PLUMMERS INDUSTRIES PTY LTD
TRUSTEE FOR THE PLUMMER FAMILY TRUST
(Incorporated in Western Australia)
A.C.N. 008 907 784

Pi 2000

MOTOR CONTROL CENTER

INSTALLATION AND MAINTENANCE MANUAL

PLUMMERS INDUSTRIES PTY LTD

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(Incorporated in Western Australia)
A.C.N. 008 907 784

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Pi 2000

Motor Control Centre

INSTALLATION INSTRUCTIONS

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1. GENERAL DESCRIPTION

1.01 INTRODUCTION

The "PI 2000" has been developed by Plummers Industries - Switchboard Division specifically to comply with the requirements of International Standard IEC 439 –1 and Australian Standard AS 3439 -1 and delivers significant benefits to engineers, installers and end users. Its space efficient and practicable modular design provides safety, flexibility and economy, making it suitable for most applications.
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1.02 CONSTRUCTION

The "PI 2000" system is manufactured from first grade 2mm Zinc Seal mild steel sheet. Each component is punched on an AMADA CNC and formed on a NC bender to ensure high precision. Components then pass through the automated powder coating plant where they are thoroughly cleaned and coated to a dry film thickness of approximately 80 microns. Components fit together to form a strong, uniform line up with guaranteed accuracy. All like parts are fully interchangeable and the system is flexible enough to easily accommodate changes in the line up at any stage of manufacture as well as extensions and modifications in the field.
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1.03 BUSBAR SUPPORTS

Busbar supports are high-pressure injection moulded Nylon 6 material which is extremely strong and self extinguishing (UL 94 V0).
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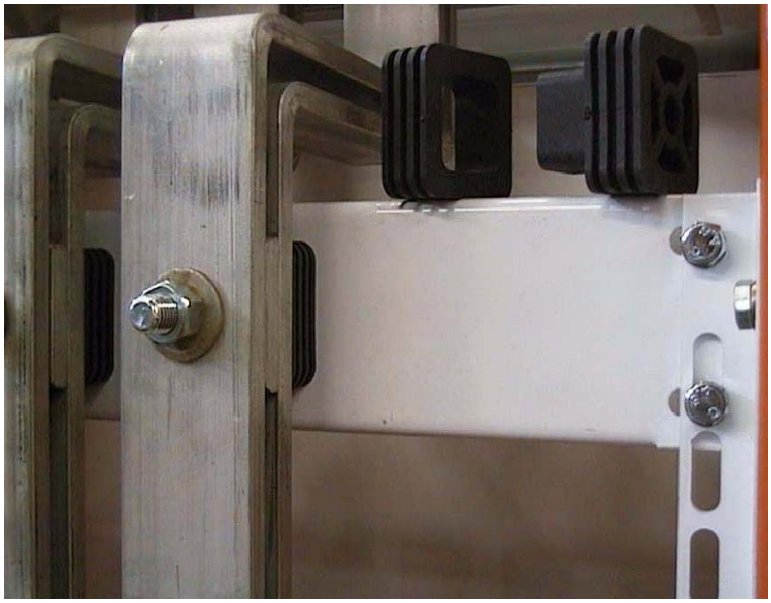

1.04 DEMOUNTABLE MODULES

Each functional unit up to and including 185kw or 400A is housed in an easily removable, totally segregated drive frame, referred to as a module.
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1.05 EARTHING

A full height vertical earth bar is provided within each vertical busbar chamber.

