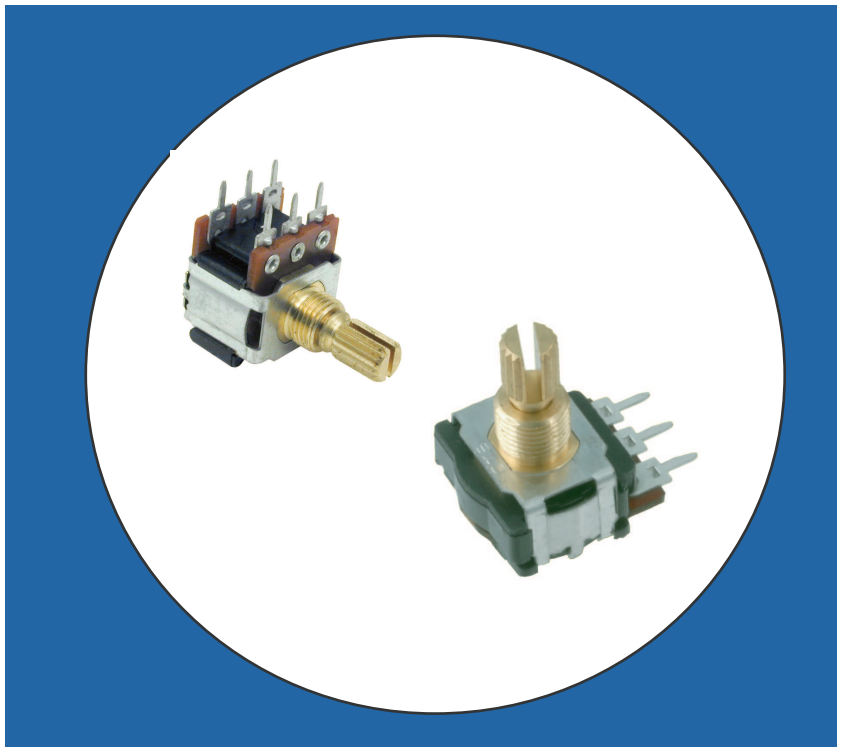# CTS®
Electrocomponents

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.

4/27/15

www.ctscorp.com

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	0	1	1	1

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

MTG. SURFACE
10.2±0.4 / .402±.016
"L"± 0.8/.031
"A"± 0.4/.016
3/8-32UNEF-2A
18.0/.709 MAX.
8.5/.335
7.9±0.13/.311±.005
11.20/.441
12.50/.492
16.4/.646
A C B

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

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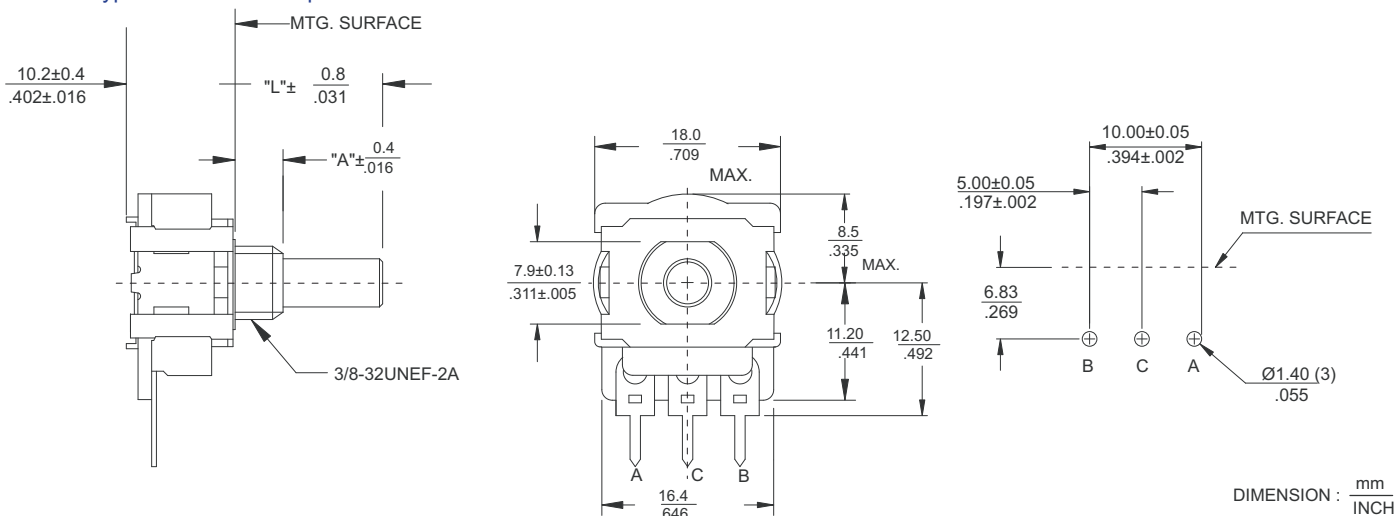
2-288X Typical 4-bit Encoder parallel to P.C. Board

