

Test Report No.: 19500215.001		Page 1 of 12 Seite 1 von 12	
<i>Prüfbericht - Nr.:</i>			
Client: <i>Auftraggeber:</i>	MFB Products 105 Lewis Road, Wantirna South, Victoria 3156, Australia		
Test item: <i>Gegenstand der Prüfung:</i>	IP 66 Cabinet Range		
Identification: <i>Bezeichnung:</i>	S280	Serial No.: <i>Serien-Nr.:</i>	N/A
Receipt No.: <i>Wareneingangs-Nr.:</i>	1113007449	Date of receipt: <i>Eingangsdatum:</i>	2015-08-31
Condition of test item at delivery: <i>Zustand des Prüfgegenstandes bei Anlieferung:</i>		New condition, no damage	
Testing location: <i>Prüfört:</i>	TÜV Rheinland Australia Pty. Ltd. 1/30 Kennington Drive Tomago NSW 2322 Australia		
Test specification: <i>Prüfgrundlage:</i>	AS 60529:2004 Degrees of protection provided by enclosures (IP Code)		
Test Result: <i>Prüfergebnis:</i>	The test item passed IP66 Der vorstehend beschriebene Prüfgegenstand wurde geprüft und entspricht oben genannter Prüfgrundlage.		
Testing Laboratory/ <i>Prüflaboratorium:</i>	TÜV Rheinland Australia Pty. Ltd. 1/30 Kennington Drive Tomago NSW 2322 Australia		
Compiled by/ <i>zusammengestellt:</i>		Reviewed by/ <i>kontrolliert:</i>	
			
2015-10-23	David Price	2015-10-28	James Bes
<small>Datum Date</small>	<small>Name Name</small>	<small>Unterschrift Signature</small>	<small>Datum Date</small>
		<small>Unterschrift Signature</small>	
Other Aspects/ <i>Sonstiges:</i>			
Complied to IP66			
Abkürzungen:	<i>P(ass) = entspricht Prüfgrundlage</i>	Abbreviations:	<i>P(ass) = passed</i>
	<i>F(ail) = entspricht nicht Prüfgrundlage</i>		<i>F(ail) = failed</i>
	<i>N/A = nicht anwendbar</i>		<i>N/A = not applicable</i>
	<i>N/T = nicht getestet</i>		<i>N/T = not tested</i>
This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.			
<i>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.</i>			

Revision 5.0

Test Report
AS 60529:2004
Degrees of protection provided by enclosures (IP Code)

Test item particulars:

Enclosure specification (IP Rating):	IP66
Internal volume of EUT, V_i (cm ³): (1 liter = 1dm ³ = 1000cm ³)	502,700
Enclosure category:	1

General remarks:

1. This report shall not be reproduced, except in full.
2. Details in test data / test plan no. 1113007449.
3. This test report is based on assessment and tests applied to the specific test item(s) as submitted by the client.
TÜV Rheinland Australia disclaims any and all responsibility or obligation for any other item.
4. Assessment and testing performed on 24/08/2015 to 28/08/2015.

Description of the test item:

The enclosure is an industrial cabinet used to house electronic equipment by using the racking system mounted internally.

Doors, which may be solid or with a window, are hung on on the front and back of the enclosure with multiple hinges and secured in the closed position by a multipoint locking system, activated by a semiflush fitting, "lift & swing" key lockable handle. The entire hinge and locking system is located outside the gasket, ie these lock rods do not encroach into the working area of the cabinet. Further, the complete hinge/lock system is symmetrical, allowing for rehanging a left hand door to right hand with the aid of a screwdriver.

Cable access to the cabinet is provided at the base where there are two 50 x 200mm cable entries fitted with protective gland plates.

Lifting Eye Bolt provisions are made on the top.

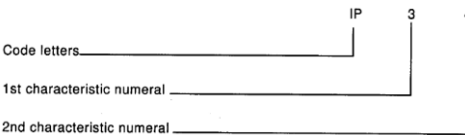
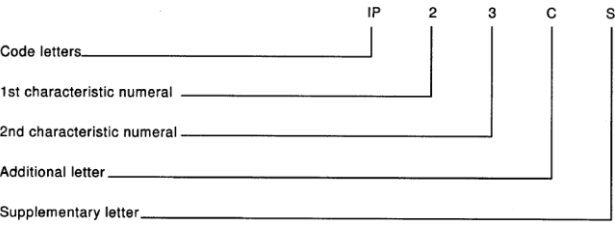
Removable sides are fitted with security screws providing added protection within public areas, the cabinet also comes with a tool for panel removal if required

Options/accessories/ancillary equipment:

The enclosure may come with a door that has a window.