Each module is fitted with a pair of spring loaded contacts which is solidly bonded to the module and makes positive contact with the vertical earth bar before the phase contacts are made, ensuring a safe arrangement. This earth contact provides a reliable earthing point for the module, internal components and the module door. The primary circuit earth termination can be located at the bottom of each cable zone. Vertical earth bars are solidly bonded to the horizontal earth bar, which is at the bottom of the structure and runs its entire length. Additional earthing points are provided along the horizontal earth bar at each cable zone.
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1.06 VENTING

Each module is vented on the left-hand side by means of special louvre plates, which provide cooling of internal components by convection and ensure maximum dissipation of gas pressure in the unlikely event of an internal arcing fault.
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1.07 NEUTRAL BAR

The neutral bar, which runs with the phase bars at the top of the structure, can be 1/3, 1/2 or full size.
There is a neutral bar provided in each vertical busbar chamber adjacent to the phase bars and can be accessed via a 4 pole plug fitted to the draw out module if required
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1.08 ARC FAULT CONTAINMENT

Internal arcing faults can cause considerable damage to MCC's and switchboards as well as loss of production. More importantly, arcing faults have the potential to cause serious injury to personnel. For this reason, it has been our endeavour to make product

developments which reduce the likelihood of an arcing fault being initiated and to design improvements which ensure that in the unlikely event of an arcing fault occurring, danger to personnel and damage to equipment are minimal. Arc fault containment tests to AS 3439 -1 have been successfully conducted on the "PI 2000" covering feeders up to 400A and motor starters up to 150kw.

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1.09 INTERLOCKS

All starter and feeder modules are equipped with a door mounted isolator operating handle and door clutch mechanism affording protection to the operator by preventing access to the interior of the module while the isolator is closed.

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1.10 WARNING!

IT IS EXTREMELY DANGEROUS TO OPERATE ANY STARTER OR FEEDER UNLESS THE DOOR IS PROPERLY CLOSED AND SECURED.

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2. HANDLING INSTRUCTIONS

2.01 LIFTING

The "PI 2000" switchgear assembly is designed to be lifted by its base using lifting bars and sling or Fork lifting depending on your requirement. Base lifting points in the form of 38mm diameter holes through the base channel, are provided for this purpose. (Refer to sketch below)The transport stabilisation brackets fixed to the roof of the structure are for securing during transport only.
Lifting apparatus and rollers are not provided.
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2.02 WARNING!

UNDER NO CIRCUMSTANCES MUST THE STABILIZATION BRACKETS BE USED FOR LIFTING THE ASSEMBLY.
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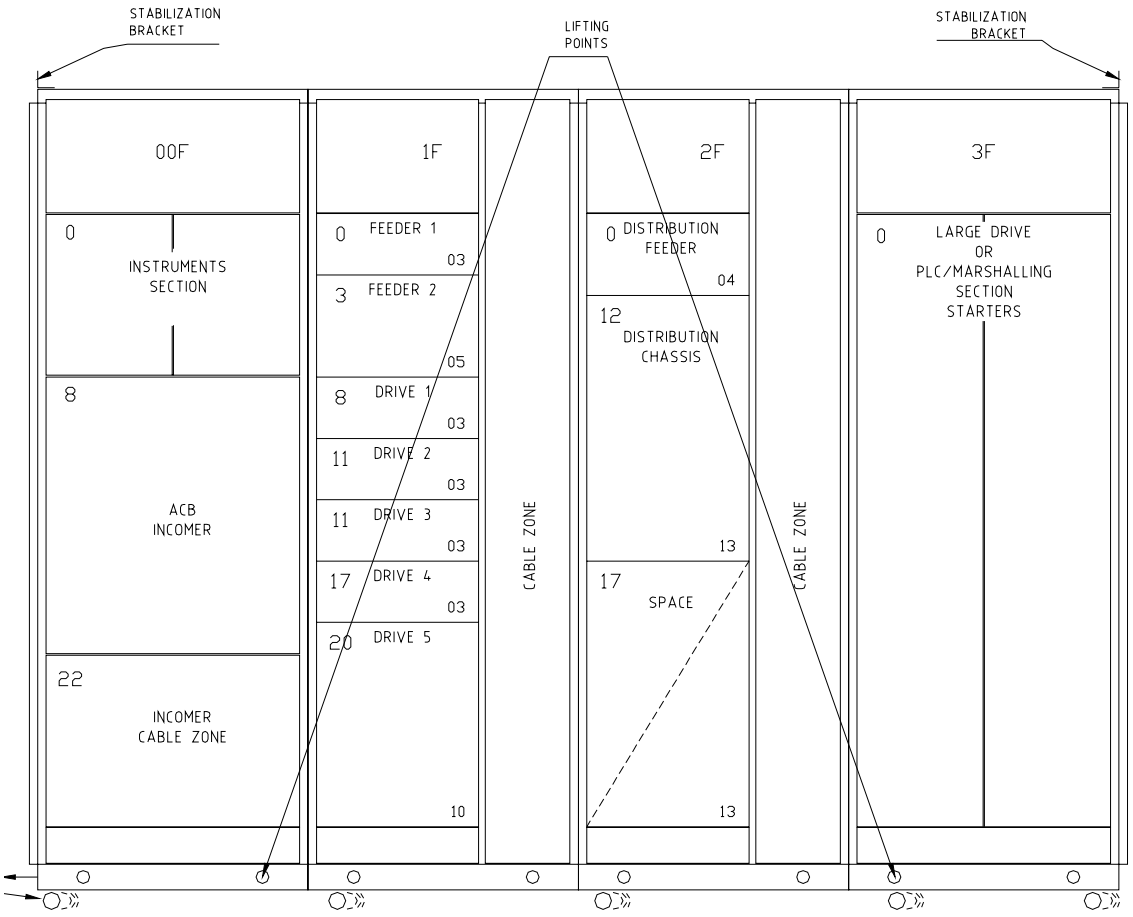

