



SHIHLIN ELECTRIC
士林電機

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2016.01 版

Power Capacitors / Series Reactor

進相電容器 / 串聯電抗器



INTEGRATION OF POWER SYSTEM



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一、高壓電容器 (油式) High voltage power capacitors (Oil type)

規範

設置處所	屋內外兼用
依據標準	CNS 1372、3739，JIS C4902，IEC 60871-1，GB T11024-2010
周圍溫度	- 20°C ~ + 40°C (24小時平均30°C以下，年平均溫度20°C以下)
最高使用電壓	額定電壓之110%以下 (24小時期間，容許8小時內)
最大使用電流	額定電壓之135%以下 (含高諧波，製造裕度)
容量誤差	額定值之-5% ~ + 10% (相間誤差在3%以內)
損失	20°C時在0.1%以下
溫升	周溫低於40°C時，溫升25°C以下
密閉性	80±5°C恆溫槽中4小時加熱，電容器外表無漏油現象
放電性	內裝放電電阻，電容器於切離電源後五分鐘其殘留電壓降50V以下
安全性	內部每一小單元電容器皆有個別熔絲保護，安全性極佳
油浸式	絕緣油為非多氯聯苯(Non-PCB)
外殼	採SUS 430不銹鋼

Specifications

Installation Location	Indoor and outdoor
Standards	CNS 1372 and 3739, JIS C4902, IEC 60871-1, GB T11024-2010
Ambient Temperature	- 20°C ~ + 40°C (24-hr average: lower than 30°C, annual average: lower than 20°C)
Max. Working Voltage	Within 110% rated voltage (8hr in every 24hrs)
Max. Working Current	Within 135% rated current (including high harmonics and manufacturing tolerances)
Capacity Tolerance	- 5% ~ + 10% of rated value (within 3% phase-to-phase tolerances)
Loss	Less than 0.1% at 20°C
Temperature Rise	Lower than 25°C when the ambient temperature is lower than 40°C
Sealing	No trace of oil leaking outside of capacitor case after heating in constant temperature tank at 80±5°C for 4 hrs
Discharge	With built-in discharge resistor, residual voltage drops to lower than 50V after capacitor is disconnected for 5 minutes
Safety	Excellent, due to individual fuse protection for every single unit inside the capacitor.
Oil type	Non-PCB
Case	SUS 430

內附熔絲型與標準型比較表

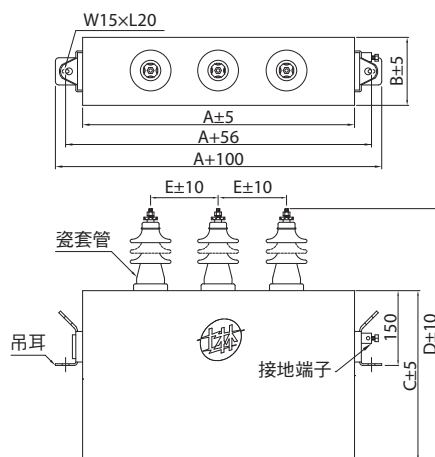
項目	內附熔絲型	標準型
安裝尺寸空間	小	較大
小單元動作後繼續使用性	佳	視情況
無功電力損失性	低	普通
不平衡保護性	佳	普通
熔絲保護性	佳	普通
外殼爆裂性	低	普通
熔絲誤動作可能性	低	普通
外附熔絲	免	必需
顏色	沙色	灰色

Internal comparison table of fuse type and standard type capacitors

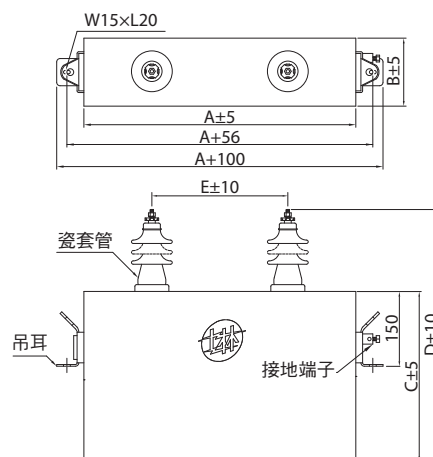
Item	Internal Fuse Type	Standard Type
Installation space	Small	Larger
Continuous usability after triggering	Excellent	Varies with different conditions
Reactive power loss	Low	Average
Imbalance protectivity	Good	Average
Fuse protectivity	Good	Average
Case breakdown possibility	Low	Average
Fuse misoperation possibility	Low	Average
External Fuse	No	Yes
Color	sand	gray

(1) 內附熔絲型 Internal fuse type

外形尺寸 Outline dimensions



圖A Fig.A



圖B Fig.B

3Ø, 60Hz, 3.8kV 內附熔絲型 (適用於系統電壓3.3kV)

3Ø, 60Hz, 3.8kV Internal fuse type (For 3.3kV system voltage)

型號 Type	容量 Capacity (kVAr)	電流 Current (A)	尺寸 Dimensions (mm)					圖別 Fig.	概重 Weight (kg)
			A	B	C	D	E		
SPF-03806100T	100	15.2	430	130	300	470	150	A	27
SPF-03806150T	150	22.8	430	130	450	620	150	A	38
SPF-03806200T	200	30.4	530	130	450	620	200	A	46
SPF-03806250T	250	38.0	530	150	450	620	200	A	52
SPF-03806300T	300	45.6	630	150	450	620	250	A	61

3Ø, 60Hz, 4.8kV 內附熔絲型 (適用於系統電壓4.16kV)

3Ø, 60Hz, 4.8kV Internal fuse type (For 4.16kV system voltage)

型號 Type	容量 Capacity (kVAr)	電流 Current (A)	尺寸 Dimensions (mm)					圖別 Fig.	概量 Weight (kg)
			A	B	C	D	E		
SPF-04806100T	100	12.0	430	130	300	470	150	A	27
SPF-04806150T	150	18.0	430	130	450	620	150	A	38
SPF-04806200T	200	24.1	530	130	450	620	200	A	46
SPF-04806250T	250	30.1	530	170	450	620	200	A	57
SPF-04806300T	300	36.1	630	170	450	620	250	A	67

3Ø, 60Hz, 7.6kV 內附熔絲型 (適用於系統電壓6.6kV)

3Ø, 60Hz, 7.6kV Internal fuse type (For 6.6kV system voltage)

型號 Type	容量 Capacity (kVAr)	電流 Current (A)	尺寸 Dimensions (mm)					圖別 Fig.	概重 Weight (kg)
			A	B	C	D	E		
SPF-07606100T	100	7.6	430	130	300	536	150	A	29
SPF-07606150T	150	11.4	430	130	450	636	150	A	40
SPF-07606200T	200	15.2	530	130	450	636	200	A	48
SPF-07606250T	250	19.0	530	150	450	636	200	A	54
SPF-07606300T	300	22.8	630	150	450	636	250	A	63



3Ø, 60Hz, 12.8kV 內附熔絲型 (適用於系統電壓11.4kV)

3Ø, 60Hz, 12.8kV Internal fuse type (For 11.4kV system voltage)

型號 Type	容量 Capacity (kVAr)	電流 Current (A)	尺寸 Dimensions (mm)					圖別 Fig.	概重 Weight (kg)
			A	B	C	D	E		
SPF-12806100T	100	4.5	430	130	300	536	150	A	29
SPF-12806150T	150	6.8	430	130	450	686	150	A	40
SPF-12806200T	200	9.0	530	130	450	686	200	A	48
SPF-12806250T	250	11.3	530	170	450	686	200	A	60
SPF-12806300T	300	13.5	630	150	450	686	250	A	63

