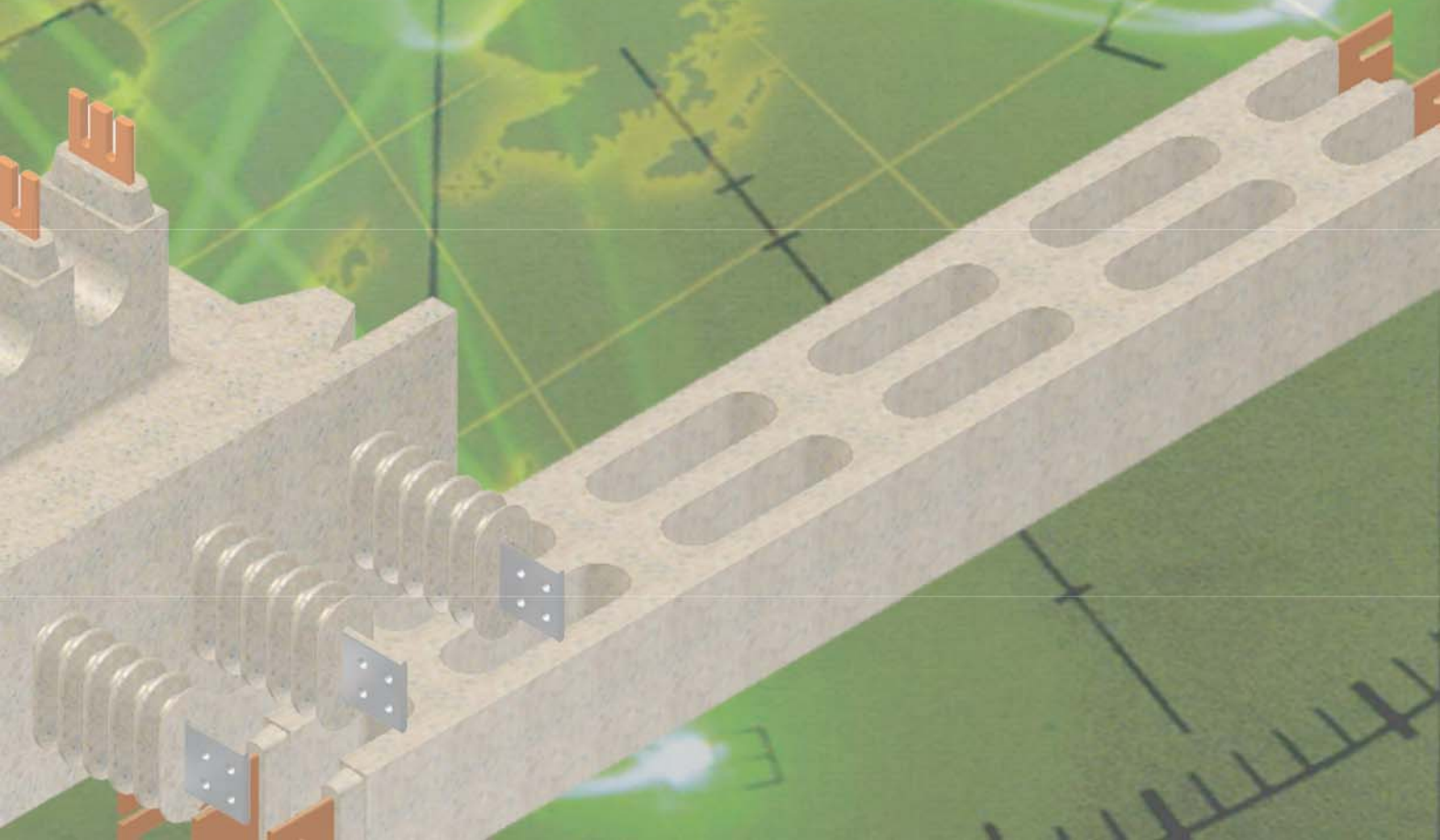


The logo for TEC BAR features the word "TEC" in a blue, italicized sans-serif font, followed by a green circular icon with white curved lines, and the word "BAR" in a blue, italicized sans-serif font.