2.03 POSITIONING

When manoeuvring the MCC or switchboard into position, the use of crowbars and similar levers should be avoided, since they have the potential to damage the base channel. The preferred method is to move on rollers made from small diameter pipe or round bar. (refer to sketch)

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3. INSTALLATION INSTRUCTIONS

3.01 MOUNTING SURFACE

The floor or platform on which the MCC or switchboard is to be mounted should be level and flat so that the weight of the structure is distributed evenly over the entire length of its base channel. If the mounting surface is not flat, then it will be necessary to place packers between the base channel and the mounting surface at regular intervals so that there is no twisting, sagging or bending stress on the MCC or switchboard structure. The temporary transport stabilisation brackets can be removed at this point.

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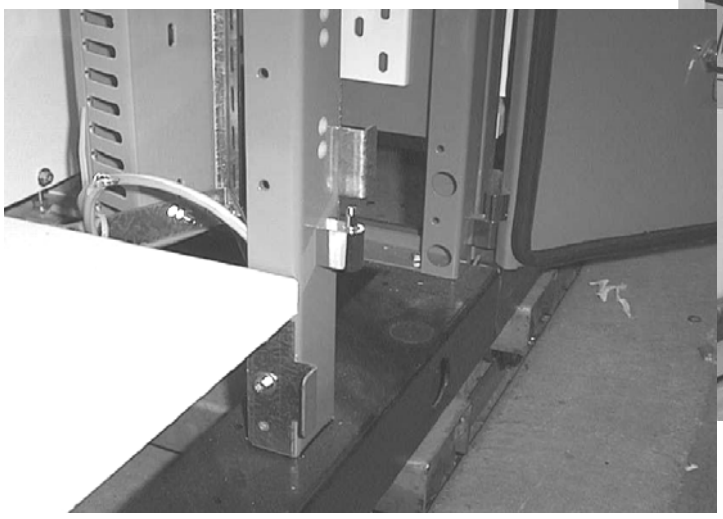
3.02 JOINING AT SHIPPING BREAKS

Once shipping sections have been manoeuvred into position, butted together and aligned they are fastened together using the 8mm bolts and special washers in the joining kit provided. Each kit includes 4 bolts and 8 washers. Fixing holes are pre- punched in the side sheets, top and bottom at the front and top



and bottom at the rear. The horizontal busbars are joined using the fishplates and special hardware in the joining kit provided. (Refer to attached drawing on page 11 and photo's on page 12) The main earth bar at the bottom of the structure is joined with a simple fishplate also provided in the kit. 12mm high tensile bolts used on horizontal busbar connections should be tightened to a torque of 60NM. 10mm high tensile bolts used on earth bar connections should be tightened to a torque of 40NM. Where Belville Washers are used it is recommended to take the bolt up to tight and back it off a quarter of a turn.

