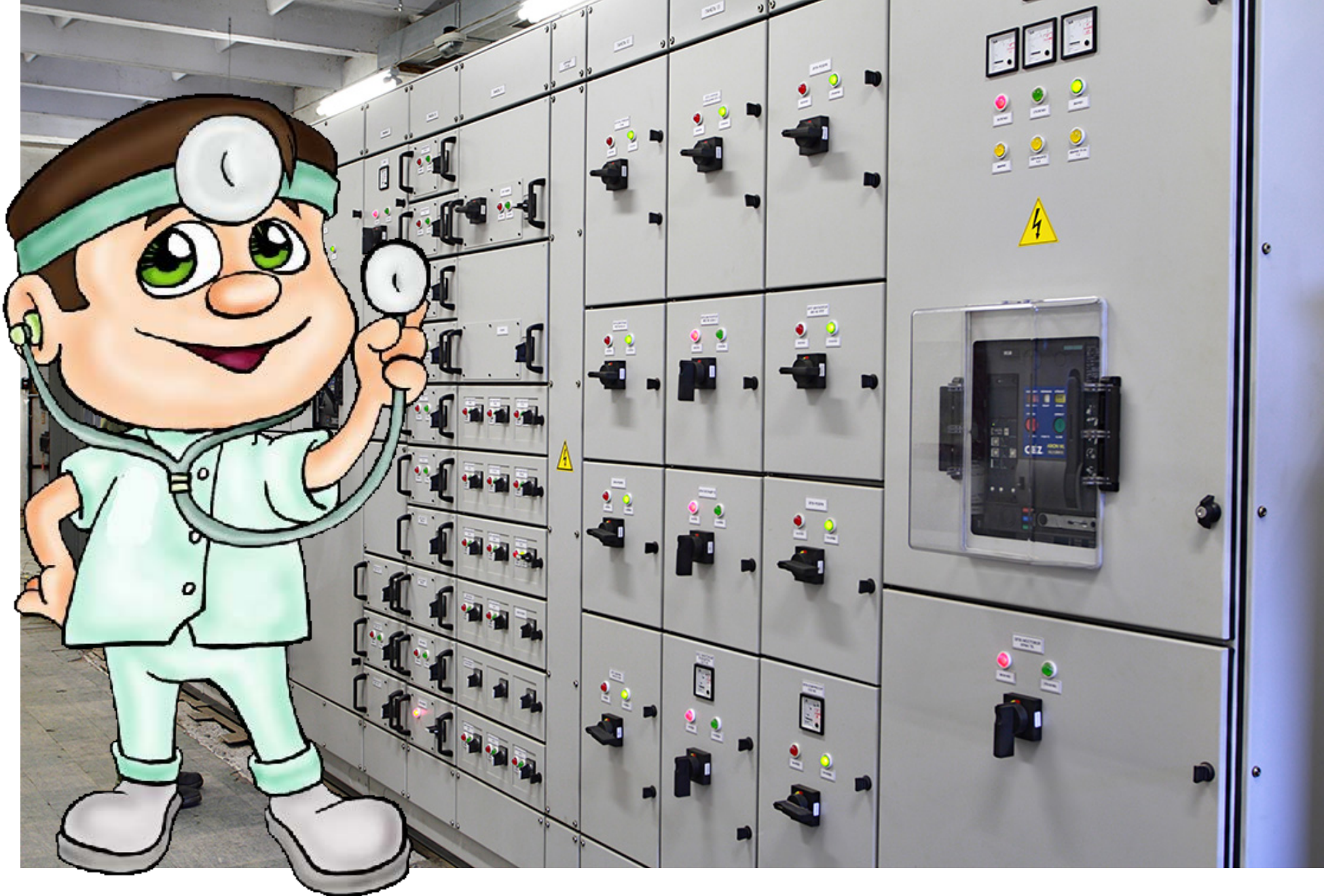


經驗分享 檢查低壓制櫃



Experience sharing in L.V. switchboard inspection

A. 三種情況下檢查制櫃:-

- (1) 新建築樓宇所安裝的制櫃
- (2) 定期檢查保養制櫃
- (3) 因超載或漏電導致開關跳制

B. 導致制櫃發生事故可能性

(1) 新建樓宇在制柜完成安裝後須注意事項:-

- * 於制柜廠家在地盤進行SAT時作見證人
- * 完成SAT後取得制柜廠家簽發的測試報告存檔



- * 電力公司完成接駁供電電纜,由制柜廠家進行最後測試並完成供電到制柜後,總開關須隔離供電源頭並鎖上鎖頭,直至所有供電線路安裝完成後正式供電

(2) 定期檢查保養制柜前所需預備工作:-

- * 安全評估
- * 臨時供電安排
- * 電力公司暫停火牛供電安排



CLP 中電
Energy for Life

暫停電力供應申請表
Application Form for Temporary Disconnection of Electricity Supply
(不適用於終止賬戶) Not Applicable To Account Termination

暫停供電範圍之區域
The District of Temporary Disconnection Area

申請人
Name of Applicant

公司名稱
Company Name

郵寄地址
Postal Address

聯絡電話
Contact Tel.

手提電話
Mobile Phone No.

註冊電業工程師姓名
Name of the REW

註冊電業工程師註冊號碼(如有)
Electrical Contractor Registration No. (if any)

註冊電業工程師電力工程號碼及註冊號碼
Code of REW and Registration No.

聯絡電話
Contact Tel.