**TEC**  **BAR**

**CAST-RESIN INSULATED  
BUSWAY SYSTEMS**

***MEDIUM VOLTAGE***



# Content

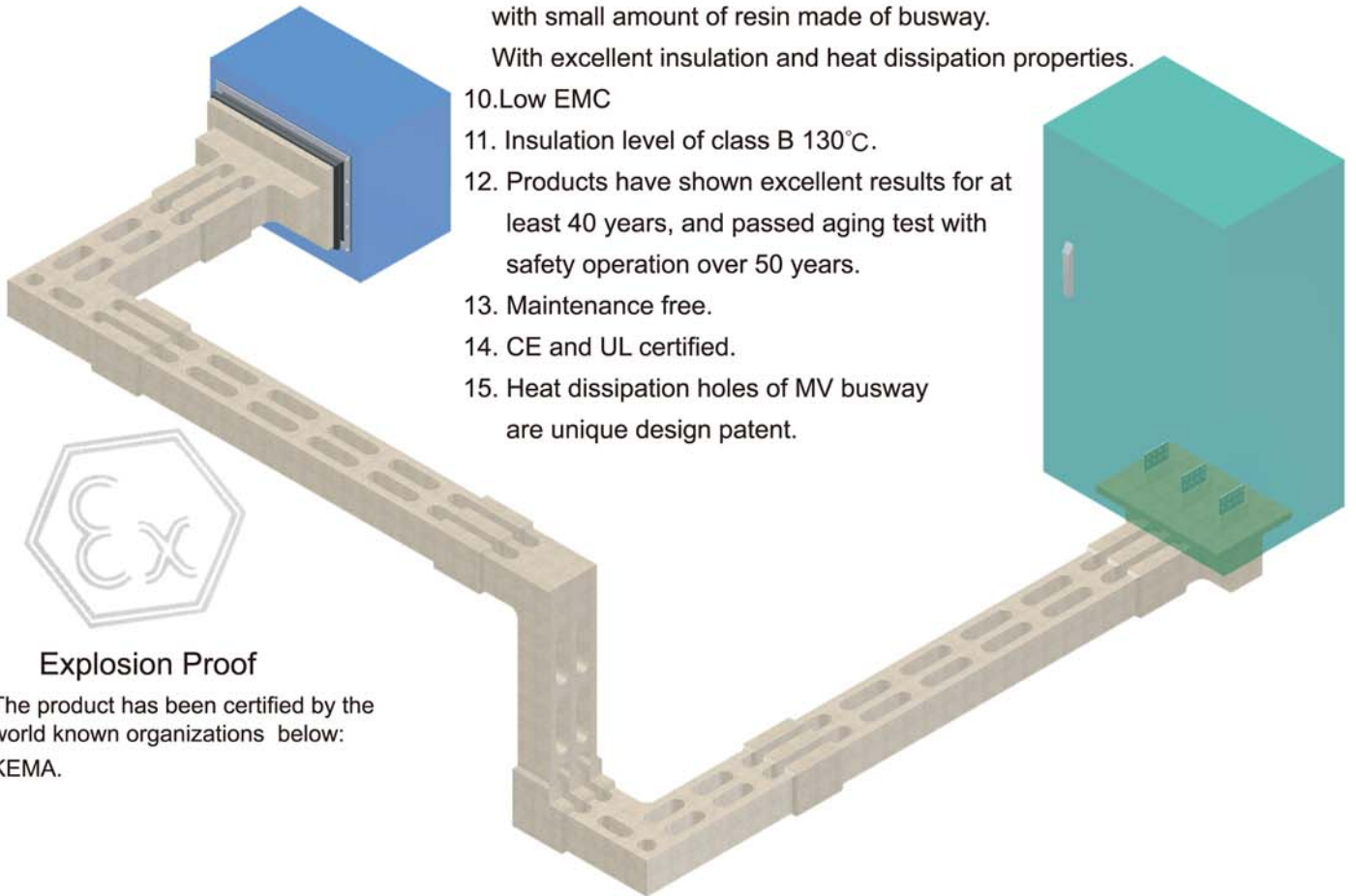
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# Excellence

1. Medium voltage products meet the standard of IEC 60694, IEC 62271-200, IEC 62771-201 IEC 62271-202 and IEEE C 37.23.
2. Compact, easy to install, no emission of toxic gas.
3. The purity of conductor is 99.9% for copper with conductivity above 98% IACS.
4. Voltage drop Low, high short circuit current withstand, carried out overload + 20% for 2 hours.
5. Degree of protection tested in accordance with IEC-60529, IP68. Mechanical Impacts IK10.
6. Fire-proof wall partitions meet S120 in accordance with IEC 60332-3 and meet NBN 713-020 add3.
7. Fire-proof partitions in the piping is in accordance with IEC 60332-3.
8. Anti-explosion certification meets EN 50028 no. EEx m II .
9. Mixing excellent material such as non-organic volcanic rock with small amount of resin made of busway. With excellent insulation and heat dissipation properties.
10. Low EMC
11. Insulation level of class B 130°C.
12. Products have shown excellent results for at least 40 years, and passed aging test with safety operation over 50 years.
13. Maintenance free.
14. CE and UL certified.
15. Heat dissipation holes of MV busway are unique design patent.



## Explosion Proof

The product has been certified by the world known organizations below:  
KEMA.

**IK10**  
Mechanical Impacts

**EMC**  
Electromagnetic compatibility

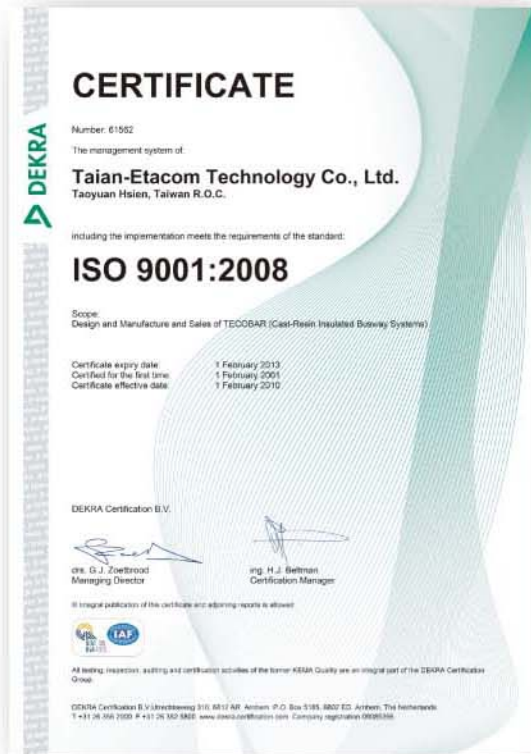
**IP67**  
Degree of protection

**S120**  
Fire Partitions

**E30**  
Fire Proof



Patent Certificate of R.O.C - Cast-Resin Insulated Busway System (Medium Voltage)