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
7.9±0.13/.311±.005
11.2/.441
12.5/.492
16.4/.646
A C B
E D F

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

CTS Electrocomponents
4/27/15
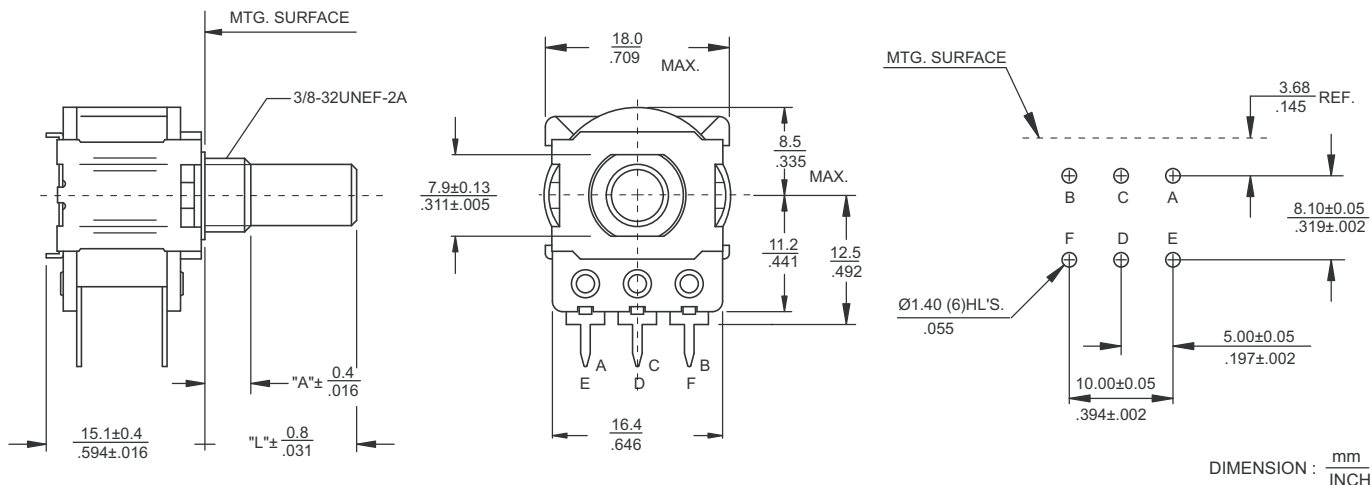
288T Typical 2-bit Encoder With Solder Lug Terminals

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

A C B

2.18X1.52HL'S(3) / .086X.060

2.92±0.08 / .115±.003

16.4 / .646

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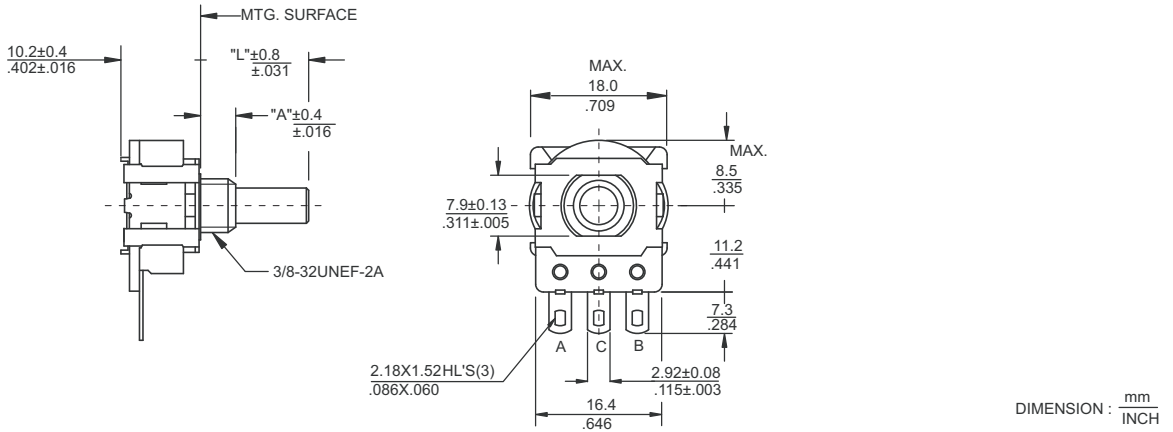
288V Typical 2-bit Perpendicular to P.C. Board