中電變電站編號
CLP Substation No.

電話號碼(如有)
Meter No. (if any)

暫停供電原因
Reasons for Temporary Disconnection

暫停供電日期
Date of Disconnection

時間(上午/下午)
Time (AM/PM)

恢復供電日期
Date of Restoration

時間(上午/下午)
Time (AM/PM)

備註
Remarks

業主立案法團授權人簽署/蓋章
Authorized Signatory / Company Stamp

授權人簽署/公司蓋章
Authorized Signatory / Company Stamp

日期
Date

頁數
Page

To: The Hongkong Electric Co., Ltd.
Customer Installation & Training Department
(Fax No.: 2510 7721)

CONFIDENTIAL

REQUEST FOR TEMPORARY SHUTDOWN OF SUPPLY

Affected Address:

HK Electric Supply Number: SN _____ □ L.V. Service Cutout □ Transformer □ H.V. Supply (See remark)

Requested Shutdown Period:

From _____ To _____

Time / Date / Time / Date

Application No.: _____ Meter No.: _____ Shutdown for Maintenance Work (if any) □ Yes □ No

Registered Electrical Worker / Contractor: _____

Name: _____ Contact Tel. No.: _____

Registration No.: _____ Page No.: _____

I undertake to pay all charges arising out of the service and declare that the approved loading of the installation will not be altered without your Company's prior approval.

I have obtained consent from all tenants affected and will display notice accordingly.

□ Please add the charge to Account No.: _____
□ Please debit the Applicant in due course Business Registration No.: _____

Applicant Name: _____ Contact Telephone No.: _____

Address: _____

Date: _____ Applicant's Signature / Chop

NOTES TO APPLICANT

- This form shall be duly completed and returned to Customer Installation Section, 9/F, Electric Centre, North Point, Hong Kong, or by FAX NO. 2510 7721 at least two weeks before the shutdown date. For enquiry, please call telephone No. 2587 3455.
- Consent should be obtained from all affected tenants who obtain electricity supply from the above HK Electric supply number and a copy of such is attached to this form.
- Please note that the requested shutdown is subject to our confirmation of acceptance. Although we will endeavour to satisfy the customer's request as far as possible, the requested shutdown may have to be re-scheduled if circumstances require. In any circumstances, you must not start work until you have received confirmation from our site engineer on site that the electricity supply has been isolated.
- Pursuant to Regulations 19 and 20 of the Electricity (Wiring) Regulations, a Certificate shall be prepared and signed by a registered electrical worker of appropriate grade certifying that the installation complies with the Electricity Ordinance. Prior to restoration of supply, the registered electrical worker shall be present at site and a copy of the duly completed Certificate prescribed by the Government shall be provided to HK Electric as stipulated in our Supply Rules.
- If changes are to be made to the metering arrangements of the installation during shutdown maintenance, the customer shall inform HK Electric before the shutdown.
- If there are no changes in metering arrangements or alteration to the installation during shutdown maintenance, the customer shall make a declaration to that effect to HK Electric before restoration of supply.
- The provision of personal data is voluntary. Personal data collected will be used in matters relating to the operations of the Company or may be disclosed to third party organisations which assist in the Company's operations. Failure to provide the data requested may mean that the Company is unable to supply the relevant services. To request a full copy of the Privacy Policy Statement, for enquiry, for data access and correction, please refer to website: www.hkelectric.com, email us at personaldata@hkelectric.com, call us at 2887 3411, fax to 2510 7667 or write to 9/F Electric Centre, 28 City Garden Road for the attention of our Personal Data Protection Officer.



(2) 定期檢查保養制柜前所需預備工作:-

- * 進行保養工作前先得取得“工程許可証”
- * 由註冊電業工程人員進行相關工作

附錄 16A
(樣本)

工程許可證
PERMIT-TO-WORK

此可證號碼: _____
許可證地點: _____
部門: _____

第 1 部 —— 發給 (由負責人員填寫)
PART 1. —— ISSUE (to be completed by Responsible Person)

本人謹此聲明, 下列電力設備已按電力 (律例) 規例工作守則第 4 條的安全規定: 截斷電源、隔離、放電及接地 (如適用), 可以安全進行工程。本人已留意到電力 (律例) 規例工作守則第 4 條的安全規定。
I hereby declare that it is safe to work on the following electrical equipment which has been made dead, isolated, discharged and earthed (if necessary) in accordance with the safety precautions in Code 4 of the Code of Practice for the Electricity (Wiring Regulations). I have drawn the attention of the Person-in-charge of the work to these precautions.

本人已向負責工作人員, 清楚指出該電力設備, 說明工程範圍以及解釋安全預備。
I have physically identified the electrical equipment, explained the extent of the work and demonstrated the safety arrangements to the Person-in-charge.