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Clause	Requirement + Test	Result - Remark	Verdict
1	SCOPE AND OBJECT		P
2	NORMATIVE REFERENCES		P
3	DEFINITIONS		P
4	DESIGNATIONS		P
4.1	Arrangement of the IP Code		P
4.2	Elements of the IP Code and their meanings		P
4.3	Examples for the use of letters in the IP Code		P
5	DEGREES OF PROTECTION AGAINST ACCESS TO HAZARDOUS PARTS AND AGAINST SOLID FOREIGN OBJECTS INDICATED BY THE FIRST CHARACTERISTIC NUMERAL		-
	The designation with a first characteristic numeral implies that conditions stated in both 5.1 and 5.2 are met.		P
5.1	Protection against access to hazardous parts		-
	Table 1 gives brief descriptions and definitions for the degrees of protection against access to hazardous parts.		P
	To comply with the conditions of the first characteristic numeral, adequate clearance shall be kept between the access probe and hazardous parts.		P
	The tests are specified in clause 12.		P
5.2	Protection against solid foreign objects		-
	Table 2 gives brief descriptions and the definitions for the degrees of protection against the penetration of solid foreign objects including dust.		P
	The protection against the ingress of solid foreign objects implies that the object probes up to numeral 2 shall not fully penetrate the enclosure. Object probes for numerals 3 and 4 shall not penetrate the enclosure at all.		P
	Dust-protected enclosures to numeral 5 allow a limited quantity of dust to penetrate under certain conditions.		N/A
	Dust-tight enclosures to numeral 6 do not allow any dust to penetrate.		P
	The tests are specified in clause 13.		P
6	DEGREES OF PROTECTION AGAINST INGRESS OF WATER INDICATED BY THE SECOND CHARACTERISTIC NUMERAL		-

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Clause	Requirement + Test	Result - Remark	Verdict
	The tests for the second characteristic numeral are carried out with fresh water.		P
	Table 3 gives brief descriptions and definitions of the protection for the degrees		P
	Degrees of protection listed in this table shall be specified only by the second characteristic numeral.		P
	The tests are specified in clause 14.		P
	Up to and including second characteristic numeral 6, the designation implies compliance also with the requirements for all lower characteristic numerals.		P
	An enclosure designated with second characteristic numeral 7 or 8 only is considered unsuitable for exposure to water jets.		N/A
7	DEGREES OF PROTECTION AGAINST ACCESS TO HAZARDOUS PARTS INDICATED BY THE ADDITIONAL LETTER		N/A
8	SUPPLEMENTARY LETTERS		N/A
9	EXAMPLES OF DESIGNATIONS WITH THE IP CODE		-
9.1	IP Code not using optional letters: 		P
9.2	IP Code using optional letters: 		N/A
10	MARKING		-
	The requirements for marking shall be specified in the relevant product standard.		P
	Where appropriate, such a standard should also specify the method of marking which is to be used when		N/A
	– one part of an enclosure has a different degree of protection to that of another part of the same enclosure;		N/A
	– the mounting position has an influence on the degree of protection;		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	– the maximum immersion depth and time are indicated.		N/A
11	GENERAL REQUIREMENTS FOR TESTS		-
11.1	Atmospheric conditions for water or dust tests		P
	The recommended atmospheric conditions during the tests are as follows:		-
	Temperature range: 15°C to 35°C	17.9°C to 24°C	P
	Relative humidity: 25% to 75%	75%	P
	Air pressure: 86 kPa to 106 kPa (860 mbar to 1 060 mbar).	1019mbar	P
11.2	Test samples		-
	The tests specified in this standard are type tests.		P
	Unless otherwise specified in a relevant product standard, the test samples for each test shall be in a clean and new condition.	The test sample was clean and new	P
	The relevant product standard shall specify details such as:		-
	– the number of samples to be tested;		N/A
	– Conditions for mounting, assembling and positioning of the samples.		N/A
	– the pre-conditioning, if any,		N/A
	– whether to be tested energized or not;		N/A
	– whether to be tested with its parts in motion or not.		N/A
	In the absence of such specification, the manufacturer's instructions shall apply.		P
11.3	Application of test requirements and interpretation of test results		-
	The application of the general requirements for tests and the acceptance conditions for equipment containing drain-holes or ventilation openings is the responsibility of the relevant technical committee.		N/A
	In the absence of such specification the requirement of this standard shall apply.		P
11.4	Combination of test conditions for the first characteristic numeral		-
	Designation with a first characteristic numeral implies that all test conditions are met for this numeral:		P
11.5	Empty enclosures		-

