GR series

• Stand product, for general purposes.

• 標準品、普通用途。

SPECIFICATION

Item 項目	Character 特性										
Capacitance Tolerance 靜電容量容許差	±20% (120Hz, 20℃)										
Operating Temperature Range 適用溫度範圍	-40 ~ +105℃							-25 ~ +105℃			
Voltage Range 工作電壓範圍	6.3 ~ 100V							160 ~ 450V			
Leakage Current 洩漏電流	I ≦0.02 CV or 3 (uA), which is greater. (After 3 minutes application of working voltage)							I ≦0.03 CV +40uA , (After 3 minutes application of working voltage)			
Dissipation Factor 散逸因素(損失角正切) (tan δ)	Measurement Frequency: 120 Hz. Temperature: 20℃										
	Rated Voltage (V)	6.3	10	16	25	35	50	63	100	160~ 250	350~450
	tan δ (MAX)	0.24	0.20	0.16	0.15	0.12	0.10	0.09	0.08	0.20	0.25
Low Temperature Stability 低溫特性 Impedance Ratio (MAX) 阻抗比率	Measurement Frequency: 120Hz.										
	Rated Voltage (V)	6.3	10	16	25	35	50	63	100	160~ 250	350~ 400	450
	Z (-25℃) / Z (20℃)	5	4	3	2	2	2	2	2	3	6	15
	Z (-40℃) / Z (20℃)	12	10	8	6	4	3	3	3	4	-	-
Load Life 高溫負荷壽命	1000 hours, with application of working voltage at 105℃										
	Capacitance Change	Within ±20% of Initial Value									
	tan δ	200% or less of Initial Specified Value									
	Leakage Current	Initial Specified Value or less									
Shelf Life 高溫放置壽命	1000 hours, no voltage applied, at 105℃										
	Capacitance Change	Within ±20% of Initial Value									
	tan δ	200% or less of Initial Specified Value									
	Leakage Current	Initial Specified Value or less									
Standards 標準參照	JIS C 5141 and JIS C 5102										

RIPPLE CURRENT COEFFICIENTS

Temperature Multiplies

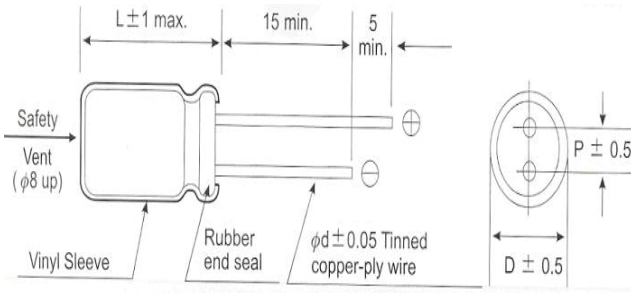
TEMP (℃)	40	60	105
Coefficient	1.30	1.25	1.00

Frequency Coefficient of Allowable Ripple Current

WV (V)	Capacitance (uF)	Frequency (Hz)			
		50	120	1K	≧10K
≦100	＜100	0.75	1.00	1.57	2.00
	100~470	0.80	1.00	1.34	1.50
	＞470	0.85	1.00	1.10	1.15
≧160	＜330	0.80	1.00	1.40	1.60
	≧330	0.90	1.00	1.13	1.15

GR series

DIMENSIONS (MM)



ΦD	5	6.3	8	10	13	16	18	22	25	30
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0	13	15
Φd	0.5	0.5	0.5	0.6	0.6	0.8	0.8	0.8	0.8	0.8

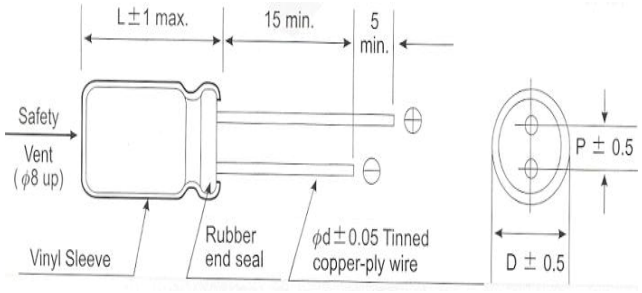
DIMENSIONS

D x L (mm); R.C.: (mA rms) at 105℃, 120Hz .