該在總局外樓上安裝 Respective/Inappropriate boxes

(一) 進行工程的電力設備
(1) ELECTRICAL EQUIPMENT TO BE WORKED ON

(甲) 配電盤及其下游部分 (A) Distribution Board and the Parts at Its Downstream

配電盤 Distribution Board
 插座 Socket Outlet
 單極開關 Single Pole Switch
 燈管 Luminaire
 冷氣機 Air-Conditioner
 其他 (請註明) Others (Please specify) _____

高壓固定電力裝置 High Voltage Fixed Electrical Installation
 低壓固定電力裝置 Low Voltage Fixed Electrical Installation

(乙) 配電盤的上游部分 (B) Upstream of Distribution Board

總開關 Main Switchboard
 分極及電路 Distribution Sub-Circuit
 高低壓 Subar Chamber
 雙極開關 Double Pole Switch
 淨化機 Air-Conditioner
 其他 (請註明) Others (Please specify) _____

上升電線 Rising Main
 及擊撞 Sub-switchboard
 其他 (請註明) Others (Please specify) _____

(二) 電力設備的準確位置
(2) LOCATION OF ELECTRICAL EQUIPMENT

開關室 Switch-room
 電線房 Cable Duct Room
 其他 (請註明) Others (Please specify) _____

電錶房 Meter Room
 房室 Room. No. _____

(三) 要進行之工程
(3) DETAILS OF WORK TO BE DONE

類別 Category: 增加 Addition 修改 Modification 更換 Replacement 維修 Repair 保養 Maintenance

定期檢查、測試及發出證明書 P/T/C 其他(註明) Others (Please specify) _____

詳情 Details: _____

(四) 隔離電力設備的準確位置
(4) EXACT POINT WHERE ELECTRICAL EQUIPMENT IS ISOLATED

四極及雙極 4-pole ACB 四極及雙極 4-pole MCCB
 兩極及雙極 Double-pole MCB 其他 (請註明) Others (Please specify) _____

(五) 電力設備接地的準確位置
(5) EXACT POINTS WHERE ELECTRICAL EQUIPMENT IS EARTHED

(六) 已鎖上安全鎖的位置 _____

(六) SAFETY LOCKS APPLIED AT _____

(七) 警告告示及危險告示的準確位置 _____

(七) CAUTION NOTICES AND DANGER NOTICES HAVE BEEN POSTED AT _____

(八) 特別指示或安全措施 _____

(八) SPECIAL INSTRUCTIONS, OR SAFETY MEASURES _____

姓名 Name: _____ (負責人員) (Responsible Person) 簽署 Signed: _____

聯絡電話號碼 Contact Tel. No.: _____ 日期 Date: _____ 時間 Time: _____

第 2 部 —— 接收 (由負責工作人員填寫)
PART 2. —— RECEIPT (to be completed by Person in-charge)

本人謹此聲明, 此工程許可證已獲發給。本人已閱讀過此工程許可證的內容, 並讀過電力設備已按電力 (律例) 規例工作守則第 4 條的安全規定: 截斷電源、隔離、放電及接地 (如適用), 可以安全進行工程。本人已留意到電力 (律例) 規例工作守則第 4 條的安全規定。
I acknowledge receipt of this permit-to-work and the key for the safety lock. I have read the content of this permit-to-work and I certified that where applicable, the electrical equipment is switched off and isolated on these premises. Safety devices and earths (if applicable) will not be removed until this permit-to-work has been cancelled and permission has been obtained from the Responsible Person.

本人謹此聲明, 本人將對此工作許可證上所述電力設備的工作負責。而本人及本人轄下人員, 均不會在電力設備進行工程。
I declare that I accept the responsibility for carrying out work on the electrical equipment described on this permit-to-work and that no attempt will be made by me or by the persons under my control to carry out work on other electrical equipment.

姓名: _____ (負責工作人員) (Person in-charge) 簽署 Signed: _____

聯絡電話號碼 Contact Tel. No.: _____ 日期 Date: _____ 時間 Time: _____

簽署於 _____
於此工程許可證 _____

此許可證於第 1 及第 2 部簽署後才生效 (此 PERMIT IS NOT VALID UNTIL PARTS 1 AND 2 HAVE BEEN SIGNED)

第 3 部 —— 清除 (由負責工作人員填寫)
PART 3. —— CLEARANCE (to be completed by Person in-charge)

本人謹此聲明, 此工程許可證第 1 部所述工程已圓滿完成/停止。本人轄下所有人員已撤離, 並受到警告, 在上列電力設備進行工程已不安全。所有工具及材料均被收回。
I hereby declare that work described in Part 1 of this permit-to-work has been satisfactorily completed/stoppped, and persons under my charge have been withdrawn and warned that the above electrical equipment is no longer safe to work on. All tools and temporary connections have been removed.

姓名 Name: _____ (負責工作人員) (Person in-charge) 簽署 Signed: _____

日期 Date: _____ 時間 Time: _____

第 4 部 —— 取消 (由負責人員填寫)
PART 4. —— CANCELLATION (to be completed by Responsible Person)

本人謹此聲明, 此工程許可證第 1 部所述工程已圓滿完成/停止。此工程許可證已交還本人及將予相關註冊電業工程師, 或該電力裝置負責人, 作最少五年保留。
I hereby declare that the work described in Part 1 of this permit-to-work has been satisfactorily completed/stoppped, and that this permit-to-work is cancelled. The original permit-to-work has been returned to me and will be passed to the relevant Registered Electrical Contractor or owner of the fixed electrical installation for their keeping for at least five years.

姓名 Name: _____ (負責人員) (Responsible Person) 簽署 Signed: _____

日期 Date: _____ 時間 Time: _____

* 請不用用的劃掉 Delete as appropriate.