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

A C B

16.4 / .646

10.00±0.08 / .394±.003

5.00±0.05 / .197±.002

CENTER LINE OF ENCODER

12.70 / .500

Ø1.40(3) HL'S / .055

A C B

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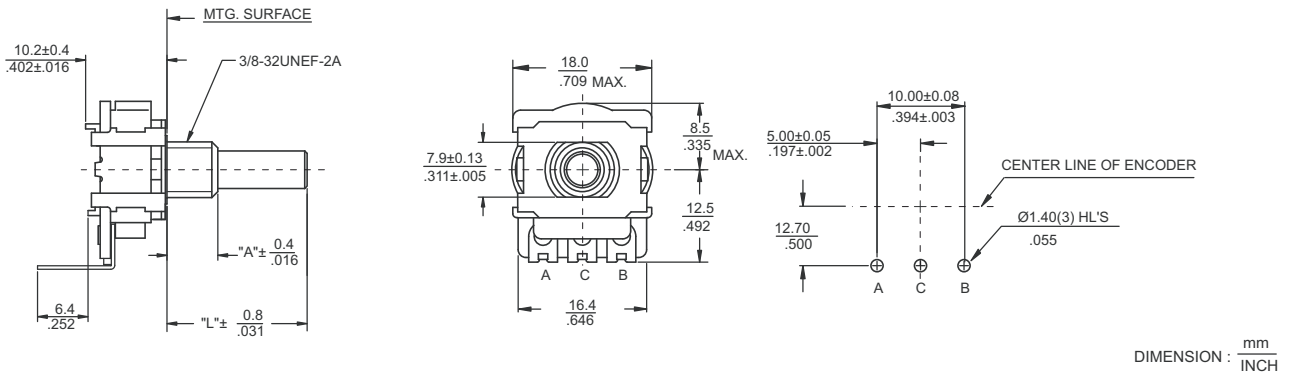
MC-288V Typical 2-bit Encoder With Momentary Switch Perpendicular to P.C. Board

MTG. SURFACE

12.26 / .483

10.76 / .424

.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

A C B

16.4 / .646

(2) HL'S   Ø1.70 (2) / .067

Ø1.40 / .055 (3) HL'S

S2 / S1

2.5±0.13(2) / .098±.005

7.0±0.13 / .276±.005

5.00±0.13 (2) / .197±.005

13.30±0.13 / .524±.005

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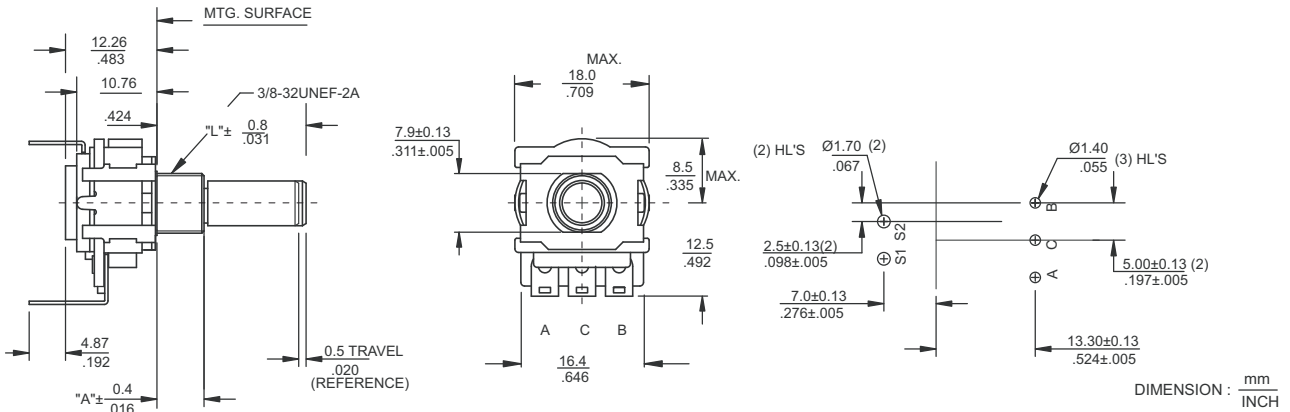
MC-288X Typical 2-bit Encoder With Momentary Switch Parallel to P.C. Board