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3.03 BOLTING DOWN

When the shipping sections have been joined together correctly, the MCC or switchboard must be securely fastened to the floor at each designated fixing down point using bolts with a minimum diameter of 10mm. Fixing down holes are pre- punched in the base channel and drilling access is provided by a pre-punched drill clearance hole positioned at the top of the base channel, directly above each fixing hole.

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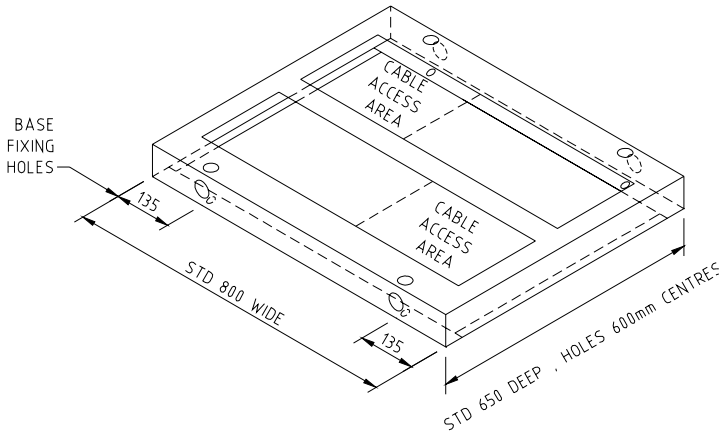

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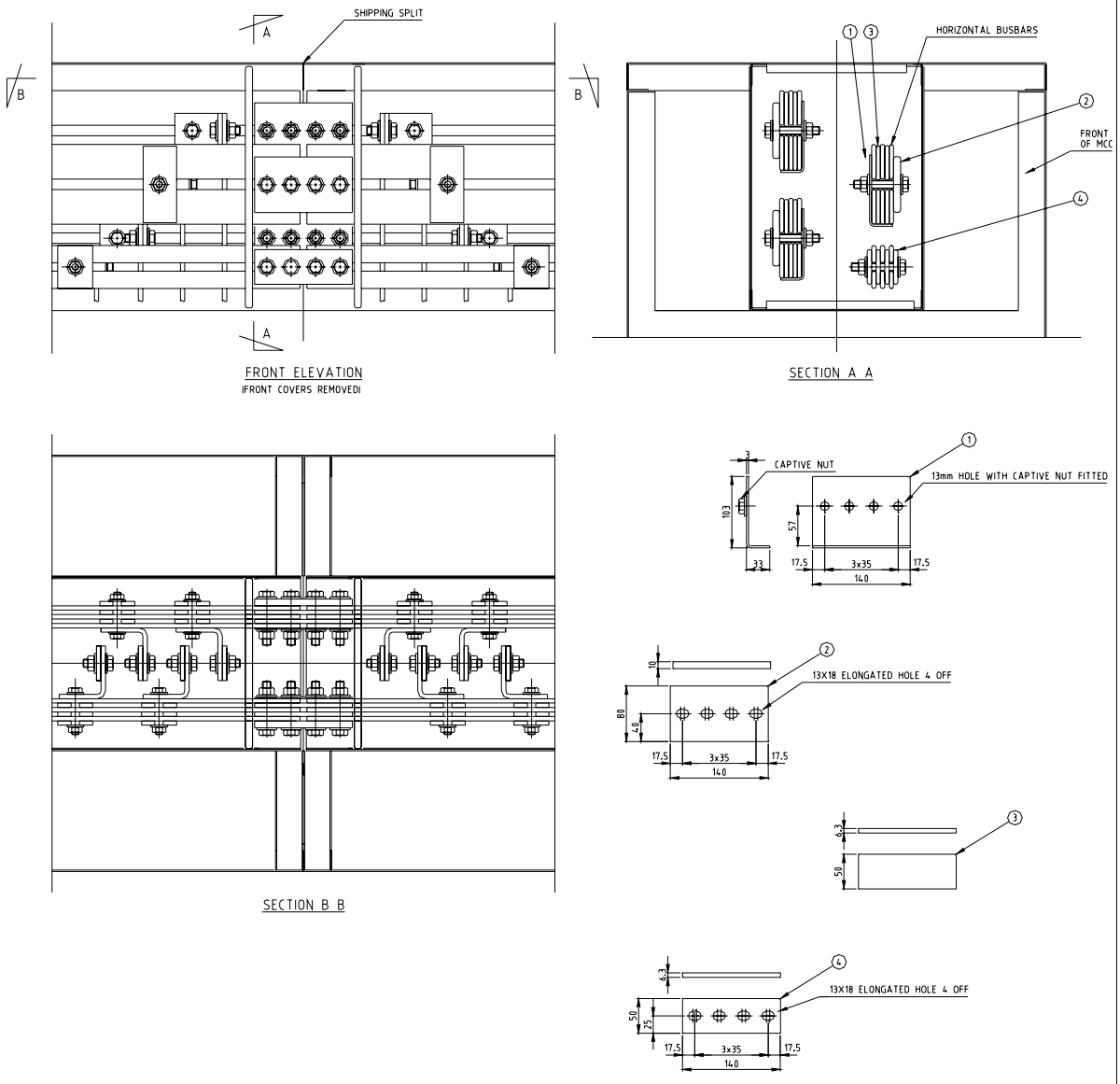

