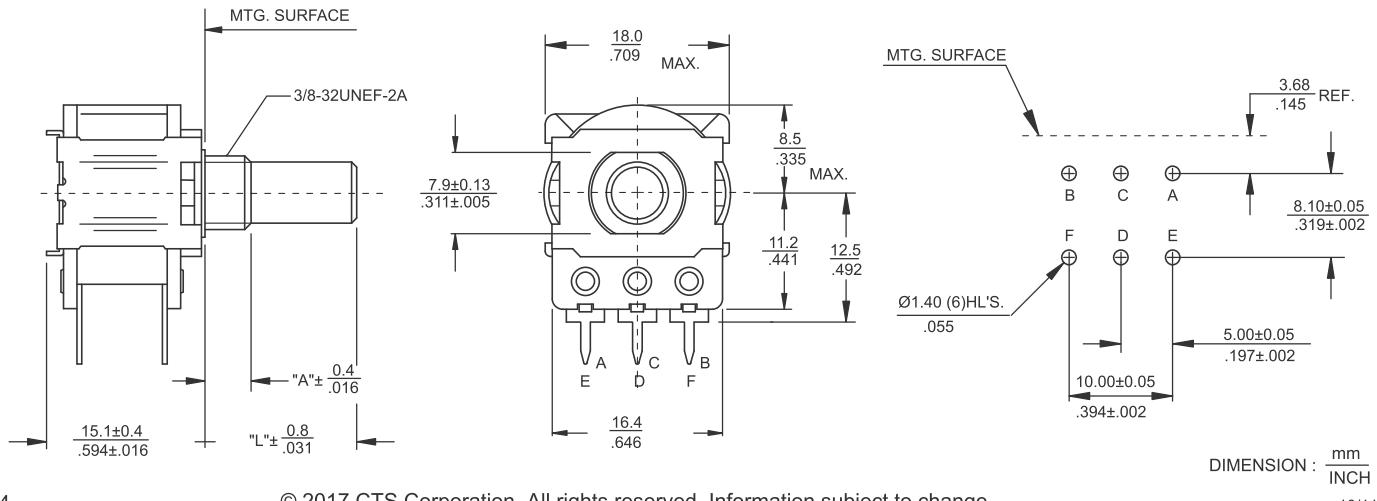
288T   Typical 2-bit Encoder With Solder Lug Terminals

MTG. SURFACE

10.2±0.4 / .402±.016
"L"±0.8 / ±.031
"A"±0.4 / ±.016
3/8-32UNEF-2A

MAX. 18.0 / .709
MAX. 8.5 / .335
7.9±0.13 / .311±.005
11.2 / .441
7.3 / .284
2.18X1.52HL'S(3) / .086X.060
2.92±0.08 / .115±.003
16.4 / .646
A   C   B

DIMENSION : mm / INCH
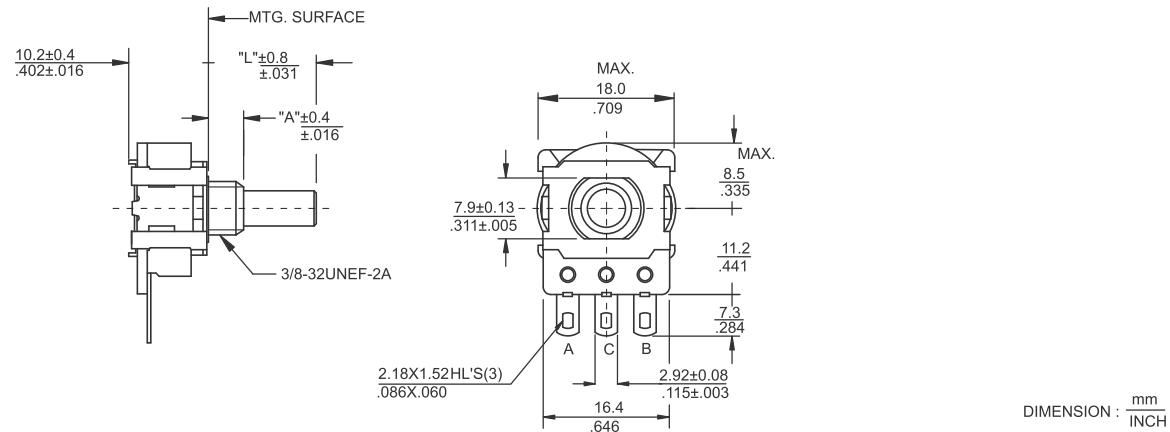
288V   Typical 2-bit Perpendicular to P.C. Board