1Ø, 60Hz, 14.7kV 內附熔絲型 (適用於系統電壓22.8kV)

1Ø, 60Hz, 14.7kV Internal fuse type (For 22.8kV system voltage)

型號 Type	容量 Capacity (kVAr)	電流 Current (A)	尺寸 Dimensions (mm)					圖別 Fig.	概重 Weight (kg)
			A	B	C	D	E		
SPF-14706100S	100	6.8	340	110	450	731	200	B	29
SPF-14706150S	150	10.2	340	150	450	731	200	B	37
SPF-14706200S	200	13.6	430	150	450	731	200	B	45
SPF-14706250S	250	17.0	530	170	450	731	200	B	59
SPF-14706300S	300	20.4	630	170	450	731	300	B	69

3Ø, 60Hz, 25.4kV 內附熔絲型 (適用於系統電壓22.8kV)

3Ø, 60Hz, 25.4kV Internal fuse type (For 22.8kV system voltage)

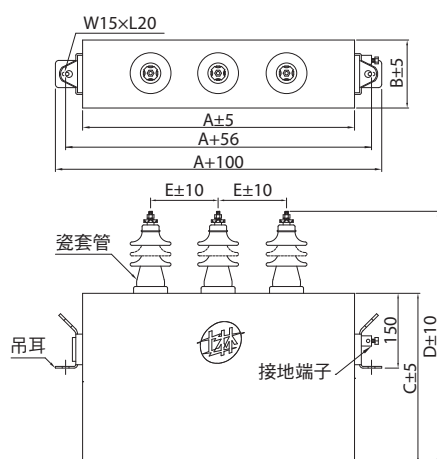
型號 Type	容量 Capacity (kVAr)	電流 Current (A)	尺寸 Dimensions (mm)					圖別 Fig.	概重 Weight (kg)
			A	B	C	D	E		
SPF-25406100T	100	2.3	630	110	300	581	250	A	36
SPF-25406150T	150	3.4	630	150	300	581	250	A	46
SPF-25406200T	200	4.6	630	130	450	731	250	A	57
SPF-25406250T	250	5.7	630	150	450	731	250	A	64
SPF-25406300T	300	6.8	630	170	450	731	250	A	71

#1. 其他電壓、容量之規格，歡迎洽詢訂購。

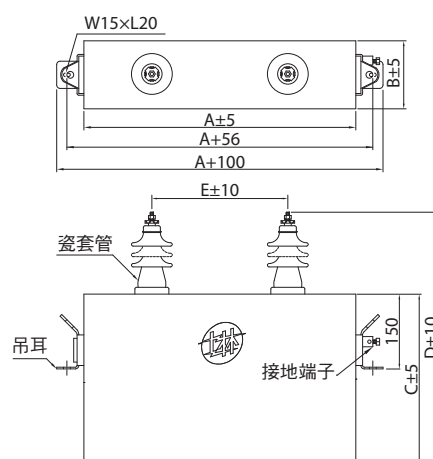
#1. Please contact Shihlin Electric for special specifications.

(2) 標準型(無內附熔絲) Standard type (non-internal fuse)

外形尺寸 Outline dimensions



圖A Fig.A



圖B Fig.B

3Ø, 60Hz, 3.8kV 標準型 (適用於系統電壓3.3kV)

3Ø, 60Hz, 3.8kV Standard type (For 3.3kV system voltage)

型號 Type	額定電壓 Rated Voltage (V)	容量 Capacity (kVar)	電流 Current (A)	尺寸 Dimensions (mm)					圖別 Fig.	概重 weight (kg)
				A	B	C	D	E		
SPO-03806100T	3800	100	15.2	430	130	300	470	150	A	26
SPO-03806150T		150	22.8	430	130	450	620	150	A	37
SPO-03806200T		200	30.4	530	130	450	620	200	A	48
SPO-03806250T		250	38.0	530	150	450	620	200	A	55
SPO-03806300T		300	45.6	630	150	450	620	250	A	63

3Ø, 60Hz, 4.8kV 標準型 (適用於系統電壓4.16kV)

3Ø, 60Hz, 4.8kV Standard type (For 4.16kV system voltage)

型號 Type	額定電壓 Rated Voltage (V)	容量 Capacity (kVar)	電流 Current (A)	尺寸 Dimensions (mm)					圖別 Fig.	概重 weight (kg)
				A	B	C	D	E		
SPO-04806100T	4800	100	12.0	430	130	300	470	150	A	26
SPO-04806150T		150	18.0	430	130	450	620	150	A	37
SPO-04806200T		200	24.1	530	130	450	620	200	A	48
SPO-04806250T		250	30.1	530	150	450	620	200	A	55
SPO-04806300T		300	36.1	630	150	450	620	250	A	63

3Ø, 60Hz, 7.6kV 標準型 (適用於系統電壓6.6kV)**3Ø, 60Hz, 7.6kV Standard type (For 6.6kV system voltage)**

型號 Type	額定電壓 Rated Voltage (V)	容量 Capacity (kVAr)	電流 Current (A)	尺寸 Dimensions (mm)					圖別 Fig.	概重 weight (kg)
				A	B	C	D	E		
SPO-07606100T	7600	100	7.6	430	130	300	536	150	A	29
SPO-07606150T		150	11.4	430	130	450	686	150	A	39
SPO-07606200T		200	15.2	530	130	450	686	200	A	47
SPO-07606250T		250	19.0	530	150	450	686	200	A	53
SPO-07606300T		300	22.8	630	150	450	686	250	A	62

3Ø, 60Hz, 12.8kV 標準型 (適用於系統電壓11.4kV)**3Ø, 60Hz, 12.8kV Standard type (For 11.4kV system voltage)**

型號 Type	額定電壓 Rated Voltage (V)	容量 Capacity (kVAr)	電流 Current (A)	尺寸 Dimensions (mm)					圖別 Fig.	概重 weight (kg)
				A	B	C	D	E		
SPO-12806100T	12800	100	4.5	430	130	300	536	150	A	28
SPO-12806150T		150	6.8	430	130	450	686	150	A	39
SPO-12806200T		200	9.0	530	130	450	686	200	A	50
SPO-12806250T		250	11.3	530	150	450	686	200	A	57
SPO-12806300T		300	13.5	630	150	450	686	250	A	65

1Ø, 60Hz, 14.7kV 標準型 (適用於系統電壓22.8kV)**1Ø, 60Hz, 14.7kV Standard type (For 22.8kV system voltage)**

型號 Type	額定電壓 Rated Voltage (V)	容量 Capacity (kVAr)	電流 Current (A)	尺寸 Dimensions (mm)					圖別 Fig.	概重 weight (kg)
				A	B	C	D	E		
SPO-14706100S	14700	100	6.8	340	110	450	731	200	B	29
SPO-14706150S		150	10.2	340	150	450	731	200	B	40
SPO-14706200S		200	13.6	430	150	450	731	200	B	48
SPO-14706250S		250	17.0	530	150	450	731	200	B	55
SPO-14706300S		300	20.4	630	150	450	731	300	B	65

3Ø, 60Hz, 25.4kV 標準型 (適用於系統電壓22.8kV)**3Ø, 60Hz, 25.4kV Standard type (For 22.8kV system voltage)**

