

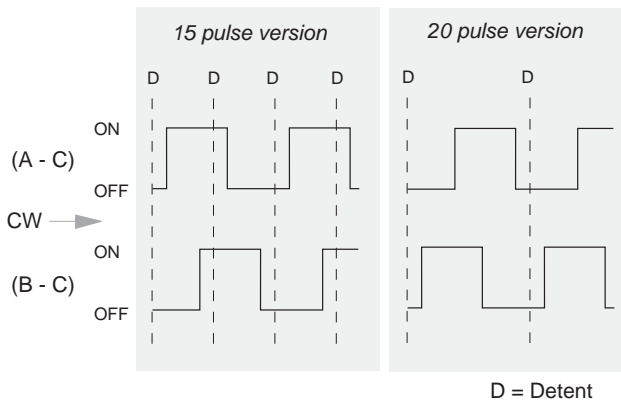
### FEATURES

- 2 bit in quadrature code
- Compact design
- Contact type
- Threaded or plain bush options
- Push-on switch (optional)
- Available in vertical mount
- Available with or without detents
- Endless rotation
- 15 or 20 pulses per rev.

### STANDARD SPECIFICATIONS

Operating Temperature:	-40°C to +85°C
Life (endless rotation):	20.000 cycles
Rotational torque:	0.3 to 2 Ncm
Push on switch:	0.5 mm. travel
Contact Resistance:	100 mΩ Initial (MAX)
Pulses / Detents:	15/00, 15/30, 20/00, 20/20

### GRAPH CODE



### TYPICAL APPLICATIONS

All kind of applications which require a single or multi-function rotary control interfaced with a digital electronic circuit:

**- Consumer:**  
Home appliances: Washing Machine/Microwave Oven timer & temperature programming controls, Hi-Fi, CD, Mini Disc and MP3 players, volume, tone and title search controls.

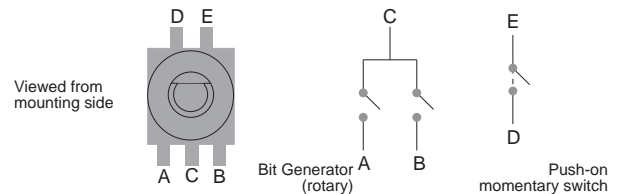
**- Multimedia:**

LCD & CRT Monitor multi-function mode select control (using push-on switch option)

**- Professional:**

Input/output adjustment for Digital Audio Mixers.

### TERMINAL DESIGNATIONS



### HOW TO ORDER

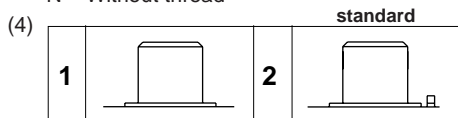
<b>CI-11</b>	<b>C</b>	<b>T</b>	<b>-</b>	<b>V</b>	<b>1</b>	<b>Y</b>	<b>2</b>	<b>2</b>	<b>-</b>	<b>L</b>	<b>F</b>	<b>A</b>	<b>C</b>	<b>F</b>
Series (see note 1)	Switch T = With 0 = Without			Terminal type 1	Bushing height 1   4 2		LT length (please see table)		Shaft dimensions		Bracket mounting options F A			
	Detents C = With 0 = Without (see note 2)		Mounting method V = Vertical		Bushing type Y N (see note 3)		Antirotation lug 1 2 (see note 4)		Shaft type (please see table) F   H K   G		Pulses A = 20 pulses C = 15 pulses (see note 5)			

#### NOTES:

- (1) Standard models: **CI-11CT-V1Y22-LFACF (threaded bushing and 0.5mm switch)**  
**CI-11C0-V1Y22-HF4CF (threaded bushing without switch)**  
**CI-11CT-V1N42-LFACF (bushing without thread and 0.5mm switch)**  
**CI-11C0-V1N42-HF4CF (bushing without thread without switch)**

(2) Standard is C

(3) Y = Threaded M7\*0.75 (**standard**). Unassembled Nuts & Washers included.  
N = Without thread

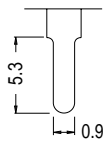


(5) Standard is C

NOTE: The information contained here should be used for reference purposes only.

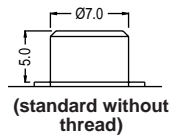
## TERMINALS

1 (standard)

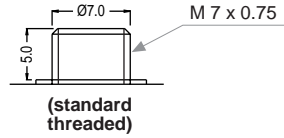


## BUSHING HEIGHT (LB LENGTH)

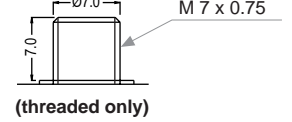
4



2



1

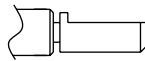


## LT LENGTH

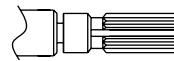
	CODE	A	C	D	E	H	L	S	J	
	SWITCH	Yes	No	No	Yes	No	Yes	Yes	No	
	LT	20mm		19.0mm	24mm	13.7mm		24.7mm	25.0mm	
	(standard)									
	CODE	M	N	I	R	U	P	W	Q	T
	SWITCH	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
	LT	21.5mm	26.5mm	15.0mm	21.0mm	17.6mm	16.5mm	17.0mm	11.4mm	16.3mm