(2) 開始檢查、保養制櫃工作:-

- * 未停電前檢查所有儀表、指示燈等是否操作正常
- * 將所有開關制脫離,待電力公司將供電火牛之電源切斷
- * 用他錶檢查及確定供電電源已經切斷
- * 打開所有門、蓋以便進行檢查
- * 用吸塵機、乾淨布料清除制櫃內塵埃
- * 用乾淨布料抹淨絕緣支架、格板等

(2) 開始檢查、保養制柜工作:-

將銅巴接頭抹淨,用磅呎檢查接頭鑼絲有否鬆離 - 範例

鑼絲 (st. 8.8)	扭矩收緊力度 (Nm)	公差
M4	2.5	+/- 0.25
M5	5	+/- 0.5
M6	8	+/- 0.8
M8	20	+/- 2.0
M10	40	+/- 4.0
M12	70	+/- 7.0
M16	170	+/- 17.0

(2) 開始檢查、保養制櫃工作:-

用微歐姆儀錶(Ductor)測量數據 - 範例

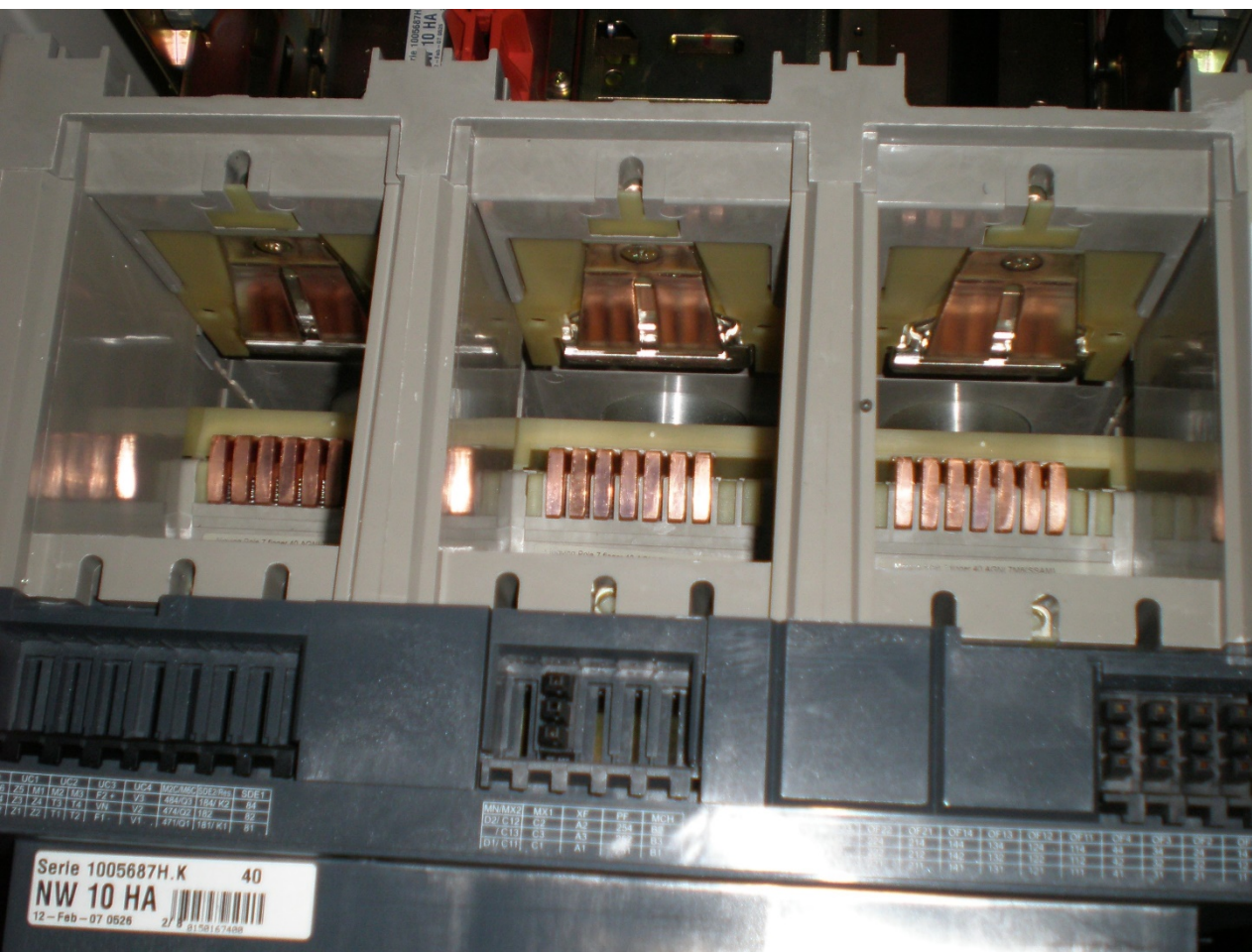
負載 (A)	菲士制	塑料開關	空氣開關	出、入氣巴	總電阻值 (μohm)
63A	1560	-	-	800	2360
160A	700	-	-	450	1150
250A	640	-	-	400	1040
400A	550	-	-	350	900
100A	-	510	-	600	1110
250A	-	320	-	400	720
400A	-	160	-	350	510
800A	-	-	30	40	70
1600A	-	-	27	23	50
2500A	-	-	20	20	40

(2) 開始檢查、保養制櫃工作:-

檢查ACB、MCCB、菲士制、自動轉換索制

- * 檢查ACB電流主接點及滅弧接點有否出現過熱及表面變色
- * 檢查MCCB,菲士制,自動轉換索制接點有否因過載令接點出現過熱及表面變色
- * 抹淨ACB接點並抹上專用潤滑油脂
- * 抹淨ACB機械裝置並抹上潤滑機油
- * 檢查ACB安全遮板是否操作正常
- * 檢查ACB,MCCB在電動 / 手動的合閘 / 切斷操作是否正常
- * 檢查ACB,MCCB的自動切斷操作是否正常
- * 檢查自動轉換索制的自動及機械連鎖操作是否正常