型號 Type	額定電壓 Rated Voltage (V)	容量 Capacity (kVAr)	電流 Current (A)	尺寸 Dimensions (mm)					圖別 Fig.	概重 weight (kg)
				A	B	C	D	E		
SPO-25406100T	25400	100	2.3	630	150	210	491	250	A	32
SPO-25406150T		150	3.4	630	130	300	581	250	A	42
SPO-25406200T		200	4.6	630	170	300	581	250	A	50
SPO-25406250T		250	5.7	630	130	450	731	250	A	62
SPO-25406300T		300	6.8	630	150	450	731	250	A	67

二、低壓電容器 Low voltage power capacitors

規範

- 依據標準：IEC 60831-1、GB 12747-91、JIS 4901、CNS 1179, 3738、UL 810 等標準。
- 使用條件：屋內用，工作環境溫度-25°C~45°C(24小時平均溫度小於35°C，一年平均溫度不得超出25°C) 濕度95%海拔2000米以下。
- 額定頻率：50/60Hz。
- 容量允差：-5~+15%（各相間誤差在±3%以內）。
- 耐電壓：極間2.15倍額定電壓10秒鐘，極殼間3kV10秒鐘。
- 介質損失：0.2W/kVAr以下。
- 最高使用電壓：額定電壓之110%以下(24小時期間，容許8小時內)。
- 最大使用電流：額定電流之130%以內。
- 保護等級：IP42。
- 自放電特性：內裝放電電阻，電容器切離電源1分鐘後，殘留電壓降至50V以下。

Specifications

- Standard: IEC 60831-1、GB 12747-91、JIS 4901、CNS 1179, 3738、UL 810.
- Location: indoor, ambient temperature -25°C~+45°C(24hr average lower than 35°C, annual average lower than 25°C), humidity≤95%, below 2000m altitude.
- Frequency: 50/60Hz
- Capacity tolerances: -5%~+15% (phase to phase tolerance within ±3%)
- Dielectric Strength: 2.15×VAC, Term-Term (10sec), 10kV Term-Case (10sec)
- Medium loss: <0.2W/kVAr
- Max. voltage: no more than 110% of rated voltage (8hr in every 24hr)
- Max. current: no more than 130% of rated current
- Protection level: IP42
- Discharging characteristics: with built-in discharge resistor, residual terminal voltage drops to below 50V within 1 minute after being disconnected.

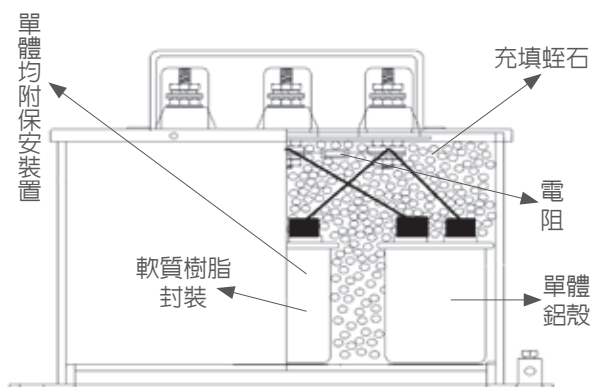
特點

- 採用耐電壓高及誘電性良好之金屬化塑膠膜(MPP)為介質，具有絕緣自復機能。
- 內部單體為鋁殼封裝，可直接將熱源傳導出去，溫升極低。
- 符合CNS、JIS、IEC等標準，內部個體電容器均附裝保護裝置（UL檢驗合格，E105535）；當線路或個體電容器發生異常時，該保護裝置將會立即動作，自動切離電源，以防止二次災害的發生。
- 電容器內裝單體均以壓力式保安裝置及填充軟質樹脂來雙重保護，連結單體時採用UL等級105°C導線連接，外殼採用高強度鋼板構成，且利用難燃性及可壓縮性蛭石，作為防火及防爆的保護。
- 電容器均附裝放電電阻，可確保用電及維護保養之安全。

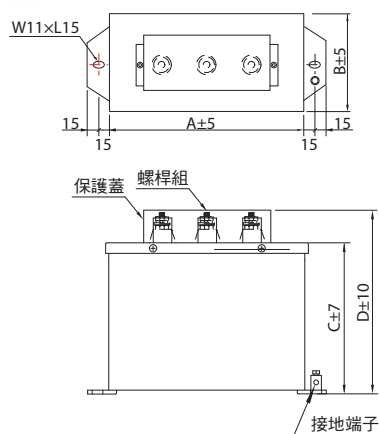
Characteristics

- The capacitor is made with self-healing high-voltage endurance and excellent dielectric metallized polypropylene film.
- Inside each capacitor unit is an aluminum sealed case that could transduce the heat rapidly and reach low temperature rise.
- The capacitor meets CNS、JIS and IEC standards. Every capacitor has an internal safety device (UL approved, E105535); this device cuts off power automatically and prevent further hazards when the capacitor malfunctions.
- The internal unit has adopted pressure protection device and epoxy resin for double protection. The capacitor adopts UL certified wire in terminal connections, vermiculite for refractory insulation. High tension steel case, filled with.
- Capacitors come with discharge resistors to ensure safe usage and maintenance.

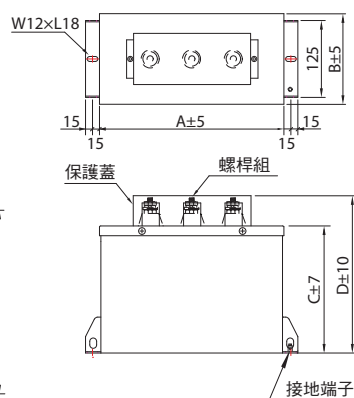
(1) 乾式KS防爆型 Dry explosion-proof KS type



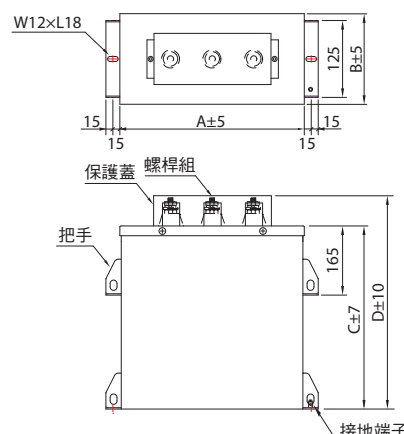
外形尺寸 Outline dimensions



圖A Fig. A



圖B Fig. B



圖C Fig. C

3Ø, 60Hz, 280V KS防爆型 (適用於系統電壓220V) 3Ø, 60Hz, 280V KS type (For 220V system voltage)

型號 Type	容量 Capacity (kVAr)	電流 Current (A)	尺寸 Dimensions (mm)				圖別 Fig	概重 Weight (kg)
			A	B	C	D		
SH-S280610T	10	20.6	200	75	250	324	A	3.5
SH-S280620T	20	41.2	230	130	250	324	B	5.5
SH-S280630T	30	61.9	230	185	250	324	B	7.2
SH-S280640T	40	82.5	300	185	250	324	B	9.0
SH-S280650T	50	103.1	300	240	250	324	B	11.5
SH-L280660T	60	123.7	350	140	470	544	C	14.5
SH-L280670T	70	144.3	420	140	470	544	C	18.0
SH-L280680T	80	165.0	420	140	470	544	C	19.0

(2) KH耐諧波防爆型 Dry withstand-harmonic KH type

近年來由於工業電子迅速發展及普遍應用，其中諧波的存在開始影響系統的運轉及設備的安全，因此對於諧波之存在不能再視而不見。

The rapid development and applications of the electronic industries had deteriorated the electrical quality in recent years. The impacts of harmonics to system operation and equipment safety had been observed. Harmonic had become a non-ignorable factor to system safety and operation.