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Clause	Requirement + Test	Result - Remark	Verdict
	If the enclosure is tested without equipment inside, detailed requirements shall be indicated by the enclosure manufacturer in his instructions for the arrangement and spacing of hazardous parts or parts which might be affected by the penetration of foreign objects or water.	The equipment was empty however the tests were performed for ingress of dust, water and foreign objects.	N/A
12	TESTS FOR PROTECTION AGAINST ACCESS TO HAZARDOUS PARTS INDICATED BY THE FIRST CHARACTERISTIC NUMERAL		-
12.1	Access probes		-
	Access probes to test the protection of persons against access to hazardous parts are given in table 6.		P
12.2	Test conditions		-
	The access probe is pushed against or inserted through any openings of the enclosure with the force specified in table 6.	The design of the equipment will prevent a 1mm probe from entering the enclosure	P
	Internal moving parts may be operated slowly, where this is possible.		N/A
12.3	Acceptance conditions		-
	The protection is satisfactory if adequate clearance is kept between the access probe and hazardous parts.		P
	For the test of first characteristic numeral 1, the access probe 50 mm diameter shall not completely pass through the opening.		N/A
	For the test of first characteristic numeral 2, the jointed test finger may penetrate to its 80 mm length, but the stop face (Ø 50 mm × 20 mm) shall not pass through the opening.		N/A
	Adequate clearance means:		N/A
12.3.1	For low-voltage equipment (rated voltages not exceeding 1 000 V a.c. and 1 500 V d.c.)		-
	The access probe shall not touch hazardous live parts.		N/A
12.3.2	For high-voltage equipment (rated voltages exceeding 1 000 V a.c. and 1 500 V d.c.)		-
	When the access probe is placed in the most unfavourable position(s), the equipment shall be capable of withstanding the dielectric tests as specified in the relevant product standard applicable to the equipment.		N/A
12.3.3	For equipment with hazardous mechanical parts:		-

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Clause	Requirement + Test	Result - Remark	Verdict
	The access probe shall not touch hazardous mechanical parts.		N/A
13	TESTS FOR PROTECTION AGAINST SOLID FOREIGN OBJECTS INDICATED BY THE FIRST CHARACTERISTIC NUMERAL		-
13.1	Test means		-
	Test means and the main test conditions are given in table 7.		P
13.2	Test conditions for first characteristic numerals 1, 2, 3, 4		-
	The object probe is pushed against any openings of the enclosure with the force specified in table 7.		P
13.3	Acceptance conditions for first characteristic numerals 1, 2, 3, 4		-
	The protection is satisfactory if the full diameter of the probe specified in table 7 does not pass through any opening.		P
13.4	Dust test for first characteristic numerals 5 and 6		-
	The test is made using a dust chamber incorporating the basic principles shown in figure 2. The talcum powder used shall be able to pass through a square-meshed sieve the nominal wire diameter of which is 50 µm and the nominal width of a gap between wires 75 µm.		P
	The amount of talcum powder to be used is 2 kg per cubic metre of the test chamber volume.		P
	Enclosures are of necessity in one of two categories:		-
	Category 1: Enclosures where the normal working cycle of the equipment causes reductions in air pressure within the enclosure below that of the surrounding air, for example, due to thermal cycling effects.		P
	Category 2: Enclosures where no pressure difference relative to the surrounding air is present.		N/A
	Category 1 enclosures:		-
	The enclosure under test is supported inside the test chamber and the pressure inside the enclosure is maintained below the surrounding atmospheric pressure by a vacuum pump.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	The object of the test is to draw into the enclosure, by means of depression, a volume of air 80 times the volume of the sample enclosure tested without exceeding the extraction rate of 60 volumes per hour. In no event shall the depression exceed 2 kPa (20 mbar) on the manometer shown in figure 2.		P
	If an extraction rate of 40 to 60 volumes per hour is obtained the duration of the test is 2 h.		N/A
	If, with a maximum depression of 2 kPa (20 mbar), the extraction rate is less than 40 volumes per hour, the test is continued until 80 volumes have been drawn through, or a period of 8 h has elapsed.	Volume = 502.7 ltrs Leakage Rate = 4.02 Ltrs/hr Volume Rate = 0.008 V/hr Test duration = 8 hours	P
	Category 2 enclosures:		-
	The enclosure under test is supported in its normal operating position inside the test chamber, but is not connected to a vacuum pump. Any drain-hole normally open shall be left open. The test shall be continued for a period of 8 h.		N/A
13.5	Special conditions for first characteristic numeral 5		-
13.5.1	Test conditions for first characteristic numeral 5		-
	The enclosure shall be deemed category 1 unless the relevant product standard for the equipment specifies that the enclosure is category 2.		N/A
13.5.2	Acceptance conditions for first characteristic numeral 5		-
	The protection is satisfactory if, on inspection, talcum powder has not accumulated in a quantity or location such that, as with any other kind of dust, it could interfere with the correct operation of the equipment or impair safety.		N/A
13.6	Special conditions for first characteristic numeral 6		-
13.6.1	Test conditions for first characteristic numeral 6		-
	The enclosure shall be deemed category 1, whether reductions in pressure below the atmospheric pressure are present or not.		P
13.6.2	Acceptance conditions for first characteristic numeral 6		-
	The protection is satisfactory if no deposit of dust is observable inside the enclosure at the end of the test.	No dust entered	P
14	TESTS FOR PROTECTION AGAINST WATER INDICATED BY THE SECOND CHARACTERISTIC NUMERAL		-