(2) 開始檢查、保養制櫃工作:- 檢查ACB、菲士制



(2) 開始檢查、保養制櫃工作:- 檢查MCCB、自動轉換索制



(2) 開始檢查、保養制櫃工作:-

過載保護繼電器用二次測試儀測試校準

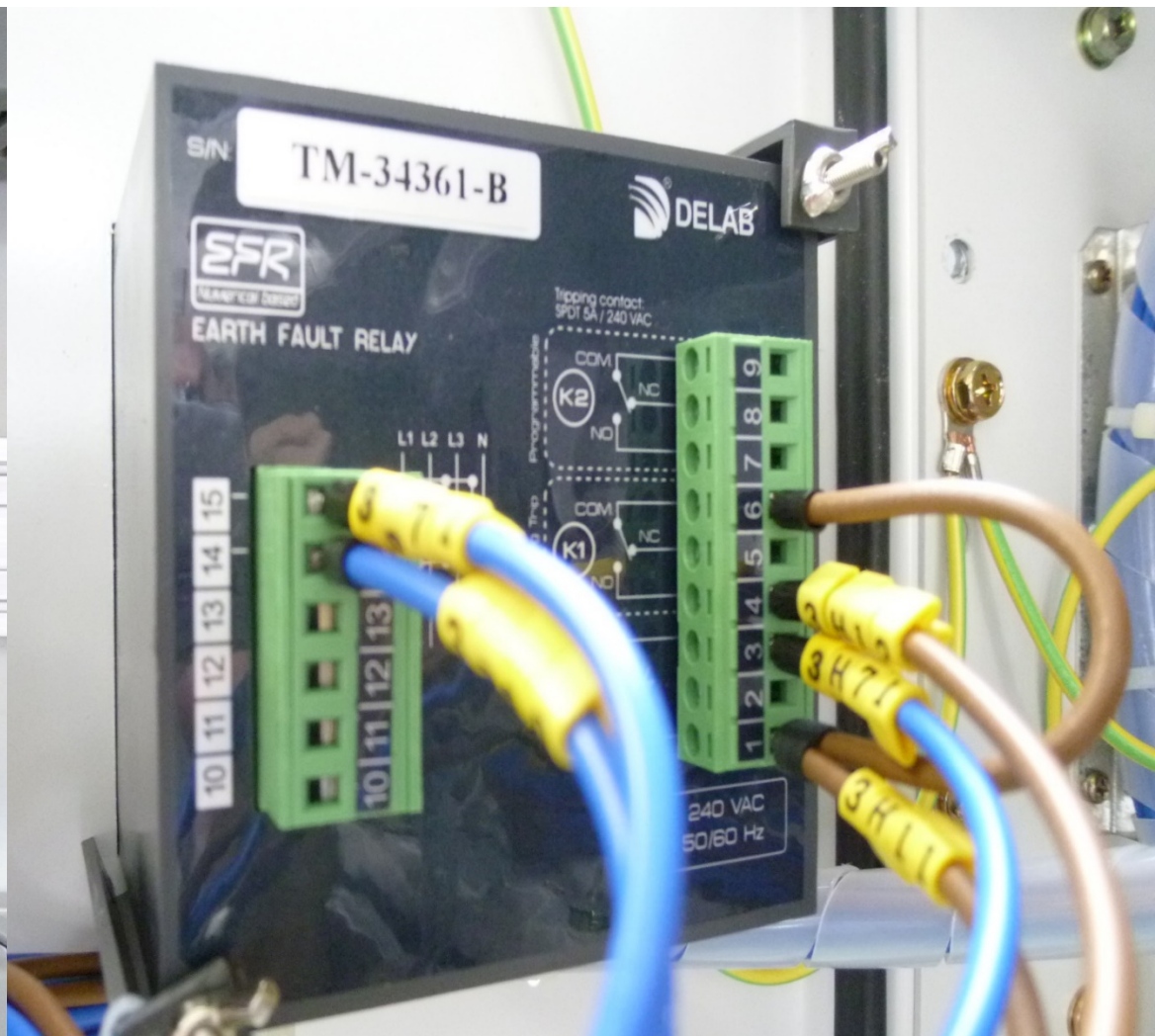
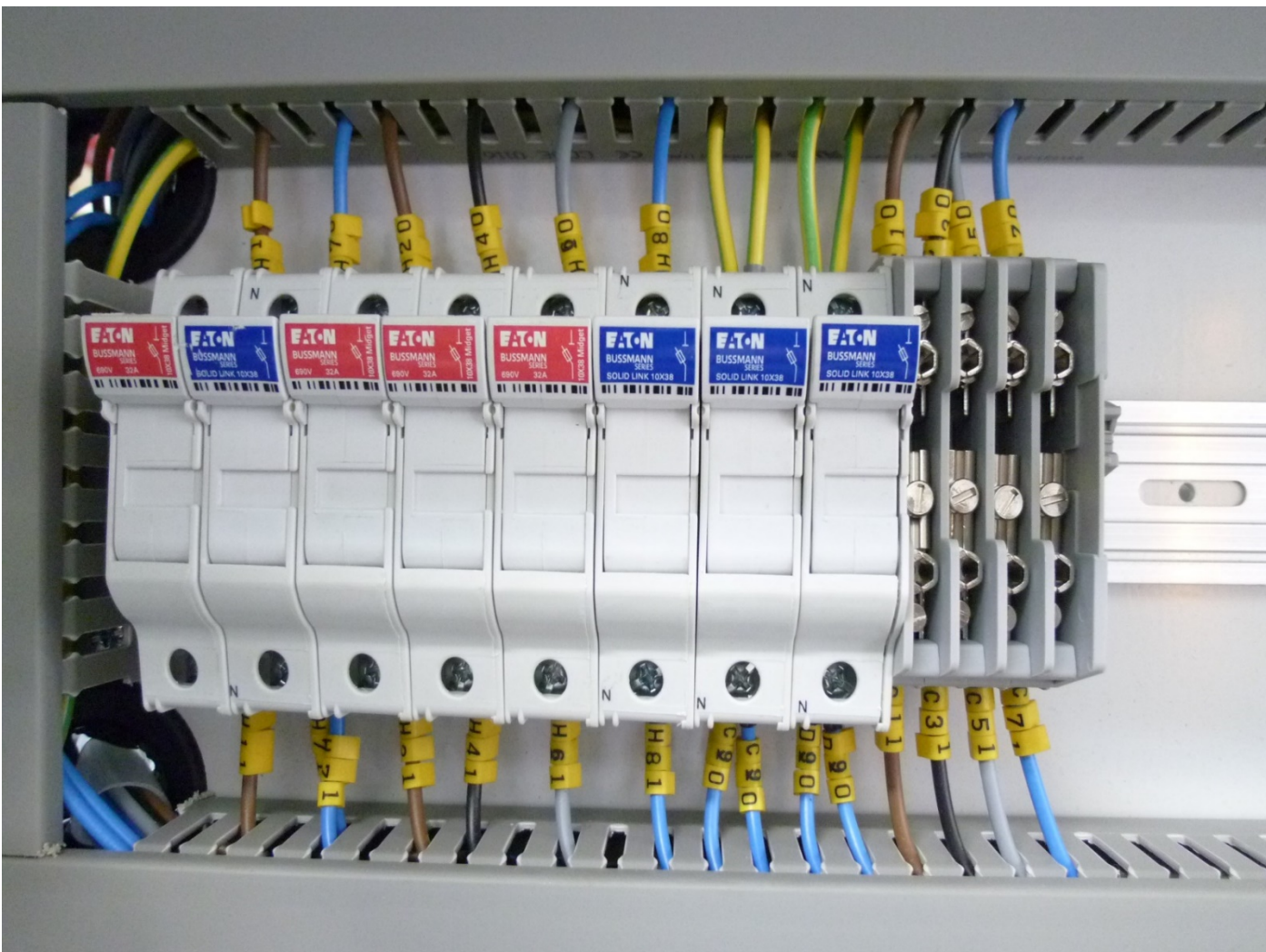