ITEM	DESCRIPTION	REMARKS	QTY
4	NEUTRAL COPPER BAR CONNECTION	50x6.3 Cu 140mm LONG	4
3	PHASE COPPER BAR CONNECTION	50x6.3 Cu 140mm LONG	12
2	PHASE COPER BAR CONNECTION	80x10 Cu 140mm LONG	3
1	BUSBAR BRACKET	BUSBAR EXTENSION BRACKET 3mm GALV MILD STEEL	3

REVISIONS			
REV	DATE	DESCRIPTION	BY
A	13/08/02	ISSUED FOR MANUAL	JFC

APPROVALS		
ACTION	BY	DATE
DRAWN	JFC	13/8/02
CHECKED	GU	13/8/02
SCALE A1		SCALE_A1
SCALE A3		SCALE_A3

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BUSBAR CONNECTIONS

DWG NO BUSBAR JOINT | A1 | REV. A

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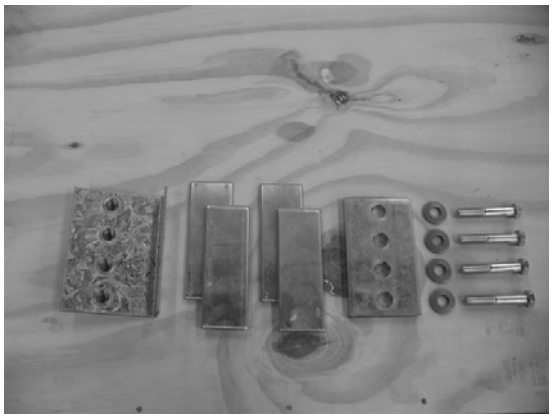
STEPS FOR THE INSTALLATION OF FISH PLATE KIT