Cap (uF) \ WV (V)	6.3		10		16		25		35		50		63	
Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
0.1~0.47											5X11	8		
1.0											5X11	12	5X11	12
2.2											5X11	20	5X11	20
3.3											5X11	25	5X11	27
4.7											5X11	28	5X11	32
6.8											5X11	35		
10					5X11	35	5X11	38			5X11	42	5X11	47
22					5X11	54	5X11	57			5X11	62	6.3X11	80
33					5X11	64	5X11	66	5X11	70	6.3X11	87		
47			5X11	65	5X11	68	5X11	72	6.3X11	90	6.3X11	104	8X11	135
68					5X11	90	6.3X11	101						
100			5X11	93	5X11 6.3X11	113 125	6.3X11	130	6.3X11 8X11	154 168	8X11	180	8X11 10X13	190 225
150					6.3X11	161	6.3X11	180						
220			6.3X11	158	6.3X11	198	8X11	230	8X11 8X14 10X13	257 266 311	10X15 10X17	340 345	10X17 10X20	350 400
330			6.3X11	229	8X11	260	8X11	330	10X15	357	10X17	460	13X21	540
470	6.3X11	247	6.3X11 8X11	255 290	8X11	370	8X12 8X14 10X13	420 430 464	10X15	470	10X20 13X21	610 700	13X21 13X25	720 750
560									10X16	576				
680			8X11 10X13	400 472	8X14	480	10X15	500	10X20	682	13X21 13X25	830 840	13X26	1018
820			10X13	521	10X15	525							16X26	1152
1000	8X12	458	8X14	533	8X16 10X16 13X16	571 587 750	10X15 10X17 13X16	690 736 800	13X16 13X18 13X21	850 860 867	13X25 16X26	1080 1210	16X26	1287
1200	10X16	685												
1500	10X16	790	10X20	715							16X32	1408		
1600							13X21	982						
2200	10X17	801	10X17	860	10X20 13X21 16X16	950 996 1000	13X21 16X16	1165 1312	16X26	1460	16X32 18X26	1530 1715	18X36	1840
2700			10X20	980	13X21	1100								
3300	10X20	945	13X21	1100	13X21	1250	16X26	1530	16X32	1650	18X36	1900	22X42	1940
3900			13X21	1290										
4700			13X21	1400	16X26	1600	16X26	1780	18X36	1920	22X36	2100	25X43	2450
6800	16X26	1490	16X26	1690	16X26	1900	18X36	2030	22X36	2150	22X43	2500		
10000	16X26 16X32	1765 1897	18X36	1930	18X36	1950	18X36	2100	25X43	2650	25X43 25X50	2700 2800		
15000	18X36	2075												

GR series

DIMENSIONS (MM)



ΦD	5	6.3	8	10	13	16	18	22	25	30
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0	13	15
Φd	0.5	0.5	0.5	0.6	0.6	0.8	0.8	0.8	0.8	0.8

DIMENSIONS

D x L (mm); R.C.: (mA rms) at 105℃, 120Hz.

Cap (uF) / WV (V) Item	100		160		200		250		350		400		450	
	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
0.1~0.47	5X11	10					6.3X11	12						
1.0	5X11	15	5X11 6.3X11	12 14	6.3X11	16	6.3X11	16	8X11	16	8X11	16	8X11	18
2.2	5X11	22	6.3X11	24	6.3X11	25	6.3X11 8X11	25 28	10X13	30	10X13	30	8X14 10X16	31 32
3.3	5X11	28	8X11	30	8X11	35	8X11	36	10X16	40	10X16	40	10X20	45
4.7	5X11	31	8X11	32	8X11	38	8X12 10X13	38 50	10X13 10X15	50 52	10X16	53	10X16 10X20	53 55
10	6.3X11	54	10X13	59	10X13	59	10X15	64	10X20	65	10X17 10X20	70 73	10X17 10X20 13X21	74 75 78
15	8X11	75												
22	8X11	95	10X16	96	10X16 10X20	100 110	10X20	110	13X21	125	13X21	125	13X25 16X26	128 131
33	8X11 10X12	120 130	10X20	135	10X20 13X21	135 140	13X21	140	13X26 16X26	144 145	13X26 16X26	147 158	16X26 16X32	160 170
47	10X15	165	13X21	180	13X21 13X26	180 200	13X26	200	16X26 16X32	210 238	16X26 16X32 18X26	250 260 280	16X32 16X36	290 300
100	10X17 10X20 13X21	270 280 300	13X26 16X26	320 350	16X26	386	16X32	422	18X36	450	22X41	500		
220	13X26 16X26	450 460	16X32 16X36 18X36	480 500 530	18X36 22X30	570 580								
330	16X26 18X26	600 650	18X32	700										
470	16X32	880			22X36	1100								
680	18X36	1090												
1000	18X40 22X36	1300 1400												