電力品質之低落，電容器為最大之受害者，時常有意想不到的事故。因此使用電容器不得不比過去更為慎重，且須留意其使用環境和規格之選擇。因此，士林特別針對客戶需求推出『耐諧波型電容器』來維持系統安全的運轉及避免災害的發生。

此產品有以下三點特性：

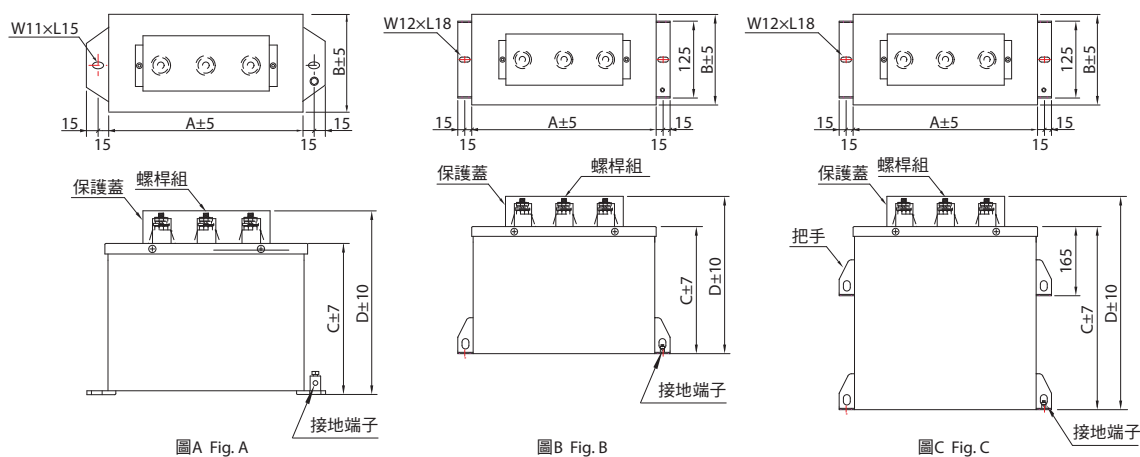
1. 保護電力裝置以免受損
2. 在不良的供電狀況下維持電力系統正常運作
3. 避免相關損壞

The deterioration of power quality has caused unpredictable accidents from time to time so the capacitor has become the biggest collateral damage. Therefore the choice of using applicable has become more important than ever. Hence, Shihlin introduces withstand harmonic capacitors that meet customer's needs and ensure a safer system operation.

The features are:

1. Protect the electronics from being damaged by harmonics.
2. Keep the electrical system running normally in poor power quality.
3. Avoid relative damage.

外形尺寸 Outline dimensions

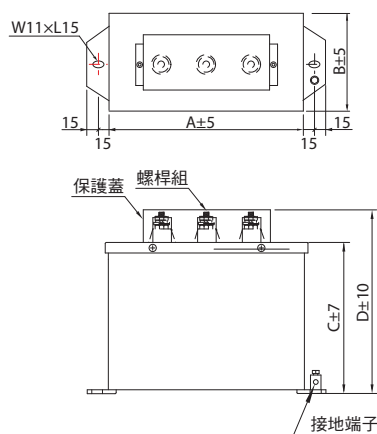


3Ø, 60Hz, 220V KH耐諧波防爆型 (適用於系統電壓220V)

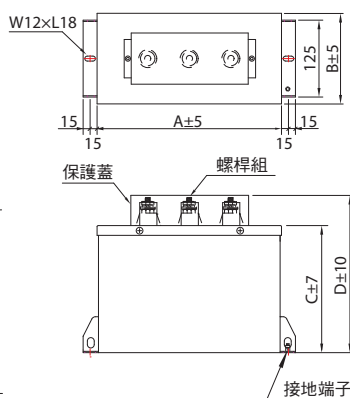
3Ø, 60Hz, 220V KH type (For 220V system voltage)

型號 Type	容量 Capacity (kVAr)	電流 Current (A)	尺寸 Dimensions (mm)				圖別 Fig	概重 Weight (kg)
			A	B	C	D		
SH-H220610T	10	26.2	230	130	250	324	B	5.5
SH-H220620T	20	52.5	300	185	250	324	B	9.0
SH-H220630T	30	78.7	300	240	250	324	B	11.5
SH-H220640T	40	105.0	420	140	470	544	C	18.0
SH-H220650T	50	131.2	420	140	470	544	C	19.0

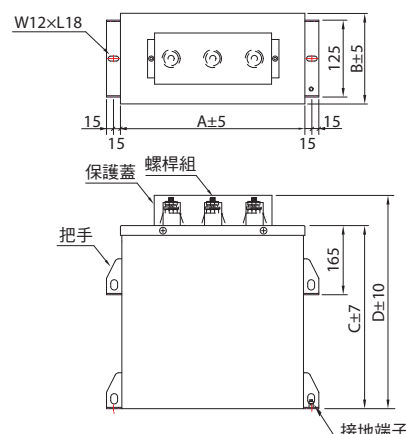
外形尺寸 Outline dimensions



圖A Fig. A



圖B Fig. B



圖C Fig. C

3Ø, 60Hz, 380V KH耐諧波防爆型 (適用於系統電壓380V)**3Ø, 60Hz, 380V KH type (For 380V system voltage)**

型號 Type	容量 Capacity (kVar)	電流 Current (A)	尺寸 Dimensions (mm)				圖別 Fig	概重 Weight (kg)
			A	B	C	D		
SH-H380610T	10	15.2	200	75	250	324	A	3.5
SH-H380620T	20	30.4	230	130	250	324	B	5.5
SH-H380630T	30	45.6	230	185	250	324	B	7.2
SH-H380640T	40	60.8	300	185	250	324	B	9.0
SH-H380650T	50	76.0	300	240	250	324	B	11.5
SH-H380660T	60	91.2	420	140	470	544	C	18.0
SH-H380670T	70	106.4	420	140	470	544	C	18.0
SH-H380680T	80	121.6	420	140	470	544	C	19.0

3Ø, 60Hz, 440V KH耐諧波防爆型 (適用於系統電壓440V)**3Ø, 60Hz, 440V KH type (For 440V system voltage)**

型號 Type	容量 Capacity (kVar)	電流 Current (A)	尺寸 Dimensions (mm)				圖別 Fig	概重 Weight (kg)
			A	B	C	D		
SH-H440610T	10	13.1	200	75	250	324	A	3.5
SH-H440620T	20	26.2	230	130	250	324	B	5.5
SH-H440630T	30	39.4	230	185	250	324	B	7.2
SH-H440640T	40	52.5	300	185	250	324	B	9.0
SH-H440650T	50	65.6	300	240	250	324	B	11.5
SH-H440660T	60	78.7	350	140	470	544	C	14.5
SH-H440670T	70	91.9	420	140	470	544	C	18.0
SH-H440680T	80	105.0	420	140	470	544	C	19.0

3Ø, 60Hz, 480V KH耐諧波防爆型 (適用於系統電壓460/480V)**3Ø, 60Hz, 480V KH type (For 460/480V system voltage)**

型號 Type	容量 Capacity (kVar)	電流 Current (A)	尺寸 Dimensions (mm)				圖別 Fig	概重 Weight (kg)
			A	B	C	D		
SH-H480610T	10	12.0	230	130	250	324	B	5.5
SH-H480620T	20	24.1	230	185	250	324	B	7.2
SH-H480630T	30	36.1	300	185	250	324	B	9.0
SH-H480640T	40	48.1	300	240	250	324	B	11.5
SH-H480650T	50	60.1	350	140	470	544	B	14.5
SH-H480660T	60	72.2	420	140	470	544	C	18.0
SH-H480670T	70	84.2	420	140	470	544	C	19.0

#1. 使用自動功率調整器APFR控制及系統電流諧波含量高時請務必串聯電抗器來使用，電容器額定電壓建議選用系統電壓之1.25倍以上。

#2. 其他特殊電壓、容量之規格，歡迎訂購。

#3. 使用耐諧波電容器若串聯電抗器，須使用耐諧波型電抗器。

#1. Series reactors must be used with APFR control and high harmonic current. Suggested capacitor rated voltage would be 1.25 times above system voltage.