(2) 開始檢查、保養制櫃工作:-

過載保護繼電器用二次測試儀測試校準

Phase	Relay settings		Current injected (A)	Operating time (sec)	
	Current setting %	Time setting		Normal	Actual
L1	50	1	5		
L1	50	1	10		
L1	100	0.5	10		
L2	50	1	5		
L2	50	1	10		
L2	100	0.5	10		
L3	50	1	5		
L3	50	1	10		
L3	100	0.5	10		
E/F	10	1	2.5		
E/F	10	1	5		
E/F	20	0.5	2		

(2) 開始檢查、保養制櫃工作:- 檢查控制電線接點有否鬆脫



(2) 開始檢查、保養制櫃工作:- 檢查電池及充電器是否操作正常



(2) 開始檢查、保養制櫃工作:-

在從新接上電源前進行絕緣測試,切記先將所有電源控制菲士 / 電燈公司電源控制菲士抽離



(2) 完成保養制柜工作後:-

- 移除所有臨時供電線路
- 安排電力公司恢復供電
- 由註冊電業承辦商及註冊電業工程人員簽發完工紙 “Form WR2”

(3) 因超載負荷或漏電導至開關跳制須 注意事項:-

- * 因超載負荷導至菲士制燒菲士/ MCCB跳制,先檢查線路將發生事故問題解決,菲士制換上新菲士/重啟MCCB還原供電
- * 因超載負荷或漏電導至ACB跳制,先檢查過載 / 漏電保護器找出原因,再檢查有關線路將發生事故問題解決,然後還原供電