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Clause	Requirement + Test	Result - Remark	Verdict
14.1	Test means		-
	The test means and the main test conditions are given in table 8.		P
14.2	Test conditions		-
	The tests are conducted with fresh water.		P
	During the tests for IPX1 to IPX6 the water temperature should not differ by more than 5 K from the temperature of the specimen under test.		P
	For the purpose of the tests, the surface area of the enclosure is calculated with a tolerance of 10 %.		P
	Adequate safety precautions should be taken when testing the equipment in the energized condition.		N/A
14.2.1	Test for second characteristic numeral 1 with the drip box		N/A
14.2.2	Test for second characteristic numeral 2 with the drip box		N/A
14.2.3	Test for second characteristic numeral 3 with oscillating tube or spray nozzle		N/A
14.2.4	Test for second characteristic numeral 4 with oscillating tube or spray nozzle		N/A
14.2.5	Test for second characteristic numeral 5 with the 6,3 mm nozzle		N/A
14.2.6	Test for second characteristic numeral 6 with the 12,5 mm nozzle		P
	The test is made by spraying the enclosure from all practicable directions with a stream of water from a standard test nozzle as shown in figure 6.		P
	The conditions to be observed are as follows:		-
	– delivery rate: 100 l/min \pm 5 %;	98l/min	P
	– test duration per square metre of enclosure surface area likely to be sprayed: 1 min;		P
	– minimum test duration: 3 min;	4 minutes	P
	– distance from nozzle to enclosure surface: between 2,5 m and 3 m.	2.5m	P
14.2.7	Test for second characteristic numeral 7: temporary immersion between 0,15 m and 1 m		N/A
14.2.8	Test for second characteristic numeral 8: continuous immersion subject to agreement		N/A
14.3	Acceptance conditions		-

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Clause	Requirement + Test	Result - Remark	Verdict
	After testing in accordance with the appropriate requirements of 14.2.1 to 14.2.8 the enclosure shall be inspected for ingress of water.	No water entered	P
	In general, if any water has entered, it shall not:		-
	– be sufficient to interfere with the correct operation of the equipment or impair safety;		P
	– deposit on insulation parts where it could lead to tracking along the creepage distances		P
	– reach live parts or windings not designed to operate when wet;		P
	– accumulate near the cable end or enter the cable if any.		P
	If the enclosure is provided with drain-holes, it should be proved by inspection that any water which enters does not accumulate and that it drains away without doing any harm to the equipment.		N/A
	For enclosures without drain-holes, the relevant product standard shall specify the acceptance conditions if water can accumulate to reach live parts.		N/A
15	TESTS FOR PROTECTION AGAINST ACCESS TO HAZARDOUS PARTS INDICATED BY THE ADDITIONAL LETTER		N/A



The enclosure before and after the IP6X test. No dust tracking into the enclosure was evident



The enclosure before and after the IPX6 test. No water tracking into the enclosure was evident

End of the Test report