12.26 / .483

MTG. SURFACE

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.

8.5 / .335 MAX.

7.9±0.13 / .311±.005

12.5 / .492

A C B

4.0 / .157

1.00±0.13(5) / .39±.005

16.4 / .646

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
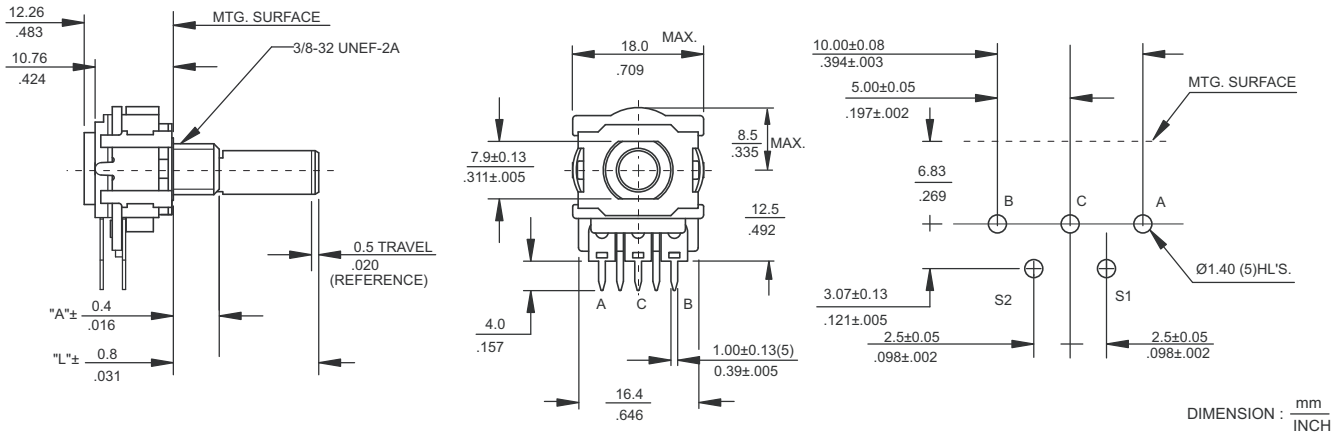
Shaft Trim
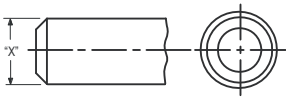
	R - ROUND
	X
Imperial Shaft	.250"
Metric Shaft	6.00
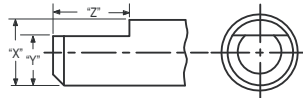
	F - FLATTED		
	X	Y	Z
Imperial Shaft	.250"	.156"	.375"
Metric Shaft	6.00	4.50	7.00
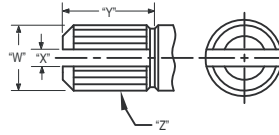
	K - KNURLED & SLOTTED			
	W	X	Y	Z
Imperial Shaft	.236"	.062"	.344"	24 TEETH
Metric Shaft	6.00	1.57	7.0	18 TEETH
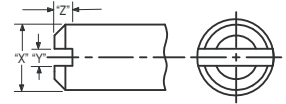
	S - SLOTTED		
	X	Y	Z
Imperial Shaft	.250"	.046"	.062"
Metric Shaft	6.00	1.17	1.57

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

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.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[CTS](#):
  [288T232R161A2](#) [288X232R161B2](#) [288V232F161B2](#) [288V232R161B2](#) [288V222R161B2](#)