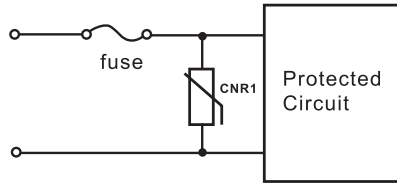


Application Notes 元件的應用注意事項

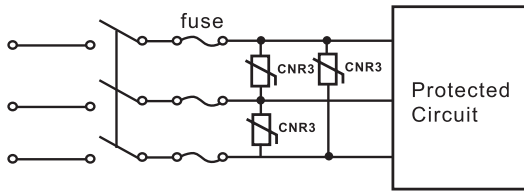
1. Power line protection 電力線的保護

Line to Line Protection Connections

DC/ AC single phase 交/直流單相



AC three phases 交流三相



Notes:

1. Maximum operating voltage shall be lower than Maximum allowable voltage of CNR at any time. 選用時相間最大連續工作電壓必須小於壓敏電阻額定的最大容許電壓值。
2. CNRs with * are recommended for single phase, 3 wire applications to withstand a temporary over voltage caused by unbalance load. 為防止單相三線式應用, 因不平衡負載引起之暫態過電壓, 建議採用上述選用參考表上打*之型號的壓敏電阻。

Selection of Ratings and Varistor Voltage

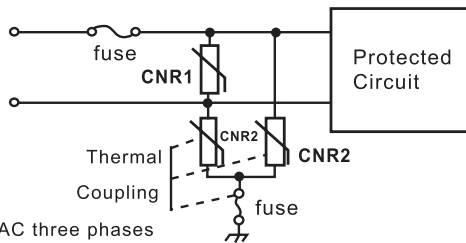
Line to Line 相間選用參考表

Symbol	Line Voltage	Part Number
CNR 1	DC 12 V	CNR-□□D220K
	DC 24 V	CNR-□□D390K
	AC 100 V	CNR-□□D201K, CNR-□□D221K CNR-□□D241K*, CNR-□□D271K*
	AC 120 V	CNR-□□D241K, CNR-□□D271K*
	AC 127 V	CNR-□□D271K
	AC 200 V	CNR-□□D391K, CNR-□□D431K CNR-□□D471K
CNR 3	AC 240 V	CNR-□□D431K, CNR-□□D471K* CNR-□□D511K
	AC 265 V	CNR-□□D511K
	AC 380 V	CNR-□□D821K
	AC415 V	CNR-□□D911K
	AC 460 V	CNR-□□D112K
	AC 480 V	CNR-□□D112K

Line to Line and Line to Ground Voltage

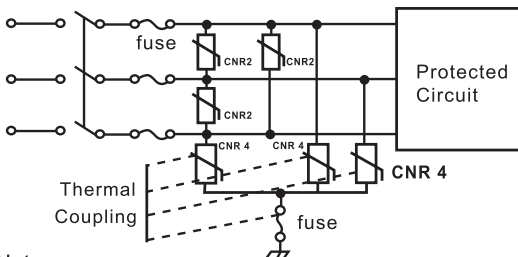
Protection Connection 相間及相-地間保護連接方式

DC / AC single phase 交/直流單相



AC three phases

交直流三相



Notes:

1. When the 500 V insulation resistance test of the circuits employing CNRs is conducted, CNR shall be remove after getting approval from the customer, or CNR ** with the Maximum Allowable Voltage exceeding to test voltage shall be used. 若壓敏電阻已經連接於電路上客戶做完500V 絕緣電阻測試後, 應將壓敏電阻移除或採用上述選用參考表上打**之型號的壓敏電阻。
2. When the 1000 V withstanding voltage test of the circuits employing CNRs is conducted, CNR shall be removed after getting approval from the customer according to the relevant regulations, or CNR *** with the Maximum allowable exceeding to the test Voltage shall be used. 若壓敏電阻已經連接於電路上客戶做完1000V 耐壓測試後, 應將壓敏電阻移除或採用上述選用參考表上打***之型號的壓敏電阻。
3. To avoid CNR failure caused by the ground fault, CNR with higher Varistor Voltage listed in the table shall be used for the AC 120 V line to ground application. 為避免因接地失效導致壓敏電阻損壞, 於AC120V相-地間應用時, 應選擇突波吸收器動作電壓較高之壓敏電阻。