Taping Specifications

Taping:

Fig.1 : Formed

TA · TR

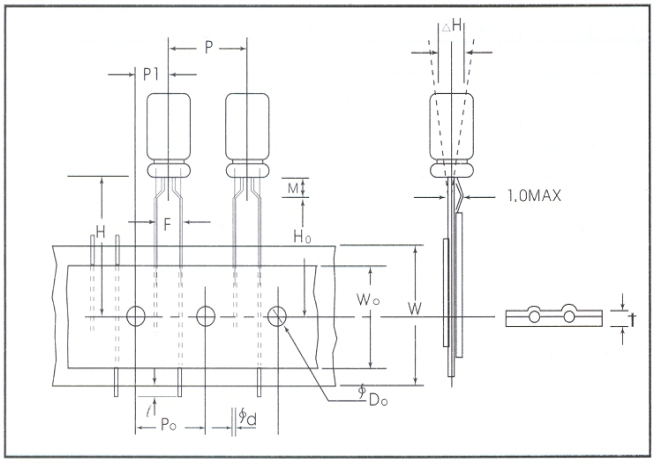
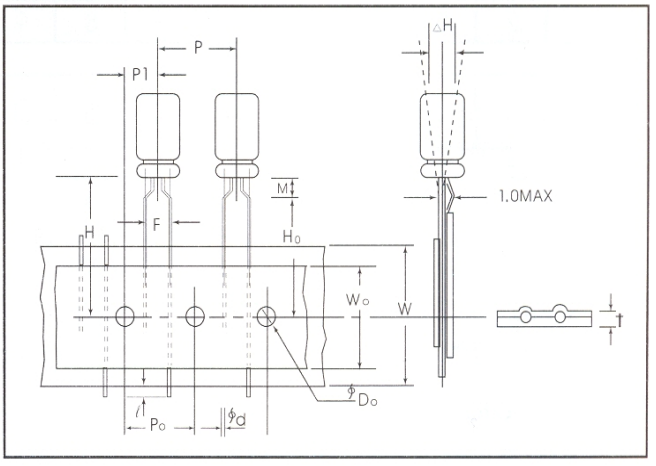


Fig.2 : Straight (10 — 13 φ)

HA · HR



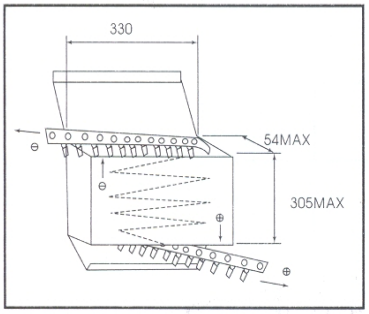
DIMENSIONS:(mm)

Item	Symbol	TA · TR		HA · HR	
		Nominal Value	Tolerance	Nominal Value	Tolerance
Lead-wire diameter	φ d	0.5	± 0.05	0.5	± 0.05
Pitch of component	P	12.7	± 1.0	12.7	± 1.0
Feed hole pitch	P_0	12.7	± 0.3	12.7	± 0.3
Feed hole center to component center	P_1	6.35	± 1.3	6.35	± 1.3
Lead to lead distance	F	5.0	-0.2 + 0.8	4 φ , 5 φ , 6.3 φ : 2.5 / 8 φ : 3.5	-0.2/ + 0.8
Lead to lead distance	F_1	—	—	5.0	+0.5/ -1.0
Clinch dimension	K	L ≦ 9 : 1.5 L > 10 : 2.5	MAX	—	—
Height of component from tape center	H	L ≦ 9 : 17.5 L > 10 : 18.5	0.75	18.5	0.75
Lead-wire clinch height	H_0	16.0	± 0.5	16.0	± 0.5
Tape width	W	18.0	-0.5 / +1.0	18.0	-0.5 / +1.0
Hole-down tape width	W_0	12.5	MIN	12.5	MIN
Feed hole diameter	φ D_0	4.0	± 0.2	4.0	± 0.2
Total tape thickness	t	0.7	± 0.2	0.7	± 0.2
Component alignment, F - R	△H	0	± 2.0	0	± 2.0
Lead-wire protrusion	ℓ	2.0	MAX	2.0	MAX