ISO 9001:2008 Certificate

**CRIF - WTCM**  
THE COLLECTIVE RESEARCH CENTER FOR THE TECHNOLOGY INDUSTRY

Quotation N°: 4-3412  
(the above reference number is to be quoted to all correspondents)  
Date: 02/05/2005

ETA-COM  
Monsieur: E. GOETHALS  
Scheidweg, 4  
B-2850 BOOM

Dear Sir,

Following our phone call, please find hereafter the test comment on your ageing tests.

Tables here below present a summary realized after different ageing durations in an oven at 80°C. Results were extrapolated at 50 years (according to specification IEC94218 on the basis of 5000 hours ageing).

Duration h	Belgium				Taiwan			
	Et MPa	tg MPa	δb mm	α %	Et MPa	tg MPa	δb mm	α %
1	12015	29.11	1.50	0.231	11403	30.93	1.80	0.269
500	12599	29.48	1.64	0.237	900	11970	32.60	1.86
1000	11762	29.98	1.83	0.200	1090	11430	34.21	2.04
1500	12487	29.43	1.89	0.237	1390	12090	31.95	1.81
2500	12331	28.86	1.65	0.238	2300	10544	29.53	1.87
3500	11716	28.65	1.67	0.242	3500	11512	29.54	1.67
5000	12388	27.52	1.59	0.231	5000	12049	29.68	1.63
50 years	11886	26.67	1.71	0.245	11610	30.50	1.76	0.265

Samples: "Belgium"  
Samples: "Taiwan"

As can be seen in these tables, the results do not show any significant decrease between 1 hour and 5000 hours ageing. Consequently this extrapolation at 50 years do not show (on the basis of 5000 hours ageing) any significant decrease.

Please note that:  
The here-above tests results may be published or communicated provided "test realised in CRIF" is mentioned.  
Test results are valid only for materials identical to the tested samples

Best regards

*M. Gasparini*  
M. Gasparini  
Laboratory manager

Responsible for the project

ISO 9001:2008 certification by decree of the Royal Government of Belgium, January 2008/04/04  
CRIF: USSE: rue de la Loi 11, B-1050 Brussels, Belgium • Tel: 32 (0) 27 07 33 33 • Fax: 32 (0) 27 07 33 32  
E-mail: info@crif.be  
Site de Châtelineau, Avenue Georges Lemaître, 22, B-1050 Brussels, Belgium • Tel: 32 (0) 27 07 33 32  
Page(s) office and production: Belgium 4, Spain 85, 9-1000 Brussels • Tel: 32 (0) 27 07 33 33 • Fax: 32 (0) 27 07 33 32

Ageing test report

**Underwriters Laboratories Taiwan Co., Ltd.**  
Commercial Inspection and Testing Services (CTS)

Underwriters Laboratories Taiwan Co., Ltd.  
1F, 280, Sec. 2, Zhongxing Rd., Taipei, Taiwan 104  
Tel: 886-2-25221663 Fax: 886-2-28907700  
http://www.ul.com

電力與消防安全檢驗有限公司  
Underwriters Laboratories Taiwan Co., Ltd.  
台北市中興路二段280號1樓  
1F, 280, Sec. 2, Zhongxing Rd., Taipei, Taiwan 104  
Tel: 886-2-25221663 Fax: 886-2-28907700  
http://www.ul.com

Commercial Inspection and Testing Services (CTS)

Project No.	UN/AT2119
Client File No.	UL71603
Testing Office	Taipei
Date	November 10, 2005

**Testing Report**

Client Name:	TAIAN-ETACOM TECHNOLOGY CO LTD	Testing Location:	Underwriters Laboratories Taiwan Co Ltd
Address:	7 FL, 156-2 SUNG CHANG RD., TAIPEI	Address:	1st Fl 260 Da-Yeh Road, Putins
City, State, Zip:	TAIPEI	City, State, Zip:	Taipei
Contact:	MR. Shou-Lung Liang	Contact:	Clair Tseng
Phone:	886-2-25221663	Phone:	886-2-2890-7700
Fax:	886-3-4783613	Fax:	886-2-2890-7432

Product Description: BIM INSULATION MATERIAL

Number of Samples Submitted: 20 pcs

Test Standard of Requirement: UL94 V

Test Results: As attachment.

Comments: N/A

THIS MESSAGE AND ANY DOCUMENTS ACCOMPANYING IT IS INTENDED ONLY FOR THE USE OF THE PARTY TO WHOM IT IS ADDRESSED AND MAY CONTAIN INFORMATION THAT IS UNLAWFUL, CONFIDENTIAL, AND EXEMPT FROM DISCLOSURE UNDER APPLICABLE LAW. If the reader of this message is not the intended recipient, or the employee or agent responsible for delivering the message to the intended recipient, you are hereby notified that any dissemination, distribution, or copying of this communication is strictly prohibited. If you have received this communication in error, please notify us immediately by return fax and please indicate you have destroyed the original message or any retaining it be as through the text.