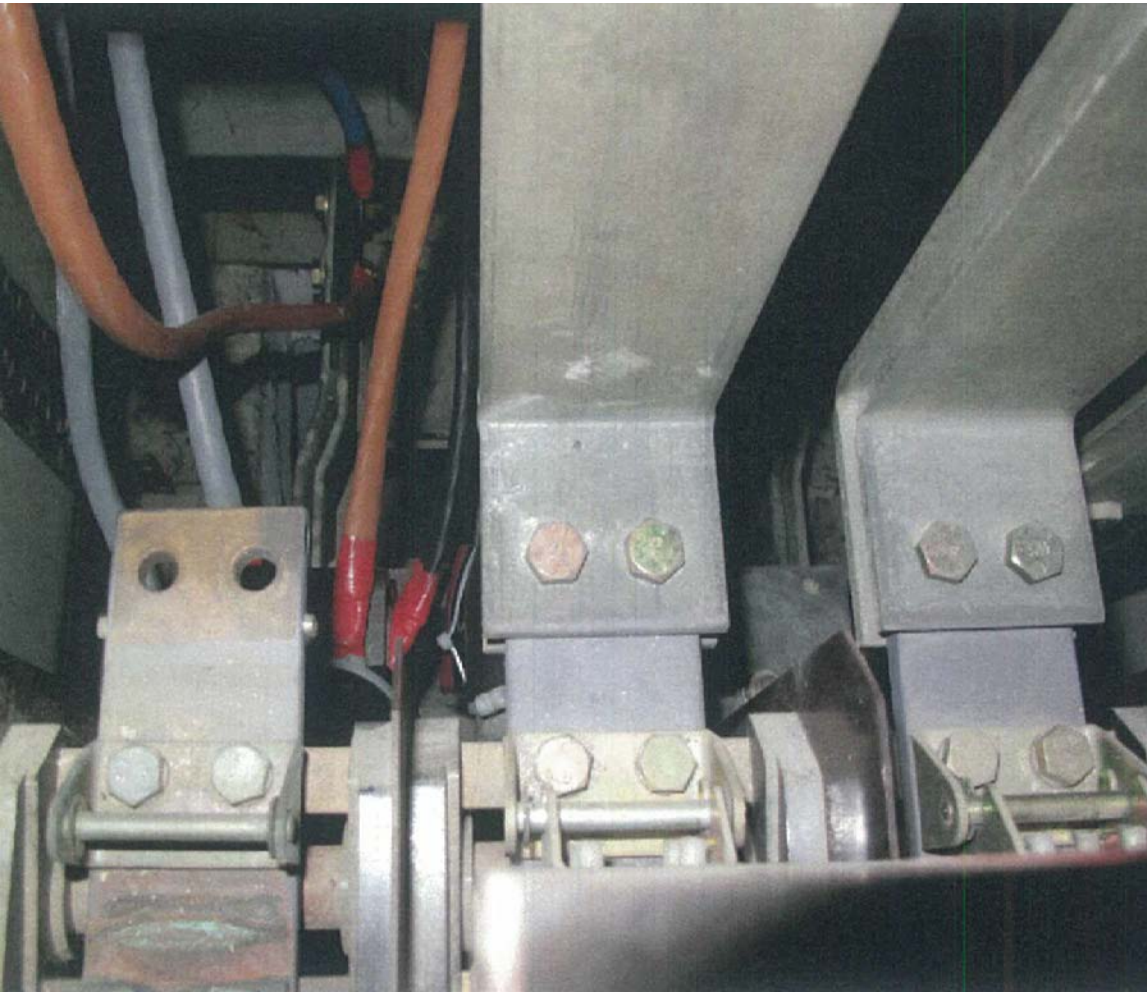
在帶電工作時,先進行安全評估(可參考電力(線路)規例中附錄15B表格樣本),並必須由相關註冊電業工程人員進行檢視