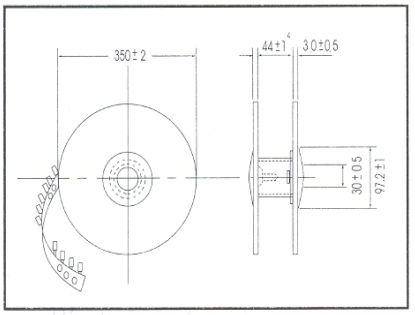
*For D=0, H=20.0 ± 0.75 is available , in this case, the dimension of H is not specified

Figure 2 : PACKAGING

2-1, Ammo pack box



2-2, Reel pack box



Packaging Quantity

φ D	4	5	6.3	8
Case Height	5,7	5,7,11	5,7,11	9,12
TA · HA	2500	2000	1600	1000
TR · HR	1500	1250	1000	800

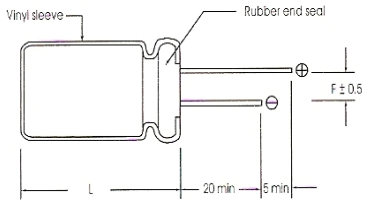
Note) Above quantities are principle.
Some difference may be provided.

Note) The component shall be oriented on the tape as such that the load is leading or the negative load is loading with customer's request.

Lead Forming & Life Chart

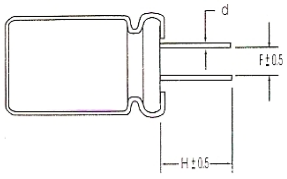
Lead Cutting, Forming, Bending and Crimping

(1) General

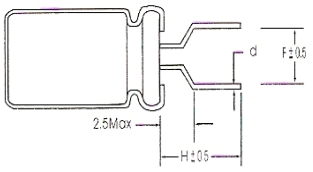


Dφ	4	5	6	8	10	13	16	18
F	1.5	2.0	2.5	3.5	5.0		7.5	
dφ	0.45	0.5		0.6			0.8	

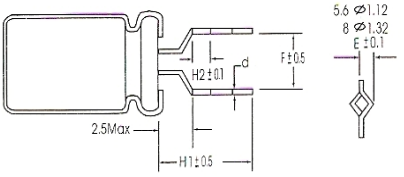
(2) Shape A



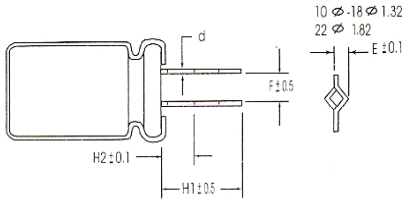
(3) Shape B



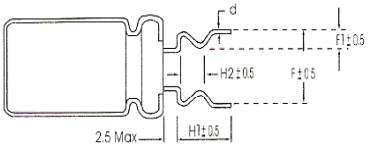
(4) Shape C



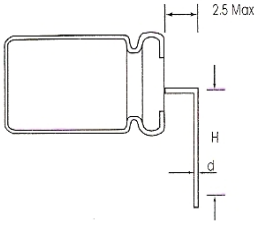
(5) Shape D



(6) Shape E



(7) Shape F



Specification Information:

Shape No.	Cutting & Forming Methods	Dφ	4φ	5φ	6φ	8φ	10φ	13φ	16φ	18φ
A	Lead Cutting Only	F	1.5	2.0	2.5	3.5	5.0	5.0	7.5	7.5
		H	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0
		d	0.45	0.5	0.5	0.6	0.6	0.6	0.8	0.8
B	Lead Cutting and Forming	F	5.0	5.0	5.0	5.0	—	—	—	—
		H	4.0	4.0	4.0	4.0	—	—	—	—
		d	0.45	0.5	0.5	0.6	—	—	—	—
C	Lead Cutting, Crimping and Forming	F	5.0	5.0	5.0	5.0	—	—	—	—
		H1	4.0	4.0	4.0	4.0	—	—	—	—
		I12	1.8	1.8	1.8	1.8	—	—	—	—
		d	0.45	0.5	0.5	0.6	—	—	—	—
D	Lead Cutting and Crimping	F	—	—	—	—	5.0	5.0	7.5	7.5
		H1	—	—	—	—	4.5	4.5	4.5	4.5
		H2	—	—	—	—	1.8	1.8	1.8	1.8
		d	—	—	—	—	0.6	0.6	0.8	0.8
E	Lead Cutting and Forming	F1	5.0	5.0	5.0	5.0	—	—	—	—
		F2	1.2	1.2	1.2	1.2	—	—	—	—
		H1	4.0	4.0	4.0	4.0	—	—	—	—
		H2	1.8	1.8	1.8	1.8	—	—	—	—
		d	0.45	0.5	0.5	0.6	—	—	—	—
F	Lead Cutting and Bending	F	1.5	2.0	2.5	3.5	—	—	—	—
		H	6.0	7.0	8.0	9.0	—	—	—	—
		d	0.45	0.5	0.5	0.6	—	—	—	—