#2. Please contact Shihlin Electric for special specifications.

#3. Using anti-harmonic capacitor series reactor, Be sure using anti-harmonic-type reactors.

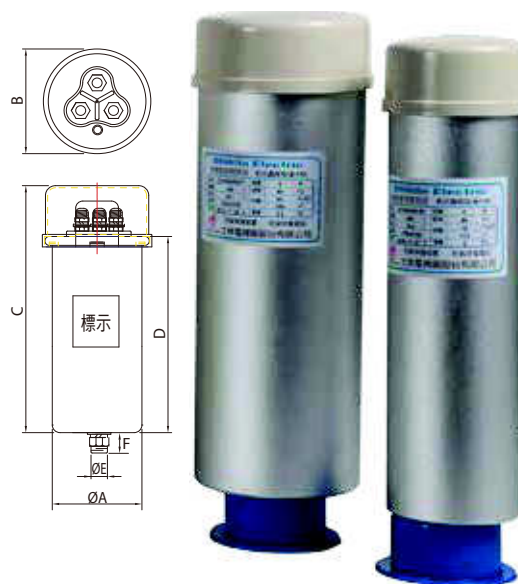
(3) 乾式圓柱型 Dry cylinder type

特點

- 省空間圓柱型電容器
- 電容器為鋁殼封裝，內部介質與外層鋁殼接觸，可直接將熱源傳導出去，溫昇低。
- 電容器均附裝放電電阻，可確保用電及維護保養之安全。
- 本公司所生產電容器，填充通過UL認證之難燃性軟質樹脂，可避免侵蝕及污染環境，為士林特有之綠色產品。

Characteristics

- Space efficient cylinder type.
- The capacitor is sealed in an aluminium shell. The inner medium touches the outer aluminium case, which provides good heat dissipation, slow temperature rise and long life span.
- The capacitor is equipped with discharge resistors to ensure the safety of usage and maintenance.
- This is a special Shihlin eco-friendly product, filled with UL certified flame resistant resin to prevent corrosion and containment.



外形尺寸 Outline dimensions

3Ø, 60Hz, 280V KR圓柱型 (適用於系統電壓220V)

3Ø, 60Hz, 280V KR type (For 220V system voltage)

型號 Type	容量 Capacity (kVAr)	電流 Current (A)	引出 接線 端子	尺寸 Dimensions (mm)						概重 Weight (kg)
				A	B	C	D	E	F	
SH-R280605T	5	10.3	M6	70	74	318	280	12	15	1.2
SH-R280610T	10	20.6	M6	70	74	318	280	12	15	1.2
SH-R280615T	15	30.9	M8	86	90	328	290	12	19	1.6
SH-R280620T	20	41.2	M8	116	120	335	290	16	25	3.3

3Ø, 60Hz, 480V KR圓柱型 (適用於系統電壓380V)

3Ø, 60Hz, 480V KR type (For 380V system voltage)

型號 Type	容量 Capacity (kVAr)	電流 Current (A)	引出 接線 端子	尺寸 Dimensions (mm)						概重 Weight (kg)
				A	B	C	D	E	F	
SH-R480605T	5	6.0	M6	70	74	318	280	12	15	1.2
SH-R480610T	10	12.0	M6	70	74	318	280	12	15	1.2
SH-R480615T	15	18.0	M8	86	90	328	290	16	19	1.6
SH-R480620T	20	24.1	M8	116	120	335	290	16	25	3.3
SH-R480625T	25	30.1	M8	116	120	335	290	16	25	3.3
SH-R480630T	30	36.1	M8	116	120	335	290	16	25	3.3

#1. 使用自動功率調整器APFR控制及系統電流諧波含量高時請務必串聯電抗器來使用，電容器額定電壓建議選用系統電壓1.25倍以上。

#2. 其他特殊電壓、容量之規格，歡迎訂購。

#3. 3Ø, 220V 300 μ F →以280V 10K選用(SH-R280610T)。3Ø, 220V 500 μ F →以280V 15K選用(SH-R280615T)。

#1. Series reactors must be used with APFR control and high harmonic current. Suggested capacitor rated voltage would be 1.25 times above system voltage.

#2. Please contact Shihlin Electric for special specifications.

#3. 3Ø, 220V 300 μ F →280V 10K(SH-R280610T)。3Ø, 220V 500 μ F →280V 15K(SH-R280615T)。

(4) SK油浸式 SK Oil immersed type

規範

- 依據規格：CNS 1179、3738、JIS 4901
- 設置處所：屋內/外用
- 周圍溫度： $-25^{\circ}\text{C} \sim 45^{\circ}\text{C}$
- 最高使用電壓：額定電壓之110%以下 (24小時期間，容許8小時內)
- 最大使用電流：額定值之130%以內
- 容量誤差： $-5\% \sim +15\%$ (各相間誤差在 $\pm 3\%$ 以內)
- 介質損失： 0.2W/kVAr 以下
- 溫升：周圍溫度低於 40°C 時，溫升 25°C 以下
- 密閉性： $70^{\circ}\text{C} \pm 3^{\circ}\text{C}$ ，恆溫槽中，2小時加熱在電容器外表無漏油現象
- 放電特性：內裝放電電阻，電容器於切離電源後1分鐘其殘留電壓降至50V以下
- 衝擊電壓試驗(BIL)： 30kV
- 耐電壓：極間2.15倍，10秒；極殼間 10kV ，10秒
- 外觀顏色：沙色(屋內用)；淺灰色(屋內/外共用)

Specifications

- Standard: CNS 1179, 3738 and JIS 4901.
- Location: Indoor or outdoor.
- Ambient temperature: $-25^{\circ}\text{C} \sim 45^{\circ}\text{C}$
- Max. voltage: No more than 110% of rated voltage (8hr in every 24hr)
- Max. current: No more than 130% of rated current
- Capacity tolerances: $-5\% \sim +15\%$ (Phase to phase tolerance within $\pm 3\%$)
- Medium loss: $<0.2\text{W/kVAr}$
- Temperature rise: When the ambient temperature is below 40°C , the temperature rise of the capacitor shall be below 25°C
- Leak test: Oil should be hold for 2hrs when heated to $70^{\circ}\text{C} \pm 3^{\circ}\text{C}$.
- Discharging characteristics: with built-in discharge resistor, residual terminal voltage drops to below 50V within 1minute after being disconnected.
- BIL: 30kV
- Dielectric Strength: $2.15 \times \text{VAC}$, Term-Term (10sec), 10kV Term-Case (10sec).
- Color: sand (Indoor) ; gray (Indoor/Outdoor)