IF YOU EXPERIENCE A PROBLEM RECEIVING THIS TRANSMISSION, PLEASE CALL.

Fire withstand examined in accordance with UL 94V





# Product Certification

財團法人國家實驗研究院  
國家地震工程研究中心地震模擬實驗室  
National Center for Research on Earthquake Engineering  
台北市中興路三段 200 號 200, Sec. 3, Xinhui Rd, Taipei, Taiwan  
Tel: 886-2-6630-0888 Fax: 886-2-6630-4856  
http://www.ncree.org.tw 統一編號: 9491073

地震模擬振動台  
測試報告

報告編號: NCREE-LT-TQM-D-T1601  
2010004  
報告日期: 2010 年 4 月 6 日

測試名稱: 全標榜式中壓區流排 0.8G 三軸向地震模擬試驗  
測試件: 全標榜式中壓區流排  
(廠牌: 安達康, 型號: 中壓區流排全系列, 序號: N/A)  
送測單位: 安達康科技股份有限公司  
地址: 桃園縣楊梅鎮新江路 158 號  
電話: 03-4883786 ext 210

上述設備經本實驗室測試, 結果如內文所述。  
本報告含附頁附件共 7 頁(不含本頁), 分離使用無效。

張國鎮  
國家地震工程研究中心主任

National Center for Research on Earthquake Engineering-0.8g in 3 - axis seismic simulation test.

**TEST REPORT**

Report no. 70670046-HVL 06-1173  
Client: TAIAN-ETACOM Technologies (TET)  
Taiwan

Concerning tests  
Date 10 February until 7 June 2008  
Place KEMA High-Voltage Laboratory, Arnhem, the Netherlands  
Object a three-phase epoxy-encapsulated busbar system 7.2 kV  
Type Busbar: (PH16) 3x1820 mm<sup>2</sup>  
Manufacturer TET (TAIAN-ETACOM Technologies), Taiwan

**REQUIREMENTS**  
The requirements as specified in the standard IEC 60694 (2001), IEC 60439-2 (2000), ANSI C37.23 (2003) and client's instructions. As the conductors and the joints were fully encapsulated by the epoxy polymer concrete, the requirements as specified in ANSI C37.23 (2003) table 5 were not applicable. In this case the client's specification (maximum temperature rise of 50 K) was applied.

**TEST PROGRAMME**  
The programme was specified by the client and was as follows:  
1. temperature-rise test at the current corresponding to a maximum temperature rise of 50 K,  
2. determination of the electrical characteristics on a phase-to-neutral basis of the busbar system by calculations from measurements.

**SUMMARY AND CONCLUSION**  
See page 2 of this report.

Authors P.J. Hülkenberg  
KEMA Nederland B.V.

This report consists of 12 pages  
1 appendix

P.J. Hülkenberg  
KEMA T&D Testing Services  
Managing Director  
Arnhem, 11 August 2008

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SH1 Temperature-rise test

**REPORT OF PERFORMANCE**      TDT 1554-10

OBJECT A three-phase cast resin busway system (insulated conductor)

TYPE PH10 3-1200      SERIAL No. HV 101, HV 102, HV 103  
17.5 kV - 2600 A - 100 kA 1 s - 260 kA peak 0.3 s - 3 x 1200 mm<sup>2</sup> Cu

MANUFACTURER TAIAN-ETACOM TECHNOLOGY Co. Ltd., Yang-Mei, Taoyuan County, Taiwan

CLIENT TAIAN-ETACOM TECHNOLOGY Co. Ltd., Yang-Mei, Taoyuan County, Taiwan

TESTED BY KEMA HIGH-VOLTAGE LABORATORY Arnhem, the Netherlands

DATE(S) OF TESTS 31 August until 2 September 2010

TEST PROGRAMME Temperature-rise tests with resistance measurements at different current levels, based on IEC 60439-2 (2000), IEC 62271-200 (2003) and client's specifications.

SUMMARY AND CONCLUSION The temperature-rise tests at current levels of 700, 1400, 2140 and 2750 A have passed the test. The temperature rise test at 3400 A exceeded the maximum allowed temperature-rise. The AC resistance measurements are for information only.

This Report of Performance applies only to the object tested. The responsibility for conformity of any object having the same designations with that tested rests with the Manufacturer.

This report consists of 31 pages in total.

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KEMA Nederland B.V.  
P.J. Hülkenberg  
KEMA T&D Testing Services  
Managing Director  
Arnhem, 24 November 2010

PH10 Temperature-rise test

**TEST REPORT**

Report no. 70670046-HVL 06-1171  
Client: TAIAN-ETACOM Technologies (TET)  
Taiwan

Concerning tests  
Date 6 February until 7 June 2008  
Place KEMA High-Voltage Laboratory, Arnhem, the Netherlands  
Object a three-phase epoxy-encapsulated busbar system 7.2 kV  
Type Busbar: (PH16) 3x1820 mm<sup>2</sup>  
Manufacturer TET (TAIAN-ETACOM Technologies), Taiwan

**REQUIREMENTS**  
The requirements as specified in the standard IEC 60694 (2001), IEC 60439-2 (2000), ANSI C37.23 (2003) and client's instructions. As the conductors and the joints were fully encapsulated by the epoxy polymer concrete, the requirements as specified in ANSI C37.23 (2003) table 5 were not applicable. In this case the client's specification (maximum temperature rise of 50 K) was applied.