鋁 質 電 解 電 容 器 使 用 需 知

1. 在電氣回路如不清楚或不明確線路之極性時，則建議使用無極性電解電容器。
2. 無極性 (或二極性) 電解電容器，可使用在極性轉換的回路或直流回路上。
3. 單極性電解電容器只能使用在直流電路上，其極性必需標明在適當之位置或在導針/端子之旁邊。
4. 電解電容器應儲存於低溫及乾燥之處所。
5. 電解電容器不可使用在周圍溫度超過所標示之使用溫度範圍。
6. 電解電容器不適用於超過可容許紋波電流範圍之回路之上，假如有需要耐高紋波電流之電解電容器，請與我們洽商詳情。
7. 電解電容器如經長久儲存，如果漏電電流超出規格值，使用前應以額定電壓重新再充電 30~60 分鐘。
8. 電解電容器一般品不適用於瞬間之充放電，如需要使用在快速充放電的場合，請與我們洽商。
9. 使用於電解電容器之工作電壓，不得超過其額定電壓。
10. 爲了保護電解電容器之內部結構，其導針或端子不容許過份之拉力或承受的拉力。
11. 電烙鐵應與電容器塑膠管保持適當距離，以防止過熱造成塑膠套管破裂。
12. 電解電容器經波峰之程序，其焊錫槽之溫度絕對不容許超過 240℃，時間 5 秒鐘。
13. 爲了保護塑膠套管、印刷標示以及封口材料不被破壞，電解電容器不得以鹵化化學藥品或類似溶劑，作爲電解電容器洗滌之用，如三氯乙烯、二甲苯類或銅類等。
14. 本公司尺寸僅供設計線路參考，本公司得視現有材料做規格設計變更尺寸，訂購前可再與本公司確認。

環 保 對 策

一 本公司積極推動地球環保政策；

一 生產過程不使用破壞臭氧層的化學物質；

一 產品不使用含鉛、鎘等對人體有害物質的材料。

PRECAUTIONS IN USING ALUMINUM ELECTROLYTIC CAPACITORS

1. If circuit polarities are unclear or uncertain, Non-polar capacitors are recommended.

2. Non-polar (or Bi-polar) capacitors can be used in polarities changing circuits or DC circuits.

3. Polarized capacitors can be used in DC circuits only. Its polarity must be marked on the proper side of lead wire/terminal.

4. Capacitors should be stored at a place of cool and dry.

5. Capacitors can not be used in a place of ambient temperature exceeding its marked temperature.

6. Capacitors can not be used in a circuit whose ripple current exceeding permissible ripple current. If high ripple current resistant capacitors are required, please contact us.

7. If capacitors have been stored for a long time and its leakage current exceed the specified value, Please recharge for 30 to 60 seconds with rated voltage before using.

8. Capacitors can not be used in a circuit of sudden charge or discharge, if used in a circuit of sudden charge of discharge is required, please contact us.

9. Application of working voltage to capacitors should not exceed its rated voltage.

10. In order to protect inside structure, capacitors can not be applied with over pull-force.

11. Soldering irons should be kept away from vinyl sleeve of capacitor in order to avoid cracking of sleeve.

12. For peak soldering, the solder temperature should not be over 240℃ for 5 seconds to capacitors.

13. In order to protect sleeve, printed marks and sealing material, capacitors can not be cleaned with halogenated chemicals or similar solvent such as Trichloroethlene, Xylene or Acetone, etc.

14. All or size and dimensions are offering for reference on design, please confirm the exact dimension before your purchase.

