DRC SWITCHBOARDS POWER IN CONTROL

VECTOR™ MODULAR SWITCHBOARD ASSEMBLY SYSTEM

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Are you actually getting what you paid for ?

Forms of Separation

There is a requirement for protection against switchboard internal arcing faults. AS/NZS3000 2.5.5
One way to achieve this compliance is by using internal separation.
There is a degree of confusion as to what some of these forms of separation are.
1 Escutcheons and additional covers are not a requirement of AS/NZS3439.1, provided Basic Protection is maintained AS/NZS 3000 1.4.77
2 Dipped chassis are compliant with the requirements for insulation, but may or may not be compliant as "i" variant. The when insulation is used, to be classified as Form of Separation, the insulation must withstand 3.5kV U_{imp} Impulse test. This is the responsibility of the Assembly manufacturer, and not the responsibility of the Chassis Manufacturer. The photos show additional heat shrink over the pre dipped chassis around the dipping points, which on the sample product did not pass 3.5kV impulse test.
3 Examples below are indicative only. The standard makes no clarification regarding incoming functional units or outgoing functional units. They are simply called "Functional Unit"
For clarity no incoming Functional units are shown in the examples.

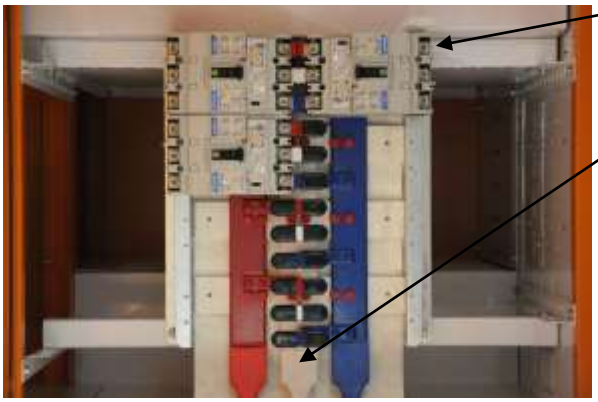
Temperature Rise, Dielectric Properties and Short Circuit Withstand Strength

Reference Standard to AS/NZS3439.1 Clause 8.1.1, 8.2.2 & 8.2.3
1 The temperature rise requirements for compliance to Table 2 of AS/NZS 3439.1 are a mandatory requirement of a TTA or PTTA assembly. All of the examples shown below must comply with the minimum requirements. Particular attention should be given for connection for outgoing connections of 70 degree rise over ambient of 35 Degree and must be verified by test or calculation. See notations on examples below.
2 For a switchboard to be a TTA or PTTA, temperature rise limits must be verified. The current rating of the chassis must be verified by the Assembler, and not the chassis manufacturer. A way of verification may be by test, with the chassis installed in the manner in which it is to operate.
3 Dielectric Properties are to be verified by the Assembler, and not by the Chassis Manufacturer. This should be done at the time for Factory Acceptance Testing. The mandated Impulse withstand Voltage, U_{imp} is 2kV for 240 Volt and 2.5kV for 415 Volt
4 Short Circuit Strength is to be verified. It is the responsibility of the Assembler and not the Chassis Manufacturer to verify the Short Circuit Strength. Whilst a Chassis Manufacturer may have conducted verification tests, the standard mandates the testing is to be "valid for the conditions in the Assembly". This includes any bus bars, feeder bus bars, cables, flexible bus bars, Straps and the like, that may or may not be connected to a Chassis.
A chassis in box is not a P.T.T.A or a T.T.A and further verification is required to make this claim.

So who is responsible?

Everybody is. The Electrical Safety Act 1998 tells us this.
The REC who installs and Assembly and who signs the Certificate of Electrical Safety, Section 45
The Inspector who inspects the installation, including the Assembly, Section 45
The Assembly manufacturer must insure compliance to the minimum standards proscribed, Section 54.

Form 2 B i. Note. There are no IP2X terminal covers

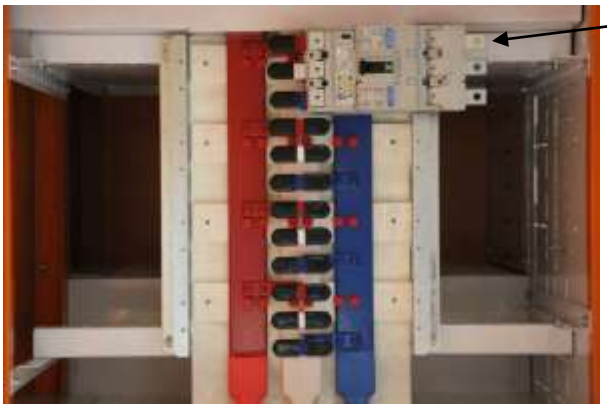


Temperature Rise 70 Degrees

Bus Bar Temperature Rise limited by,
-Mechanical Strength of Conductors
-Possible effect on adjacent equipment
-Permissible Temperature of insulation
-Plus other factors Table 2 AS/NZS 3439.1
-And is considered to comply if Temperature Rise is less than 70 Degrees.