**TEST PROGRAMME**  
The programme was specified by the client and was as follows:  
1. temperature-rise test at the current corresponding to a maximum temperature rise of 50 K,  
2. determination of the electrical characteristics on a phase-to-neutral basis of the busbar system by calculations from measurements.

**SUMMARY AND CONCLUSION**  
See page 2 of this report.

Authors P.J. Hülkenberg  
KEMA Nederland B.V.

This report consists of 12 pages  
1 appendix

P.J. Hülkenberg  
KEMA T&D Testing Services  
Managing Director  
Arnhem, 11 August 2008

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PH16 Temperature-rise test



**KEMA**

**TEST REPORT**

Report no. 70670206-1HV, 06-1308  
Client TAIAN-ETACOM Technologies (TET), Taiwan

Concerning tests  
Date 25 October 2006 up to and including 27 October 2006  
Place KEMA High Voltage Laboratory, Arnhem, the Netherlands  
Object a three phase epoxy-encapsulated busbar system, 17.5 kV  
Type BEBOSOL system PH20 3x3000 mm<sup>2</sup>  
Manufacturer TAIAN-ETACOM Technologies (TET), Taiwan

**REQUIREMENTS**  
The requirements as specified in the standard IEC 60894 (2001), IEC 60438-2 (2000), ANSI C37.23 (2003) and client's instructions. As the conductors and the joints were fully impregnated by the epoxy polymer concrete, the requirements as specified in ANSI C37.23 (2003) table 5 were not applicable. In this case the client's specification (maximum temperature rise of 50 K) was applied.

**TEST PROGRAMME**  
The programme was specified by the client and was as follows:  
1. temperature-rise tests at 2000 A, 4000 A and 6000 A (50 Hz)  
2. temperature-rise test at the specified current of 2000 A (50 Hz)  
3. determination of the electrical characteristics on a phase-to-neutral basis of the busbar system by calculations from measurements.

**SUMMARY AND CONCLUSION**  
See page 2 of this report.

Author: P.J. Hilkenberg  
KEMA Nederland B.V.  
P.O. Box 8000  
KEMA T&O Testing Services  
Managing Director  
Arnhem, 22 December 2006

This B-report consists of 15 pages  
1 appendix

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PH20 Temperature-rise test

**KEMA**

**REPORT OF PERFORMANCE** 09-1247

OBJECT 3-phase, 24 kV cast resin busway system (insulated conductor)

TYPE TET/TECO power busway PE16 3x1920 SERIAL No.'s HV 102, HV 103, HV 105  
24 kV, 3 x 1920 mm<sup>2</sup> Cu

MANUFACTURER Tain-Etacom Technology Co., Ltd., Yang-Mei, Taoyuan Hsien, Taiwan

CLIENT Tain-Etacom Technology Co., Ltd., Yang-Mei, Taoyuan Hsien, Taiwan

TESTED BY KEMA HIGH-VOLTAGE LABORATORY Arnhem, the Netherlands

DATE OF TESTS 9 February 2009 until 19 February 2009

TEST PROGRAMME Selected type tests based on IEC 60438-2 (2000), IEC 62271-209 (2003), IEC 62271-202 (2006) and customer specifications (see page 2).

SUMMARY AND CONCLUSION The tests were passed.

This Report of Performance applies only to the object tested. The responsibility for conformity of any object having the same designations with that tested rests with the Manufacturer.

This report consists of 58 pages in total.

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KEMA Nederland B.V.  
P.O. Box 8000  
KEMA T&O Testing Services  
Managing Director  
Arnhem, 19 May 2009

PE16 Temperature-rise test

**KEMA** 83-06

**TYPE TEST CERTIFICATE OF SHORT-CIRCUIT PERFORMANCE**

APPARATUS A three phase epoxy-encapsulated busbar system

DESIGNATION Beibac+ SH1 3x720

Rated voltage	7.2 kV	Rated normal current	1487 A
Rated short-time withstand current	90 kA	Rated frequency	50/60 Hz

MANUFACTURER TAIAN-ETACOM TECHNOLOGY Co., Ltd., Yang-Mei, Taoyuan Hsien, Taiwan, ROC

TESTED FOR TAIAN-ETACOM TECHNOLOGY Co., Ltd., Yang-Mei, Taoyuan Hsien, Taiwan, ROC

TESTED BY KEMA HIGH-POWER LABORATORY Utrechtseweg 310 - 6812 AR Arnhem - The Netherlands

DATE(S) OF TESTS 17 February 2006

The apparatus, constructed in accordance with the description, drawings and photographs incorporated in this Certificate, has been subjected to the series of proving tests in accordance with:

**IEEE Std C37.23** subclause 8.2.4

The results are shown in the record of Proving Tests and the oscillograms attached hereto. The values obtained and the general performance are considered to comply with the above Standard and to justify the ratings assigned by the manufacturer as listed on page 4.