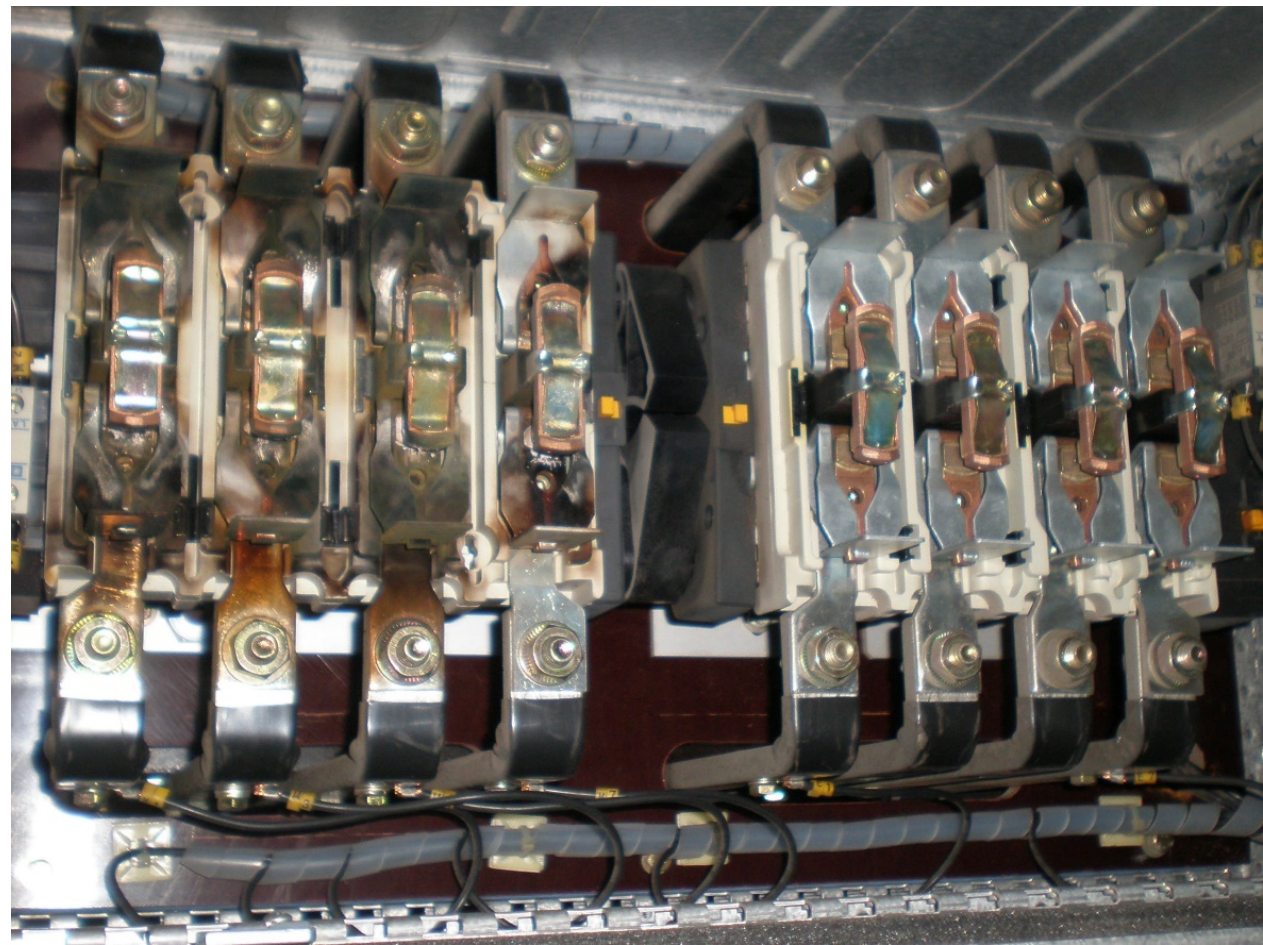
導至制柜發生
事故可能性

- ACB、菲士制超載負荷產生電弧導致燃著附近物料





- MCCB、索制超載負荷產生電弧導致燃著附近物料

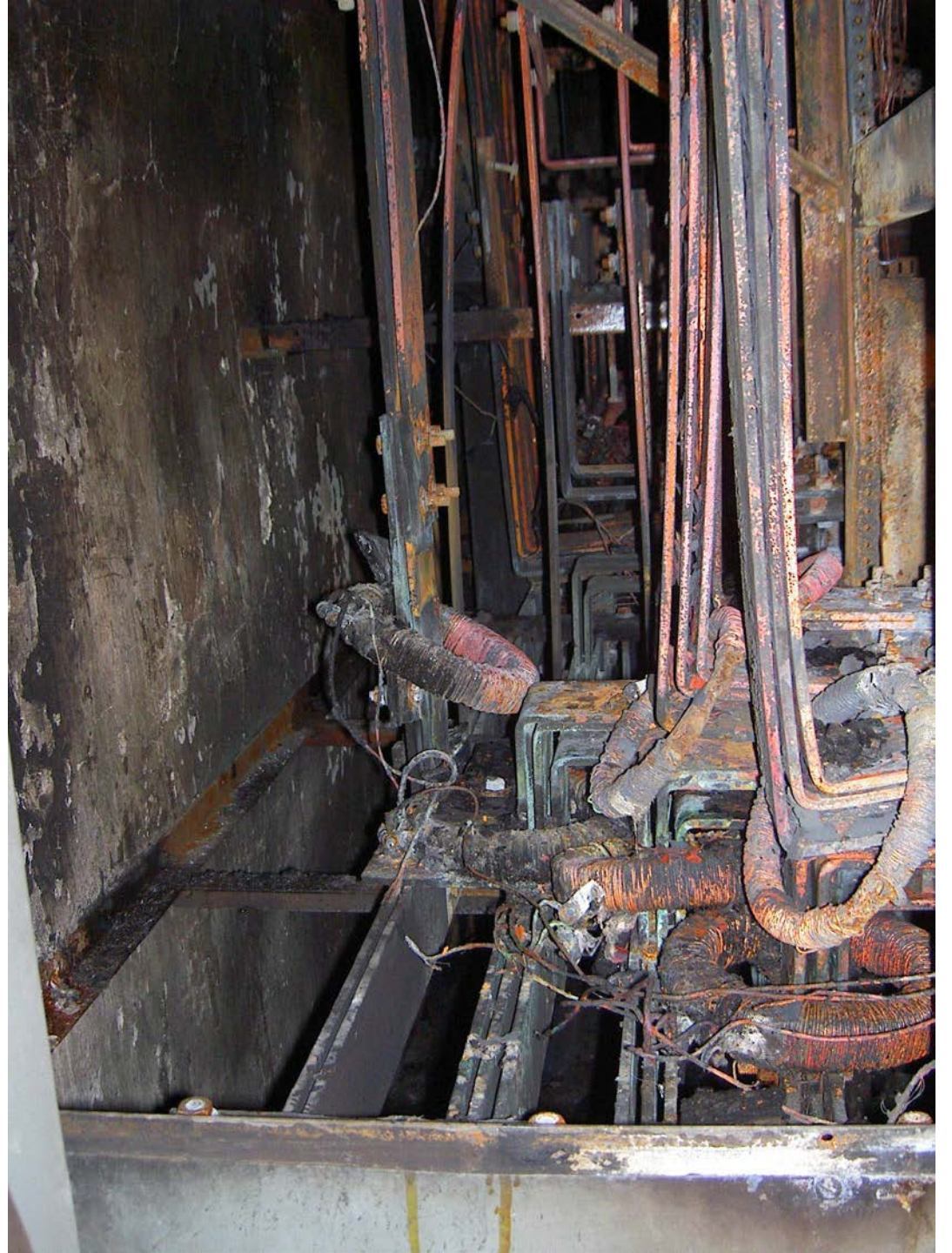


- 過載 / 漏電保護器損壞或故障



- 電池未能充電或充電器損壞





- 完 -