Selection of Ratings and Varistor

Line to Ground 相-地間選用參考表

Symbol	Line Voltage	Part Number
CNR 2	AC 100 V to AC 220 V	CNR-□□D431K, CNR-□□D471K CNR-□□D431K, CNR-□□D471K or CNR-□□D751K ** or higher Varistor Voltage
	AC 240 V	or CNR-□□D182K ***
CNR 4	AC 240 V	CNR-□□D431K CNR-□□D471K or CNR-□□D751K ** or higher Varistor Voltage or CNR-□□D182K ***

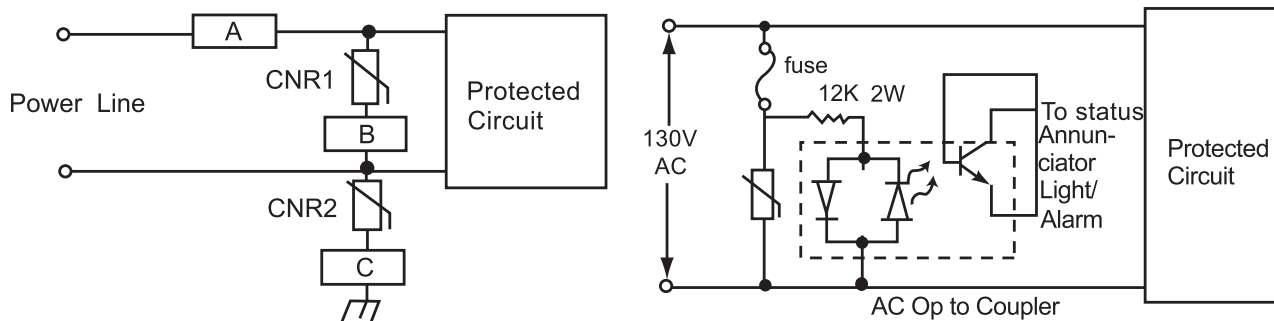
Application examples 應用範例

Protected circuit	Location	Part Number
Home Appliances	Indoor	CNR-05D□□□K CNR-07D□□□K CNR-10D□□□K
	Outdoor	CNR-10D□□□K CNR-14D□□□K CNR-20D□□□K
Consumer industrial	Indoor, Outdoor	CNR-14D□□□K CNR-20D□□□K

Protected circuit	Location	Part Number
Communications Measurements Controls	Indoor	CNR-07D□□□K CNR-10D□□□K CNR-14D□□□K
	Outdoor	CNR-10D□□□K CNR-14D□□□K CNR-20D□□□K

CAUTION :

1. A surge excess of the specified Maximum Peak Current may Cause short circuit or mechanical damage. The following measures are recommended. 當雷擊產生時引起之雷電流超過壓敏電阻最大可承受峰值電流時,可能造成壓敏電阻產生短路或機械性損壞,可用下述右圖範例電路作為損壞之偵測。



- 1) Location of the over current protector (circuit breaker or current fuse) shall be in the power line to the circuit (Location A) or in series with CNR (Location B). 過電流保護器(斷路器或電流保險絲)應使於電力線上(位置A)或與壓敏電阻串聯一起使用(上述左圖B之位置)。

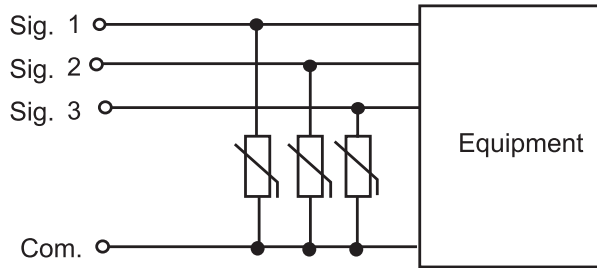
Part Number	CNR-05D□□□K	CNR-07D□□□K	CNR-10D□□□K	CNR-14D□□□K	CNR-20D□□□K
Fuse rating	1 to 2 A	2 to 3 A	3 to 5 A	3 to 10 A	3 to 15 A