The Certificate applies only to the apparatus tested. The responsibility for conformity of any apparatus having the same designations with that tested rests with the Manufacturer.

This Certificate consists of 20 sheets in total.

The Certificate falls under the scope of the accreditation certificate L002 of the Dutch Council for Accreditation. See information sheet (page 2).

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KEMA Nederland B.V.  
P.O. Box 8000  
KEMA T&O Testing Services  
Managing Director  
Arnhem, 3 August 2006

SH1 Short-circuit test

**KEMA**

**REPORT OF PERFORMANCE** TDT 2588-10

APPARATUS A three-phase cast resin busway system (insulated conductor)

TYPE PH10 3-1200 SERIAL No. HV 101, HV 102, HV 103  
17.5 kV - 2800 A - 100 kA 1 s - 280 kA peak 0.3 s - 3 x 1200 mm<sup>2</sup> Cu

CLIENT TAIAN-ETACOM TECHNOLOGY Co. Ltd., Yang-Mei, Taoyuan County, Taiwan

MANUFACTURER TAIAN-ETACOM TECHNOLOGY Co. Ltd., Yang-Mei, Taoyuan County, Taiwan

TESTED BY KEMA HIGH-POWER LABORATORY Utrechtseweg 310 - 6812 AR Arnhem - The Netherlands

DATE(S) OF TESTS 1 October 2010

TEST SPECIFICATION The tests have been carried out in accordance with the client's instructions. Test procedure and test parameters were based on IEC 62271-201 and IEEE Std C37.23.

This report applies only to the apparatus tested. The responsibility for conformity of any apparatus having the same designations with that tested rests with the Manufacturer.

This report consists of 16 sheets in total.

The report falls under the scope of the accreditation certificate L002 of the Dutch Council for Accreditation. See information sheet (page 2).

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KEMA Nederland B.V.  
P.O. Box 8000  
KEMA T&O Testing Services  
Managing Director  
Arnhem, 24 November 2010

PH10 Short-circuit test



# Product Certification

**KEMA** 81-06

**TYPE TEST CERTIFICATE OF SHORT-CIRCUIT PERFORMANCE**

**APPARATUS** A three-phase epoxy-encapsulated busbar system

**DESIGNATION** Barstar PH16 3x1920

Rated voltage	17.5 kV	Rated nominal current	3750 A
Rated short-time withstand current	85 kA	Rated frequency	50/60 Hz

**MANUFACTURER** TAIAN-ETACOM TECHNOLOGY Co., Ltd.  
Yang-Mei Taoyuan Hsien, Taiwan, ROC

**TESTED FOR** TAIAN-ETACOM TECHNOLOGY Co., Ltd.  
Yang-Mei Taoyuan Hsien, Taiwan, ROC

**TESTED BY** KEMA HIGH-POWER LABORATORY  
Ulrichsteeweg 310 - 6812 AR Arnhem - The Netherlands

**DATE(S) OF TESTS** 17 February 2006

The apparatus, constructed in accordance with the description, drawings and photographs incorporated in this Certificate, has been subjected to the series of proving tests in accordance with

**IEEE Std C37.23** subclause 6.2.4

The results are shown in the record of Proving Tests and the oscillograms attached hereto. The values obtained and the general performance are considered to comply with the above Standard and to justify the ratings assigned by the manufacturer as listed on page 4.

The Certificate applies only to the apparatus tested. The responsibility for conformity of any apparatus having the same designations with that tested rests with the Manufacturer.

This Certificate consists of 22 sheets in total.

This Certificate falls under the scope of the accreditation certificate L100 of the Dutch Council for Accreditation. See information sheet page 21.

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**KEMA Nederland B.V.**  
P.O. Box 8000  
KEMA T&D Testing Services  
Managing Director  
Arnhem, 3 August 2006

PH16 Short-circuit test

**KEMA** 468-06

**REPORT OF PERFORMANCE**

**APPARATUS** A three-phase epoxy-insulated busduct

**TYPE** PH205 3x3000mm<sup>2</sup>

17.5 kV - 5000 A - 100 kA - 50/60 Hz

**CLIENT** Taiwan - ETACOM Technologies,  
Yang-Mei, Taiwan

**MANUFACTURER** Taiwan - ETACOM Technologies,  
Yang-Mei, Taiwan

**TESTED BY** KEMA HIGH-POWER LABORATORY  
Ulrichsteeweg 310 - 6812 AR Arnhem - The Netherlands

**DATE(S) OF TESTS** 28 September 2006

**TEST SPECIFICATION** The tests have been carried out in accordance with the client's instructions. Test procedure and test parameters were based on IEC 62271-201 and IEEE Std C37.23

This report consists of 16 sheets in total.

This report falls under the scope of the accreditation certificate L100 of the Dutch Council for Accreditation. See information sheet page 21.