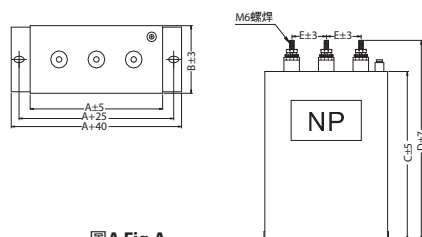
特點

- 體積小重量輕：採用耐壓及誘電性良好之金屬化塑膠薄膜捲製而成，體積小、重量輕搬運安裝極為方便。
- 介質損失小。
- 經濟性：電力使用經費可大幅節省。
- 安全性：內裝保安裝置於電壓異常時電容器內部保安動作，切斷電源可防止二次災害發生。
- 無公害：因所用絕緣油為無公害油(NON-PCB)對環境無污染之現象。
- 外殼採用SUS不鏽鋼
- 套管與外殼連接處以焊錫方式或可防止洩漏之迫緊方式密封，使電容器能永保氣封狀態。

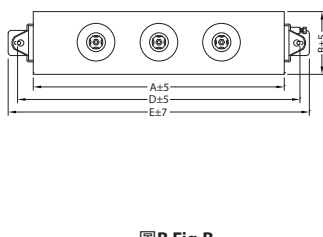
Characteristics

- Compact and light weight: It is made of high voltage endurance and excellent dielectric metallized film.
- Economical: The electricity cost can be reduced to a great scale.
- Safety: An internal protective device is installed and functions when the capacitor is under fault; cuts off power to prevent the further damage.
- Hazard free: An Eco-friendly, Non-PCB, insulation oil is used.
- Stainless Case (SUS430), ceramic bushing.

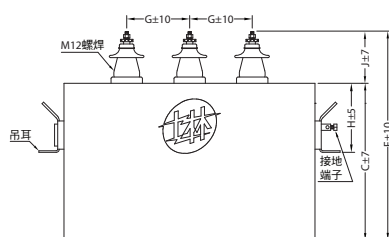
外形尺寸 Outline dimensions



圖A Fig.A
屋內用 Indoor



圖B Fig.B
屋內/外用 Indoor/Outdoor



3Ø, 60Hz, 280V 油浸式 (適用於系統電壓220V)**3Ø, 60Hz, 280V Oil type (For 220V system voltage)**

型號 Type	容量 Capacity (kVA)	電流 Current (A)	尺寸 Dimensions (mm)					概重 Weight (kg)	圖別 (Fig)
			A	B	C	D	E		
SH-OI280605T	5	10.3	140	70	190	225	40	2.9	A
SH-OI280610T	10	20.6	140	70	190	225	40	3.3	A
SH-OI280615T	15	30.9	170	70	320	355	40	5.2	A
SH-OI280620T	20	41.2	170	70	320	355	40	5.2	A
SH-O280610T	10	20.6	300	120	190	313	100	11	B
SH-O280620T	20	41.2	300	120	190	313	100	11	B
SH-O280630T	30	61.9	300	120	190	313	100	11	B
SH-O280640T	40	82.5	300	120	240	363	100	14	B
SH-O280650T	50	103.1	300	120	280	403	100	16	B
SH-O280660T	60	123.7	300	120	280	403	100	16	B
SH-O280670T	70	144.3	300	120	330	453	100	18	B
SH-O280680T	80	165.0	300	120	380	503	100	20	B

3Ø, 60Hz, 480V 油浸式 (適用於系統電壓380V)**3Ø, 60Hz, 480V Oil type (For 380V system voltage)**

型號 Type	容量 Capacity (kVA)	電流 Current (A)	尺寸 Dimensions (mm)					概重 Weight (kg)	圖別 (Fig)
			A	B	C	D	E		
SH-OI480605T	5	6.0	140	70	190	225	40	2.9	A
SH-OI480610T	10	12.0	140	70	190	225	40	2.9	A
SH-OI480615T	15	18.0	170	70	190	225	40	3.3	A
SH-OI480620T	20	24.1	170	70	320	355	40	5.2	A
SH-OI480625T	25	30.1	170	70	320	355	40	5.2	A
SH-OI480630T	30	36.1	170	70	320	355	40	5.2	A
SH-OI480635T	35	42.1	200	70	320	355	40	6.0	A
SH-OI480640T	40	48.1	200	70	320	355	40	6.0	A
SH-O480610T	10	12.0	300	140	190	313	100	12	B
SH-O480620T	20	24.1	300	140	190	313	100	12	B
SH-O480630T	30	36.1	300	140	190	313	100	12	B
SH-O480640T	40	48.1	300	140	190	313	100	12	B
SH-O480650T	50	60.1	300	140	240	363	100	15	B
SH-O480660T	60	72.2	300	140	240	363	100	15	B
SH-O480670T	70	84.2	300	140	240	363	100	15	B
SH-O480680T	80	96.2	300	140	280	403	100	18	B
SH-O480690T	90	108.3	300	140	280	403	100	18	B
SH-O4806100T	100	120.3	300	140	330	453	100	20	B
SH-O4806110T	110	120.3	300	140	330	453	100	20	B
SH-O4806120T	120	144.3	300	140	330	453	100	20	B

3Ø, 60Hz, 600V 油浸式 (適用於系統電壓440/460/480V)**3Ø, 60Hz, 600V Oil type (For 440/460/480V system voltage)**

型號 Type	容量 Capacity (kVA)	電流 Current (A)	尺寸 Dimensions (mm)					概重 Weight (kg)	圖別 (Fig)
			A	B	C	D	E		
SH-OI600605T	5	4.8	140	70	190	225	40	2.9	A
SH-OI600610T	10	9.6	170	70	190	225	40	3.3	A
SH-OI600615T	15	14.4	170	70	320	355	40	5.2	A
SH-OI600620T	20	19.2	170	70	320	355	40	5.2	A
SH-OI600625T	25	24.1	170	70	320	355	40	5.2	A
SH-OI600630T	30	28.9	200	70	320	355	40	6.0	A
SH-OI600635T	35	33.7	200	70	320	355	40	6.0	A
SH-O600610T	10	9.6	300	140	190	313	100	12	B
SH-O600620T	20	19.2	300	140	190	313	100	12	B
SH-O600630T	30	28.9	300	140	190	313	100	12	B
SH-O600640T	40	38.5	300	140	240	363	100	15	B
SH-O600650T	50	48.1	300	140	240	363	100	15	B
SH-O600660T	60	57.7	300	140	280	403	100	18	B
SH-O600670T	70	67.4	300	140	280	403	100	18	B
SH-O600680T	80	77.0	300	140	330	453	100	20	B
SH-O600690T	90	86.6	300	140	330	453	100	20	B
SH-O6006100T	100	96.2	300	140	380	503	100	23	B
SH-O6006110T	110	105.9	300	140	380	503	100	23	B
SH-O6006120T	120	115.5	300	140	430	553	100	26	B

#1. 其他電壓、容量之規格，歡迎洽詢訂購。

#1. Please contact Shihlin Electric for special specifications.

三、乾式串聯電抗器 Dry-type series reactor

串聯電抗器之優點說明

- 可抑制電容器啓閉之高頻突波之衝擊。
- 可抑制電容器切離電源瞬間，再點弧所引起的過電壓。
- 可改變系統阻抗特性，抑制諧波之放大及系統高諧波電壓和電流。
- 電容器組串聯電抗器可以減輕電路或抑制電容器突增之電流用。

Advantages of series reactors

- Suppress high frequency surge caused by capacitor power switching.
- Suppress over-voltage caused by repeated arc at instance of capacitor switch off.
- Change system impedance, suppress harmonic voltage and current.
- It can be connected to series capacitors to reduce or suppress sudden increased current.