## SHAFT TYPE

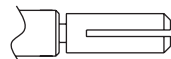
F (standard)



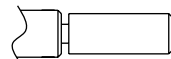
K



H



G

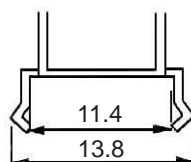


## SHAFT DIMENSIONS

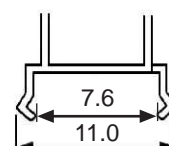
		(standard without switch)						(standard with switch)					
DIMENSIONS		CODE	1	2	3	4	5	6	7	8	9	A	
SHAFT TYPE	F	"F"	9.0	10.0	12.0	7.0	6.0	5.0	8.0	9.5	3.5	6.8	
	K	"LS"	17.0	13.0	9.6			10.0	12.0	14.0	12.3		
		"T"	12.0	11.0	5.6			6.0	7.0	7.0	10.0		
		"H"	1.0	1.0	1.0			1.0	1.0	1.0	1.0		
	H	"LS"		17.0	8.0	11.0	18.0	8.0	9.3				
		"F"		11.0	7.0	9.0	11.0	6.0	8.0				
		"H"		1.42	1.0	1.42	1.42	1.0	1.42				
	G	"F"	12.0	13.0	10.8	7.7							

## BRACKET MOUNTING OPTIONS

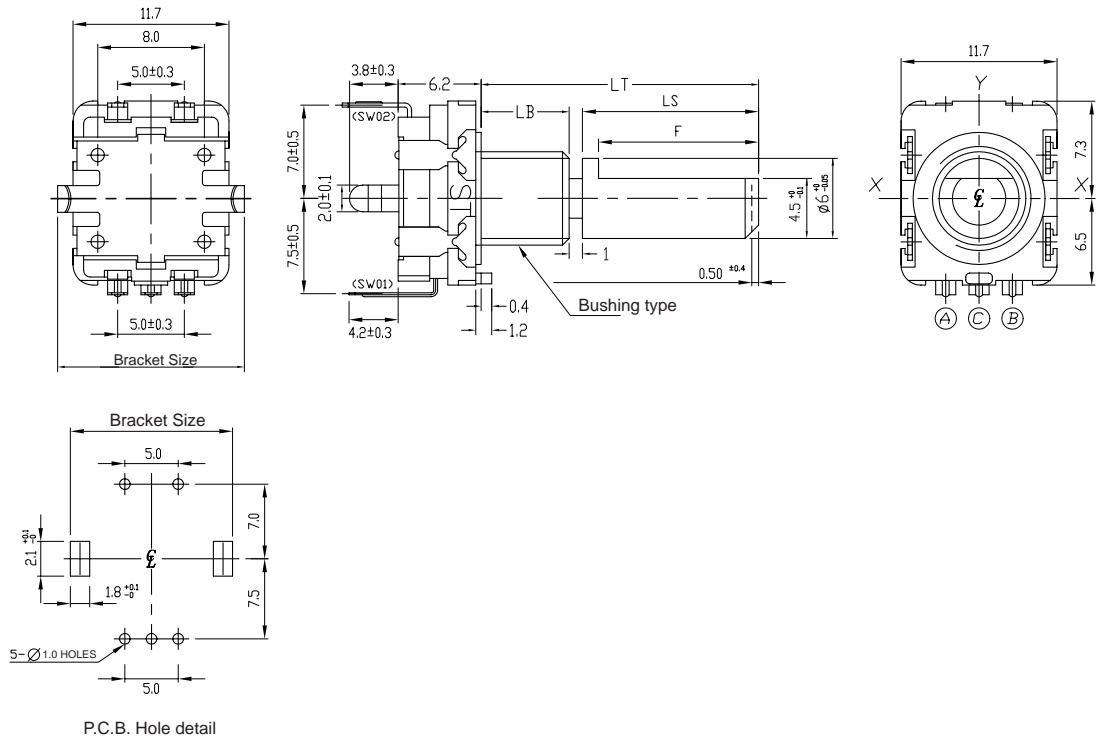
F (standard)