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**KEMA Nederland B.V.**  
P.O. Box 8000  
KEMA T&D Testing Services  
Managing Director  
Arnhem, 23 January 2007

PH20 Short-circuit test

**KEMA** 58-09

**TYPE TEST CERTIFICATE OF SHORT-CIRCUIT PERFORMANCE**

**APPARATUS** A three-phase epoxy-encapsulated busbar system

**DESIGNATION** TET/TECO power busway PE16 3x1920

Rated voltage	24 kV	Rated nominal current	3900 A
Rated short-time withstand current	100 kA	Rated frequency	50/60 Hz

**MANUFACTURER** TAIAN-ETACOM TECHNOLOGY Co., Ltd.,  
Yang-Mei, Taoyuan Hsien, Taiwan

**TESTED FOR** TAIAN-ETACOM TECHNOLOGY Co., Ltd.,  
Yang-Mei, Taoyuan Hsien, Taiwan

**TESTED BY** KEMA HIGH-POWER LABORATORY  
Ulrichsteeweg 310 - 6812 AR Arnhem - The Netherlands

**DATE(S) OF TESTS** 1 April 2006

The apparatus, constructed in accordance with the description, drawings and photographs incorporated in this Certificate, has been subjected to the series of proving tests in accordance with

**IEC 60466**, subclause 6.5,  
**IEEE Std. C37.23**, subclause 6.2.4

The results are shown in the record of Proving Tests and the oscillograms attached hereto. The values obtained and the general performance are considered to comply with the above Standard and to justify the ratings assigned by the manufacturer as listed on page 4.

This Certificate applies only to the apparatus tested. The responsibility for conformity of any apparatus having the same designations with that tested rests with the Manufacturer.

This Certificate consists of 25 sheets in total.

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**KEMA Nederland B.V.**  
P.O. Box 8000  
KEMA T&D Testing Services  
Managing Director  
Arnhem, 30 June 2006

PE16 Short-circuit test





1. Title: TECOBAR Medium Voltage Cast-Resin Insulated Busway.

2. Product Description:

TECOBAR Medium Voltage Cast-Resin Insulated Busway is developed for power systems between 3.6kV~24kV. The product has features of safety and compact. It is designed to using insulation material to perform cast resin sealing to the copper (aluminium) conductor. The insulation material is cast resin containing non-organic volcanic rock and has excellent insulation characteristics and mechanical strength, humidity-proof, non-combustible, and self-extinguishing features.

3. Applicable Scope:

TECOBAR medium voltage busway is manufactured in accordance with, IEC 60694, IEC 62271-200, IEC 62271-201, IEC 62271-202 and IEEE C37.23 standards. The elements included as below:

3.1 Straight elements, Elbow elements, T-elements and Terminal elements, etc.

4. Condition of Use:

TECOBAR medium voltage busway is composed of the parts listed in item 3.1. The elements are connected through junction units on site before cast molding with insulation mix to complete the medium voltage busway. Conditions for TECOBAR:

4.1 Altitude: below 2000m, indoor or outdoor site.

4.2 Ambient temperature: -45°C~65°C

4.3 Ambient humidity: 0%~100%

5. Technical Specifications:

5.1 Rated Voltage

Model	SH	HCB	PH	PE
Voltage	7.2kV	15.5kV	17.5kV	24kV

5.2 Frequency Hz: 50/60

5.3 System Type: 3Φ3w.

5.4 Conductor Material : Copper (E-Cu57).

Purity : 99.9% Conductivity : Above 98% IACS.

According to standards : JIS H3140 , DIN 1787, DIN 1759, DIN 40500.

5.5 Electrical characteristics of each TECOBAR element:

Partial discharge : ◎ Partial discharge coulomb value less than 20pC.

Protection degree : ◎ In accordance with IEC 60529 IP67.

Mechanical impacts : ◎ In accordance with IEC 62262 IK10.

Insulation capabilities : ◎ Max 50kV/1min.





# Product Specifications SH

## Copper

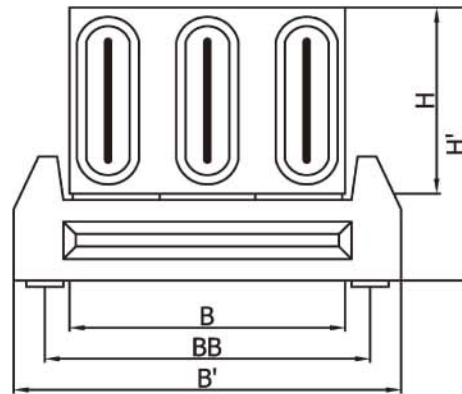
Type						
Model	SH1	SH1	SH1	SH2	SH2	SH2
Conductor Section(mm <sup>2</sup> )	300	480	720	800	1000	1200
Conductor Dimensions (mm)	w60xt5	w60xt8	w60xt12	w100xt8	w100xt10	w100xt12

Conductor Material	purity copper 99.9% , above 98% IACS					
Rated Current A (35/40 °C)	1040	1295	1500	1710	1880	2018
Rated Voltage V	7.2kV					
Frequency Hz	50/60					

Electrical Characteristics						
R at 20 °C $\mu\Omega / m$	57.7	36.1	24.1	21.7	17.3	14.4
R at 85 °C $\mu\Omega / m$	73.6	47.6	35.5	30.1	24.9	21.6
X $\mu\Omega / m$ f:60Hz	128.7	126.5	124.3	89.9	88.3	87.0
I <sub>cw</sub> kA / 1Sec	50	50	50	80	80	80
I <sub>peak</sub>	130	130	130	208	208	208
P <sub>loss</sub> W / m	239	239	239	264	264	264
IP/IK	IP67/IK10					

※Technical specifications may change without any further notice.