- 2) It is recommended that a fuse listed in the table shall be put in location A or B. 建議於上述左圖位置A或B 的位置,如上表所列之電流值依型號裝上保險絲。
- 3) In case that CNR is used in line to ground, the ground fault circuit interrupter shall be applied in locate A or thermally coupled fuse shall be applied in location C. 壓敏電阻於相-地間應用時,應於上述位置A裝上接地失效之斷路器或於位置C裝上溫度保險絲。
- 4) CNR shall not be used near the flammable materials. 壓敏電阻不應裝在易燃物附近。

2. When CNR is molded at en-user, molding resin materials shall be carefully selected , otherwise CNR' s long term stability could degrade. 當使用者欲將壓敏電阻包套時,應慎選包套材質,否則壓敏電阻常態穩定性會衰減。
3. CNR shall not be used near heat generating device and free from direct sunlight. CNR shall be used With in the specified Operating Temperature Range. 壓敏電阻應避免使用於在發熱元件附近及曝露於陽光下,且應用於規定的溫度範圍內。
4. CNR shall be free from dust, metal powder, dew and sea wind. A protective box is recommended to prevent the unit from those. 壓敏電阻應遠離灰塵、金屬粉末、露水、海水環境,建議放在保護盒內預防前述物質之影響。

2. Signal line and telephone line surge protection 信號線路與電話線路雷擊保護

Signal Line 信號線

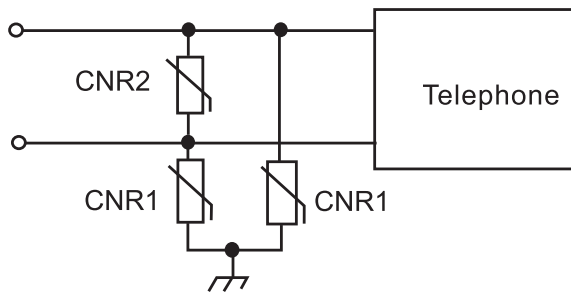


Selection Example 選型範例

Surge Protection of Signal Line

Signal Line Voltage	Part Number
DC 48 V	CNR-□□D820K
DC 100 V	CNR-□□D201K

Telephone Line 電話線



Surge Protection of Telephone Line

Telephone Line	Part Number
CNR1	CNR-□□D331K CNR-□□D361K
CNR2	CNR-□□D151K

Note :

CNR has relatively high capacitance , special attention shall be paid for it in high frequency circuits.

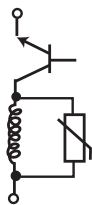
壓敏電阻有相對較高之電容值,於高頻電路使用須特別注意。

Caution : Refer to the power line protection. 參考電力線保護注意事項。

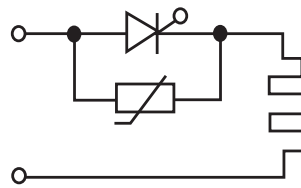
3. Switching surge protection, semiconductor protection and contact spark suppression

開關型雷擊保護、半導體的保護、接觸放電火花的吸收

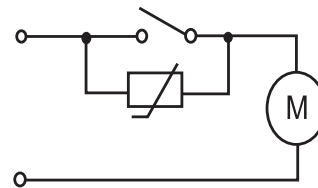
Switching surge protection



Semiconductor protection



Contact spark suppression



Selection Examples 選型範例

Voltage	Part Number	Note :
DC 12 V	CNR-□□D220K	1. The Maximum Allowable Voltage to be higher than maximum operation voltage at all time. 選用時相間最大連續工作電壓必須小於壓敏電阻額定的最大容許電壓值。
DC 24 V	CNR-□□D390K	
DC 100 V	CNR-□□D151K	2. Energy handling capability of CNR shall be selected by studying switching surge energy from the inductive load. 壓敏電阻吸收能量的能力選擇可經由電感性負載產生之開關突波能量計算而來。
AC 120 V	CNR-□□D221K	
	CNR-□□D241K CNR-□□D271K	

Caution :

1. Refer to the mentioned caution described in power line protection. 參考電力線保護注意事項。
2. The relation between surge current repetition and CNR ratings is drawn in the CNR's impulse life characteristics. 壓敏電阻的脈衝雷電流次數脈衝壽命。
3. Capacitor connection in parallel CNR is recommended for a contact spark suppression. 放電火花消除的應用時除壓敏電阻外建議再並聯一電容器效果更好。