MTG. SURFACE

10.2±0.4 / .402±.016
3/8-32UNEF-2A
"A"± 0.4 / .016
6.4 / .252
"L"± 0.8 / .031

18.0 / .709 MAX.
8.5 / .335 MAX.
7.9±0.13 / .311±.005
12.5 / .492
16.4 / .646
A   C   B

10.00±0.08 / .394±.003
5.00±0.05 / .197±.002
CENTER LINE OF ENCODER
Ø1.40(3) HL'S / .055
12.70 / .500
A   C   B

DIMENSION : mm / INCH
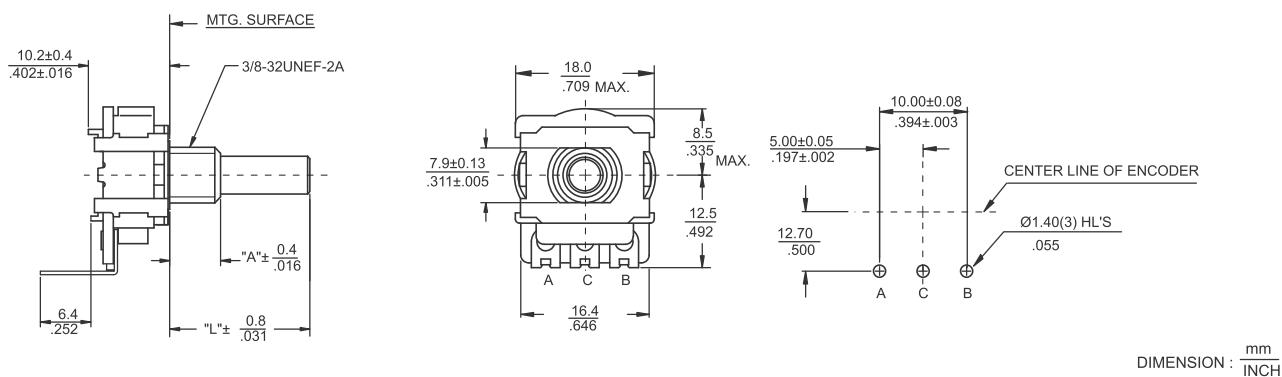
MC-288V   Typical 2-bit Encoder With Momentary Switch Perpendicular to P.C. Board

MTG. SURFACE

12.26 / .483
10.76 / .424
3/8-32UNEF-2A
"L"± 0.8 / .031
4.87 / .192
"A"± 0.4 / .016
0.5 TRAVEL / .020 (REFERENCE)

MAX. 18.0 / .709
7.9±0.13 / .311±.005
8.5 / .335 MAX.
12.5 / .492
16.4 / .646
A   C   B

(2) HL'S   Ø1.70 (2) / .067
2.5±0.13(2) / .098±.005
7.0±0.13 / .276±.005
S1 S2
Ø1.40 / .055 (3) HL'S
B
C
A
5.00±0.13 (2) / .197±.005
13.30±0.13 / .524±.005

DIMENSION : mm / INCH
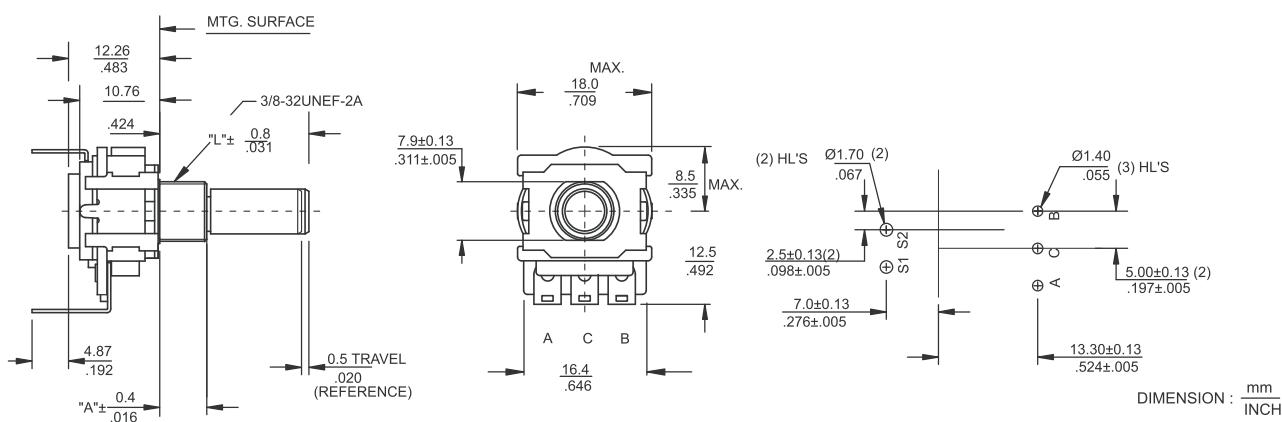
MC-288X   Typical 2-bit Encoder With Momentary Switch Parallel to P.C. Board

MTG. SURFACE

12.26 / .483
10.76 / .424
3/8-32 UNEF-2A
0.5 TRAVEL / .020 (REFERENCE)
"A"± 0.4 / .016
"L"± 0.8 / .031

18.0 / .709 MAX.
7.9±0.13 / .311±.005
8.5 / .335 MAX.
12.5 / .492
4.0 / .157
1.00±0.13(5) / 0.39±.005
16.4 / .646
A   C   B