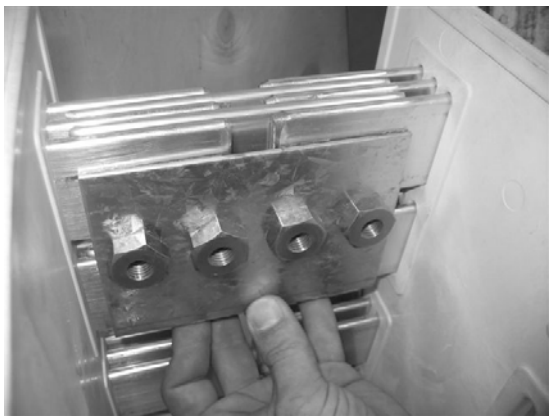


STEP 1

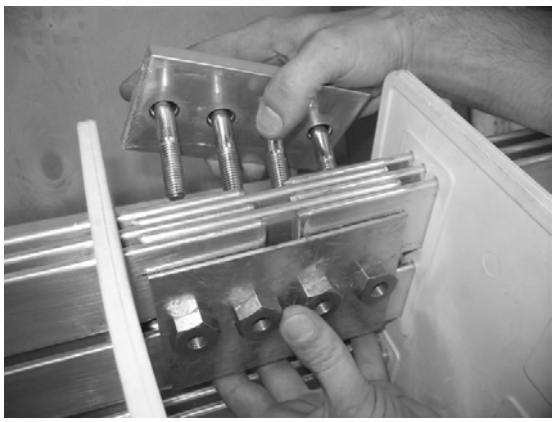
STEP 2

STEP 3

STEP 4



STEP 5



STEP 6

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OPERATING INSTRUCTIONS

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OPERATING INSTRUCTIONS

1.01 DRIVE MODULES

Each drive module and feeder module is equipped with an isolator, which is operated by a door-mounted handle via a door clutch mechanism. This arrangement prevents the module door being opened while the isolator is closed.

The procedure for opening the module door is as follows:

a) Move the isolator operating handle to the "off" position.

b) Release 1/4 turn locks securing the module door.

c) Hold the isolator operating handle in the "off" position (clockwise rotation) to release the interlock mechanism, and swing the door outwards, left to right.

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1.02 WARNING!

IT IS EXTREMELY DANGEROUS TO OPERATE ANY STARTER OR FEEDER WHILE THE MODULE DOOR IS OPEN. THE FUNCTIONAL UNITS OF THE MCC OR SWITCHBOARD CAN ONLY BE OPERATED SAFELY WHEN THE MODULE DOOR IS PROPERLY CLOSED AND SECURED.

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MAINTENANCE INSTRUCTIONS

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1.01 ENVIRONMENT
1.02 INTERLOCKS AND OPERATING MECHANISMS
1.03 PREVENTATIVE MAINTENANCE

Attachments: **BUSBAR JOINT DRAWING**
STEPS FOR THE INSTALLATION OF FISH PLATE KIT

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CARE AND MAINTENANCE

1.01 ENVIRONMENT

The switchroom or plant room where the MCC or switchboard is installed should be kept clean and well ventilated. The ambient temperature in the switchroom should be no higher than 40 deg C.

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1.02 INTERLOCKS AND OPERATING MECHANISMS

Regular checks should be made of door fasteners, operating mechanisms and mechanical interlocks to ensure their correct operation, since malfunction of any of these items could give rise to a dangerous situation. Care should also be taken to ensure that all shrouds and safety covers remain securely in place.

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1.03 PREVENTIVE MAINTENANCE

It is recommended that a shutdown and maintenance inspection be carried out annually. (More frequently if operating conditions are harsh in terms of temperature, vibration, dust etc)

Preventive maintenance procedures should include (but not be limited to):

a) Routine tests in accordance with AS 3439 -1

b) Ductor tests of all busbar connections

c) Removal of all modules to inspect for evidence of overheating of main incoming Plug contacts

As an alternative to b) and c) above, we recommend that a thermographic survey be conducted annually, supplemented by more frequent inspections using a hand held infra red scanner.

NOTE: It is generally not recommended to check busbar joints by performing a bolt check, since over tightening could cause bolts to fatigue.

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