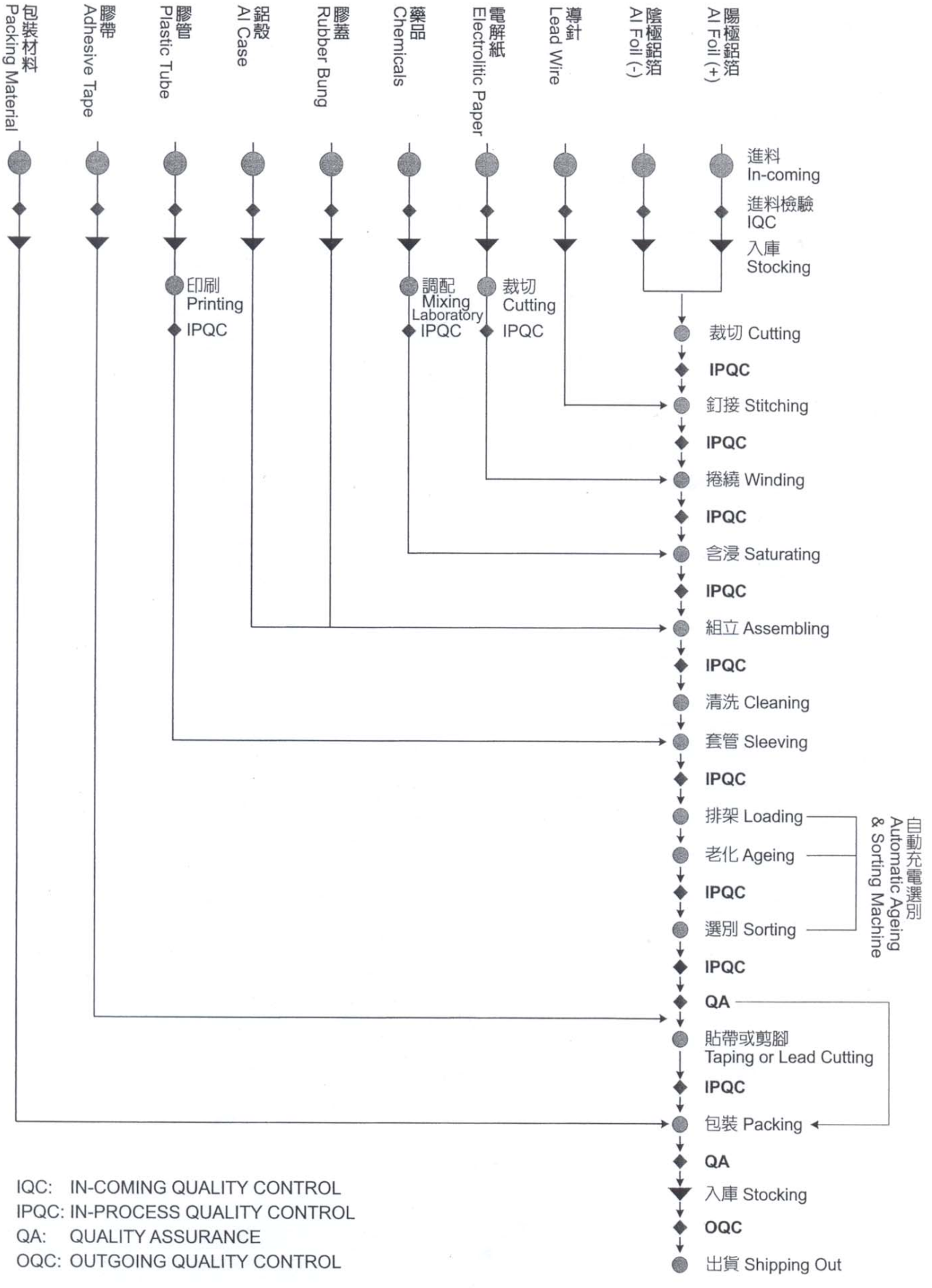
MEASURES TAKEN FOR ENVIRONMENT PROTECTION

— Actively promoting Environment Protection Policies

— No ozone unfriendly chemicals is used in our production processes

— No lead and cadmium of hazardous elements is used in our products

Automatic Production Flow Chart



IQC: IN-COMING QUALITY CONTROL
IPQC: IN-PROCESS QUALITY CONTROL
QA: QUALITY ASSURANCE
OQC: OUTGOING QUALITY CONTROL