10.00±0.08 / .394±.003
5.00±0.05 / .197±.002
MTG. SURFACE
6.83 / .269
B   C   A
3.07±0.13 / .121±.005
S2   S1
Ø1.40 (5)HL'S.
2.5±0.05 / .098±.002
2.5±0.05 / .098±.002

DIMENSION : mm / INCH

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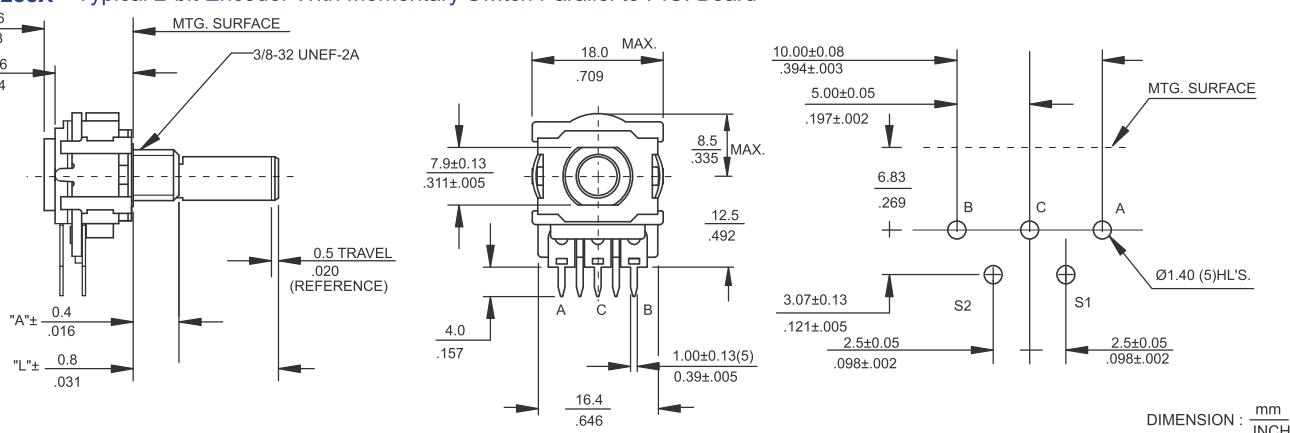
Shaft Trim
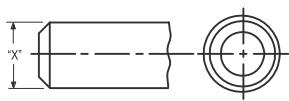
R - ROUND

	X
Imperial Shaft	.250"
Metric Shaft	6.00
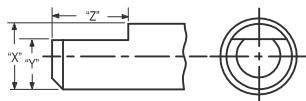
F - FLATTED

	X	Y	Z
Imperial Shaft	.250"	.156"	.375"
Metric Shaft	6.00	4.50	7.00
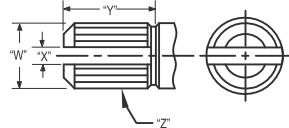
K - KNURLED & SLOTTED

	W	X	Y	Z
Imperial Shaft	.236"	.062"	.344"	24 TEETH
Metric Shaft	6.00	1.57	7.0	18 TEETH
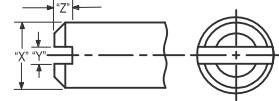
S - SLOTTED

	X	Y	Z
Imperial Shaft	.250"	.046"	.062"
Metric Shaft	6.00	1.17	1.57

DIMENSION: $\frac{inch}{mm}$

Ordering Information

288 T B 24 F 40 2 A 1

TERMINAL STYLE

∗**T** – SOLDER LUG
X – PC
∗∗**V** – PC FORMED
TO REAR

∗Not available in switch construction.

∗∗Not available with 4 bit code

"A" BUSHING LENGTH

mm	inch
A=5.0mm	**2**=.250"
B=6.35mm	**3**=.375"
C=7.0mm	**8**=1.000"
D=9.53mm	
ALL	ALL
M8X.75P	3/8-32 UNEF-2A

SHAFT TRIM

R – ROUND
F – FLATTED
K – KNURLED & SLOTTED
S – SLOTTED

"L" SHAFT LENGTH

mm	inch
A0=10mm	**20**=.625"
A5=15mm	**24**=.750"
B0=20mm	**28**=.875"
B5=25mm	**32**=1.000"
C0=30mm	
C5=35mm	
ALL	ALL
6.0mm Dia.	.250" Dia.

ENCODER CODE

1 – 2 BIT BINARY
∗**2** – 4 BIT GRAY
∗**3** – 4 BIT HEXADECIMAL

∗ 16 COMBINATION ONLY

COMBINATION (RESOLUTION)

16 - 16 COM (4 PULSES - 2 bit)
　　 - 16 COM (1 PULSE - 4 bit)
24 - 24 COM (6 PULSES)
32 - 32 COM (8 PULSES)
40 - 40 COM (10 PULSES)
48 - 48 COM (12 PULSES)

DETENT

1 – NONE
2 – 16 DETENTS

SWITCH

A – NONE
∗**B** – MOMENTARY
SWITCH

∗ 2 BIT MODELS ONLY

Please consult CTS for customized or features not listed.