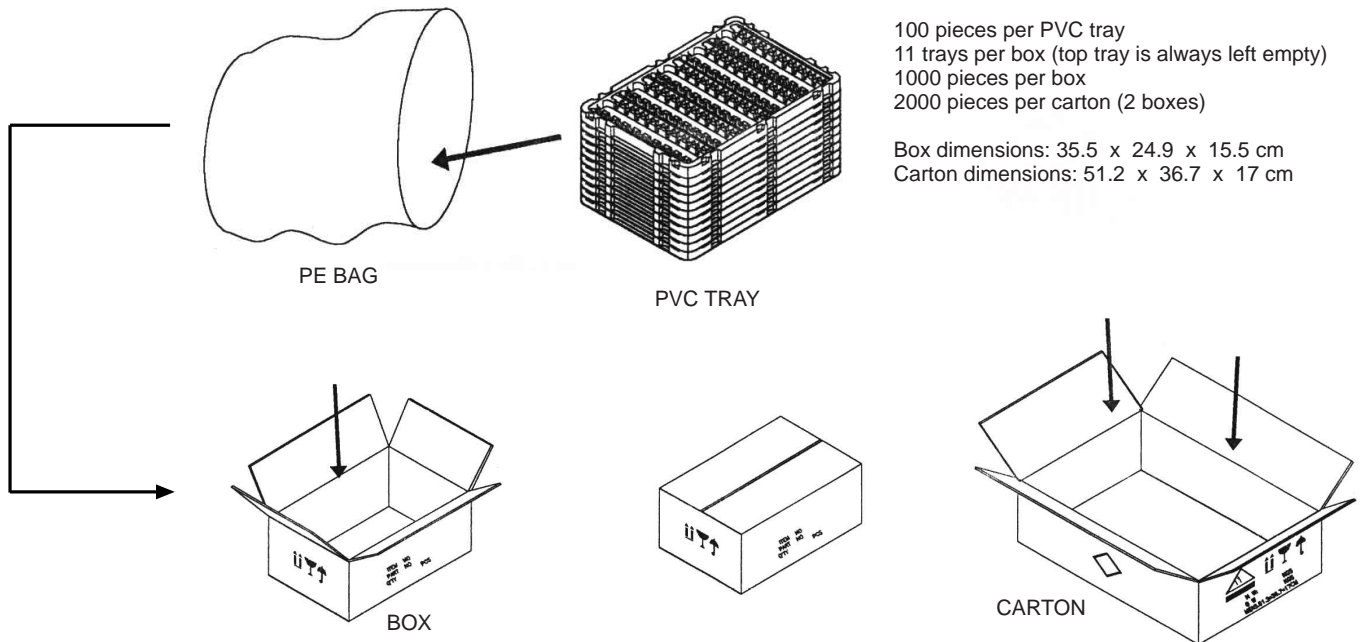
A



# STANDARD DIMENSIONS



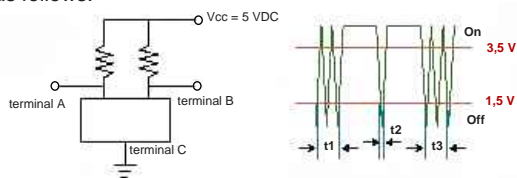
# PACKAGING



# TEST CIRCUIT DIAGRAM

Measurements shall be made under the following conditions.

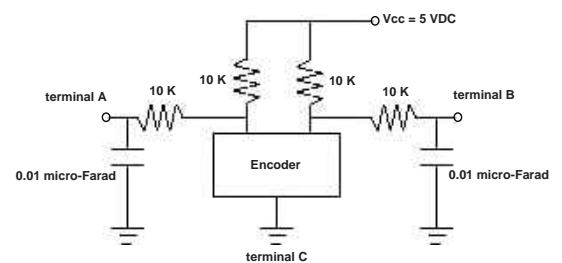
- (1) Shaft rotational speed: 360 degrees/second
- (2) Test circuit as follows:



On area: The area which the voltage is 3.5V or more  
 Off area: The area which the voltage is 1.5V or less

# R/C FILTER TEST CIRCUIT

The R/C filter circuit as shown is recommended in the pulse count process design



## SPECIFICATIONS

### *Electrical:*

- Resolution:	360°
- Rated Power:	5 VDC 10 mA (1 mA min.)
- Contact Resistance:	100 mΩ (max.) @ initial
- Insulation Resistance:	100 MΩ (min.) @ 250 VDC 1 mA
- Dielectric Strength:	300 VAC for 1 min (Leak current 1 mA)
- Sliding Noise:	t1, t3 < 3 ms, t2 < 2 mS (under 360°/S test condition)
- Phrase Difference:	0.08T min.
- Electrical Life:	20,000 operations

### *Mechanical:*

- Number of Detents:	20 (20-pulse encoder), 30 (15-pulse encoder)
- Rotational Torque:	0.3 to 2 Ncm(with detents) 0.5 Ncm Max. (without detents)
- Shaft play in axial direction	0.7x l/30 mm p-p MAX
- Push-Pull Strength of Shaft:	20 N(2.0 4kgf)

### *Switch:*

- Type:	SPST
- Switching Function:	(On)-Off
- Contact Resistance:	100 mΩ (max.) @ initial
- Insulation Resistance:	100 MΩ (min.) @ 250 VDC 1 mA
- Dielectric Strength:	300 VAC 1 mA for 1 minute
- Operating Force:	4.5 ± 1.5 N (450±153 gf)

### **Durability:**

- Operating Temperature:	-40°C to +85°C
- Storage Temperature:	-40°C to +85°C
- Switch	Circuit single pole and single throw (push on)
- Travel of switch	0.5mm
- Contact Resistance	initial period 100mΩ, 200mΩ after the end of useful life is reached
- Rotational life	min 20,000 cycles
- Cold	-20 ± 2°C for 96H
- Dry heat	85 ± 2°C for 96H
- Damp heat	40 ± 2°C 90 to 95% RH for 96H