規範

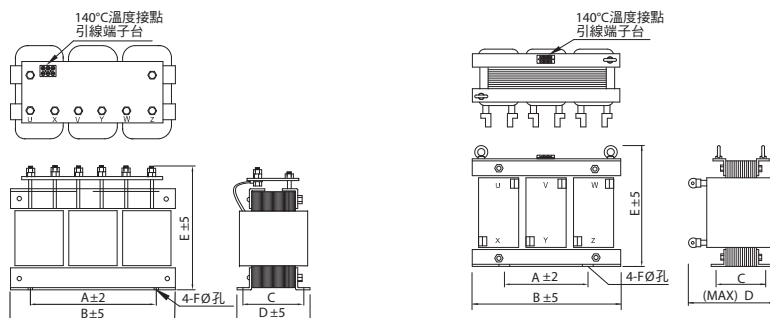
- 依據標準：依JEC-2210(2003)等之規定設計、製造及試驗。
- 使用地區為海拔1000公尺以下，周溫40°C以下，平均周溫在任何24小時內不得超過35°C之場所使用。
- 溫升：連續額定電流135%，線圈溫升不超過120°C。
- 絕緣耐壓：AC 4000V/ 1分鐘(min)。
- 最大容許電流：5th諧波電流含量35%以下，合成電流120%以下。
- 容許瞬間電流：額定電流之25倍2秒。
- 電抗器絕緣等級H級，保護等級IP00。

Specifications

- Standard: JEC-2210(2003)
- Location: below 1000m, ambient temperature below 40°C, average temperature in 24 hours does not exceed 35°C.
- Temperature rise: continuous rated current at 135%, coil temperature below 120°C.
- Dielectric withstand voltage: AC 4000V/ 1min.
- Max. allowable current: 5th harmonic current below 35%, compound current below 120%.
- The max. excessive current for the short periods is 25 time of the rated current in 2 sec.
- Reactor insulation level: Class H. Protection level: IP00.



外形尺寸 Outline dimensions



3Ø, 60Hz, (適用於系統電壓為220V) 3Ø, 60Hz, (For 220V system voltage)

電容器 280VAC (kVar)	電抗器		電流 Current (A)	容量 6% (kVar)	尺寸 Dimensions (mm)						圖別 Fig	概重 Weight (kg)
	型號 Type	額定電壓 (V)			A	B	C	D	E	F		
10	SR6-2860060T	280	20.6	0.6	90	200	85	105	215	8	A	10
20	SR6-2860120T	280	41.2	1.2	90	200	105	125	215	8	A	13
30	SR6-2860180T	280	61.9	1.8	160	250	115	145	250	10	A	19
40	SR6-2860240T	280	82.5	2.4	160	250	135	215	220	10	B	24
50	SR6-2860300T	280	103.1	3.0	180	285	135	215	250	14	B	31
60	SR6-2860360T	280	123.7	3.6	180	285	145	230	250	14	B	34
70	SR6-2860420T	280	144.3	4.2	180	320	140	225	250	14	B	42
80	SR6-2860480T	280	165.0	4.8	180	320	140	225	290	14	B	44

3Ø, 60Hz, (適用於系統電壓為380V) 3Ø, 60Hz, (For 380V system voltage)

電容器 480VAC (kVar)	電抗器		電流 Current (A)	容量 6% (kVar)	尺寸 Dimensions (mm)						圖別 Fig	概重 Weight (kg)
	型號 Type	額定電壓 (V)			A	B	C	D	E	F		
10	SR6-4860060T	480	12.0	0.6	90	200	85	105	215	8	A	10
20	SR6-4860120T	480	24.1	1.2	90	200	105	125	215	8	A	13
30	SR6-4860180T	480	36.1	1.8	160	250	115	145	245	10	A	19
40	SR6-4860240T	480	48.1	2.4	160	250	135	165	250	10	B	24
50	SR6-4860300T	480	60.1	3.0	180	285	135	215	250	14	B	31
60	SR6-4860360T	480	72.2	3.6	180	285	145	225	250	14	B	34
70	SR6-4860420T	480	84.2	4.2	180	320	140	220	290	14	B	42
80	SR6-4860480T	480	96.2	4.8	180	320	140	220	290	14	B	44
90	SR6-4860540T	480	108.3	5.4	180	320	140	230	290	14	B	46
100	SR6-4860600T	480	120.3	6.0	180	320	155	240	290	14	B	50
120	SR6-4860720T	480	144.3	7.2	180	320	155	245	290	14	B	53

3Ø, 60Hz, (適用於系統電壓為440/460/480V) 3Ø, 60Hz, (For 440/460/480V system voltage)

電容器 600VAC (kVar)	電抗器		電流 Current (A)	容量 6% (kVar)	尺寸 Dimensions (mm)						圖別 Fig	概重 Weight (kg)
	型號 Type	額定電壓 (V)			A	B	C	D	E	F		
10	SR6-6060060T	600	9.6	0.6	90	200	85	105	215	8	A	10
20	SR6-6060120T	600	19.2	1.2	90	200	105	125	215	8	A	13
30	SR6-6060180T	600	36.1	1.8	160	250	115	145	245	10	A	19
40	SR6-6060240T	600	48.1	2.4	160	250	135	165	250	10	A	24
50	SR6-6060300T	600	60.1	3.0	180	285	135	170	290	14	A	31
60	SR6-6060360T	600	72.2	3.6	180	285	145	180	290	14	A	34
70	SR6-6060420T	600	84.2	4.2	180	320	140	220	290	14	B	42
80	SR6-6060480T	600	96.2	4.8	180	320	140	220	290	14	B	44
90	SR6-6060540T	600	108.3	5.4	180	320	140	230	290	14	B	46
100	SR6-6060600T	600	120.3	6.0	180	320	155	240	290	14	B	50
120	SR6-6060720T	600	115.5	7.2	180	320	155	245	290	14	B	53

· 其他電壓、容量之規格及串聯7%、8%、13%、14.8%、15%電抗器，歡迎訂購。
· Inquiries are welcomed (different voltages, capacitances of 7%, 8%, 13%, 14.8% & 15% series reactors.)