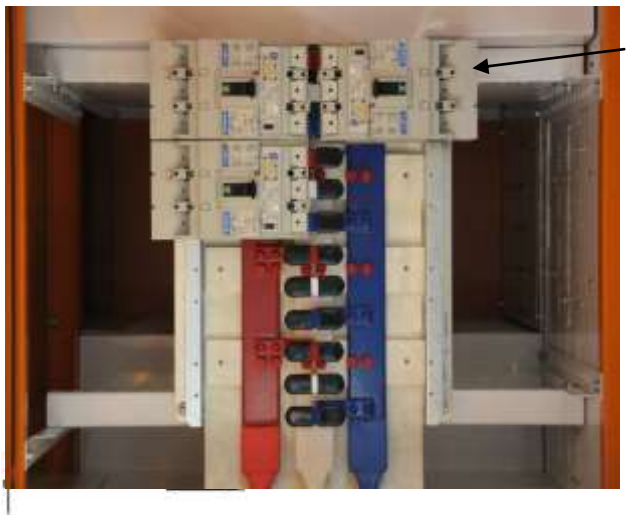
Bus Bar Temperature rise clarification.
This means 70+35(ambient temperature, as nominated in standard) =105 Final Temperature, is deemed to comply with no other supporting documentation. With supporting documentation, for example the insulation can withstand a higher rating and verified by the supplier, the temperature rise limit can be higher.

Form 3 B i h. Note. IP2X terminal covers are in place. Cable terminations are not on, or in the Functional Unit. There is not a requirement to shroud or cover these connections. Refer to higher Forms of Separation if this is required



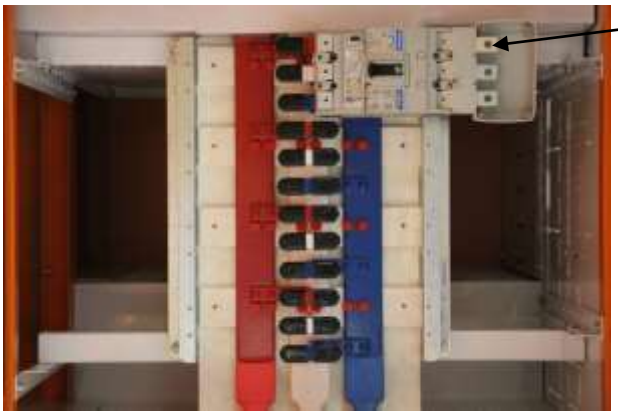
Temperature Rise 70 Degrees

Form 4 A i h. Note. IP2X Terminal Covers in place on line and load connections of Functional Unit

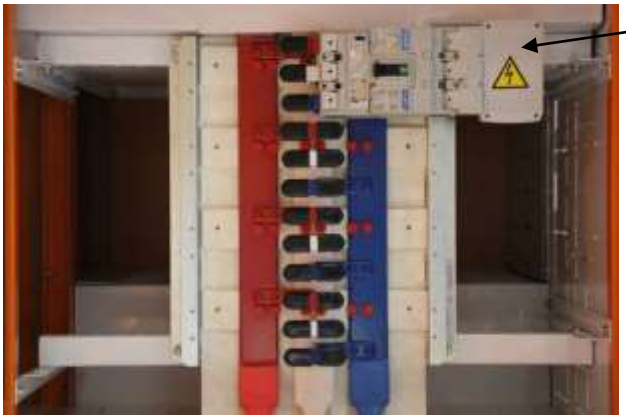


Temperature Rise 70 Degrees

Form 4 B i h, Note IP2X Terminal Covers in place on line and load connections of Functional Unit
Connection/outgoing cable Connection, is not within the functional unit and is inside a housing
Cover for load connection removed for clarity of photo only



Form 4 B i h, Note IP2X Terminal Covers in place on line and load connections of Functional Unit
Connection/outgoing cable Connection is not within the functional unit and is inside a housing
Cover for load connections in place



There is a lot of technical requirements for verification noted in this article.
Feel free to contact your NESMA Switchboard Manufacturer if you need clarification. Switchboard design is complicated and should be only done by people with the necessary skill set to ensure compliance to standards.
Is not a matter of just installing “Stuff in a Box”