四、電容器裝置容量 Installed capacities

(1) 計算係數表 Calculation table of coefficients

應用例：

$$\text{改善係數}(K) = \tan(\cos^{-1} \theta_1) - \tan(\cos^{-1} \theta_2)$$

設工廠負荷：1000kW

改善前功因： $\cos \theta_1 = 0.8$

擬改善功因： $\cos \theta_2 = 0.95$

所需電容量 = $1000 \times 0.421 \div 421 \text{ kVar}$ (由下表查得)

Example:

System load of the plant: 1000kW

Power factor before improvement: $\cos \theta_1 = 0.8$

Desired power factor after improvement: $\cos \theta_2 = 0.95$

Capacitance of the capacitor required = $1000 \times 0.421 \div 421 \text{ kVar}$

(Note: 0.421 is obtained from the aforesaid table)

計算係數表 Calculation table of coefficients

改善前功因 Power factor before improvement	擬改善功因 $\cos \theta_2$ Desired power after improvement												
$\cos \theta_1$	0.80	0.85	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	Unity
0.70	0.270	0.400	0.536	0.564	0.591	0.625	0.657	0.691	0.729	0.769	0.817	0.878	1.020
0.71	0.242	0.372	0.508	0.536	0.563	0.597	0.629	0.663	0.701	0.741	0.783	0.850	0.992
0.72	0.214	0.344	0.479	0.507	0.534	0.568	0.600	0.634	0.672	0.712	0.754	0.821	0.963
0.73	0.186	0.316	0.452	0.480	0.507	0.541	0.573	0.607	0.645	0.685	0.727	0.794	0.936
0.74	0.159	0.289	0.425	0.453	0.480	0.514	0.546	0.580	0.618	0.658	0.700	0.767	0.909
0.75	0.132	0.262	0.398	0.426	0.453	0.487	0.519	0.553	0.591	0.631	0.673	0.740	0.882
0.76	0.105	0.235	0.371	0.399	0.429	0.460	0.492	0.526	0.564	0.604	0.652	0.713	0.855
0.77	0.079	0.209	0.345	0.373	0.400	0.434	0.466	0.500	0.538	0.578	0.620	0.687	0.829
0.78	0.053	0.183	0.319	0.347	0.374	0.408	0.440	0.474	0.512	0.552	0.594	0.661	0.803
0.79	0.026	0.156	0.292	0.320	0.347	0.381	0.413	0.447	0.485	0.525	0.567	0.634	0.776
0.80	—	0.130	0.266	0.294	0.321	0.355	0.387	0.421	0.459	0.499	0.547	0.608	0.750
0.81	—	0.104	0.240	0.268	0.295	0.329	0.361	0.395	0.433	0.473	0.515	0.582	0.724
0.82	—	0.078	0.214	0.242	0.269	0.303	0.335	0.369	0.407	0.447	0.489	0.556	0.698
0.83	—	0.052	0.188	0.216	0.243	0.277	0.309	0.343	0.381	0.421	0.463	0.530	0.672
0.84	—	0.026	0.162	0.190	0.217	0.251	0.283	0.317	0.355	0.395	0.437	0.504	0.645
0.85	—	—	0.136	0.164	0.191	0.225	0.257	0.291	0.329	0.369	0.417	0.473	0.620
0.86	—	—	0.109	0.140	0.167	0.198	0.230	0.264	0.301	0.343	0.390	0.450	0.593
0.87	—	—	0.083	0.114	0.141	0.172	0.204	0.238	0.275	0.317	0.364	0.424	0.567
0.88	—	—	0.054	0.085	0.112	0.143	0.175	0.209	0.246	0.288	0.335	0.395	0.538
0.89	—	—	0.028	0.059	0.086	0.117	0.149	0.183	0.230	0.262	0.309	0.369	0.512
0.90	—	—	—	0.031	0.058	0.089	0.121	0.155	0.192	0.234	0.281	0.341	0.484
0.91	—	—	—	—	0.027	0.058	0.090	0.124	0.161	0.203	0.250	0.310	0.453
0.92	—	—	—	—	—	0.031	0.063	0.097	0.134	0.176	0.223	0.283	0.426
0.93	—	—	—	—	—	—	0.032	0.066	0.103	0.145	0.192	0.252	0.395
0.94	—	—	—	—	—	—	—	0.034	0.071	0.113	0.160	0.220	0.363
0.95	—	—	—	—	—	—	—	—	0.037	0.079	0.126	0.186	0.329
0.96	—	—	—	—	—	—	—	—	—	0.042	0.089	0.149	0.292
0.97	—	—	—	—	—	—	—	—	—	—	0.047	0.107	0.250
0.98	—	—	—	—	—	—	—	—	—	—	—	0.060	0.203
0.99	—	—	—	—	—	—	—	—	—	—	—	—	0.143

(2) 電壓提高後其容量變化之計算係數

Calculation coefficients of the capacitances after increasing the voltages.

(A) 高壓電容器 High voltage capacitor						(B) 低壓電容器 Low voltage capacitor			
系統電壓 System Voltage (kV)	電容器擬提升後之額定電壓 (kV) Desired rated voltage for the capacitor (kV)					系統電壓 System Voltage (V)	電容器擬提升後之額定電壓 (V) Desired rated voltage for the capacitor (V)		
	3.8	4.8	7.6	12.8	25.4		280	480	600
3.3	1.326	—	—	—	—	220	1.620	—	—
4.16	—	1.331	—	—	—	380	—	1.596	—
6.6	—	—	1.33	—	—	440	—	—	1.860
11.4	—	—	—	1.261	—	460	—	—	1.701
22.8	—	—	—	—	1.241	480	—	—	1.563

應用例：

設系統電壓380V，所需電容器容量為50kVar，因考量串聯電抗器時及高諧波含量所造成的壓升，電容器額定電壓擬提高至480V時之容量換算式：

所需電容器容量 = 50kVar × 1.596 (由上表查得) = 80kVar (取5的倍數容量)

Example:

Assuming the system voltage is 380V, the required capacitance is 50kVar. Taking into consideration of voltage rise due to series reactor or high harmonics, the actual capacitance would be:

Required capacitor capacitance = 50kVar × 1.596 (obtained from above table) = 80kVar

換算式 Conversion formula:

$$\frac{Q_{\text{原設計}}}{Q_{\text{提升後}}} = \left(\frac{V_{\text{原設計}}}{V_{\text{提升後}}} \right)^2 \Rightarrow Q_{\text{提升後}} = Q_{\text{原設計}} \times \left(\frac{V_{\text{提升後}}}{V_{\text{原設計}}} \right)^2$$

$$\Rightarrow Q_{@480V} = 50 \times \left(\frac{480}{380} \right)^2 = 80 \text{ kVar}$$

$$\frac{Q_{\text{original}}}{Q_{\text{desired}}} = \left(\frac{V_{\text{original}}}{V_{\text{desired}}} \right)^2 \Rightarrow Q_{\text{desired}} = Q_{\text{original}} \times \left(\frac{V_{\text{desired}}}{V_{\text{original}}} \right)^2$$

$$\Rightarrow Q_{@480V} = 50 \times \left(\frac{480}{380} \right)^2 = 80 \text{ kVar}$$

(3) 訂貨需知 Ordering information

1. 供電系統電壓、諧波狀況、負擔特性及單線圖。

2. 串聯電抗器、阻抗%、型號。範例：280V, 1.2kVar, 6% → SR6-2860120T

1 2 3 4 5
阻抗% 電壓 頻率 容量 三相

3. 電容器規格 → Ø、Hz、V、Q、型號。範例：280V, 20kVar, KS → SH-S280620T

1 2 3 4 5
KS型式 電壓 頻率 容量 三相

4. 確認新設 → 必要時協同技術單位會同檢測服務。

5. 汰換SC → 協同技術單位確認SC/SR匹配問題。

1. Power system voltage, harmonic situation, the burden of characteristics and line diagram.

2. Series reactor impedance%, type. Ex: 280V, 1.2kVar, 6% → SR6-2860120T

Impedance% 1 1 2 3 5-Phase
Voltage (V) Frequency (Hz) Capacity (kVar)

3. Capacitor specification → Ø, Hz, V, Q, type. Ex: 280V, 20kVar, KS → SH-S280620T

KS type 1 2 3 4 5-Phase
Voltage (V) Frequency (Hz) Capacity (kVar)

4. Confirm new → testing services units, together with collaborative technology.

5. Confirm replacement when necessary → capacitor matching series reactor question, together with collaborative technology.