Product Dimensions (mm)



Width (B) / Height(H)	160x100			160x140		
BB	200			200		
B'xH'	250x155			250x195		
Product Weight kg/m	48	51	56	74	77	81

- ※Please contact us for specific layouts and connection details.
- ※SH type has no protection cover required. However, SH type is advised to add aluminum cover for outdoor use. For detail please contact us or local dealers.
- ※Please refer to the temperature correction coefficient of rated current on page 2-27 while ambient temperature exceeds 40°C.



## Copper

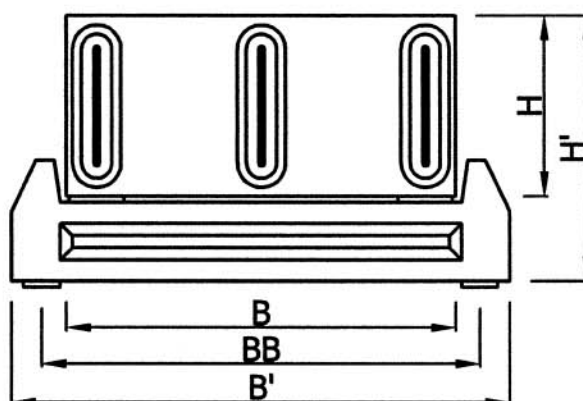
Type				
Model	PH10	PH10	PH10	PH10
Conductor Section(mm <sup>2</sup> )	600	800	1000	1200
Conductor Dimensions (mm)	w100xt6	w100xt8	w100xt10	w100xt12

Conductor Material	purity copper 99.9% , above 98% IACS			
Rated Current A (35/40 °C)	2070	2308	2560	2800
Rated Voltage V	17.5kV			
Frequency Hz	50/60			

Electrical Characteristics				
R at 20 °C $\mu\Omega / m$	28.9	21.7	17.3	14.4
R at 85 °C $\mu\Omega / m$	39.9	32.1	26.1	21.8
X $\mu\Omega / m$ f:60Hz	157.8	154.9	152.1	149.4
I <sub>cw</sub> kA / 1Sec	100	100	100	100
I <sub>peak</sub>	260	260	260	260
P <sub>loss</sub> W / m	513	513	513	513
IP/IK	IP67/IK10			

※Technical specifications may change without any further notice.

Product Dimensions (mm)



Width (B) / Height(H)	322x150			
BB	340			
B'xH'	415x225			
Product Weight kg/m	78	80	83	90

※Please contact us for specific layouts and connection details.

※PH type is advised to add aluminum cover for outdoor use and rated voltage greater than 12kV.

For detail please contact us or local dealers.

※Please refer to the temperature correction coefficient of rated current on page 2-27 while ambient temperature exceeds 40°C.





## Copper

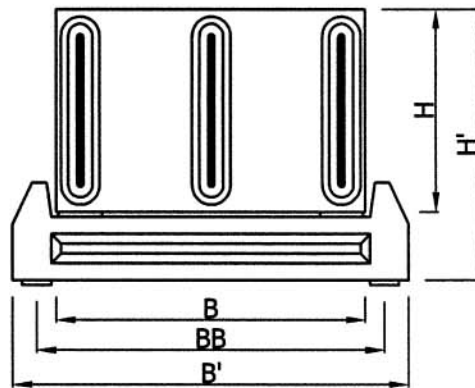
Type						
Model	PH16	PH16	PH16	PH20	PH20	PH20
Conductor Section(mm <sup>2</sup> )	1280	1600	1920	2000	2400	3000
Conductor Dimensions (mm)	w160xt8	w160xt10	w160xt12	2-w100xt10	2-w100xt12	2-w100xt15

Conductor Material	purity copper 99.9% , above 98% IACS					
Rated Current A (35/40 °C)	3215	3525	3711	4208	4535	5000
Rated Voltage V	17.5kV					
Frequency Hz	50/60					

Electrical Characteristics						
R at 20 °C $\mu\Omega / m$	13.5	10.8	9.1	8.7	7.2	5.8
R at 85 °C $\mu\Omega / m$	21.4	17.8	16.1	14.4	12.4	10.2
X $\mu\Omega / m$ f:60Hz	123.8	122.9	121.7	85.7	84.9	83.8
I <sub>cw</sub> kA / 1Sec	80	80	80	100	100	100
I <sub>peak</sub>	208	208	208	260	260	260
P <sub>loss</sub> W / m	665	665	665	765	765	765
IP/IK	IP67/IK10					

※Technical specifications may change without any further notice.

Product Dimensions (mm)



Width (B) / Height(H)	322x210			322x260		
BB	340			340		
B'xH'	415x285			415x335		
Product Weight kg/m	113	120	128	149	159	173

※Please contact us for specific layouts and connection details.

※PH type is advised to add aluminum cover for outdoor use and rated voltage greater than 12kV.

For detail please contact us or local dealers.

※Please refer to the temperature correction coefficient of rated current on page 2-27 while ambient temperature exceeds 40°C.



## Copper

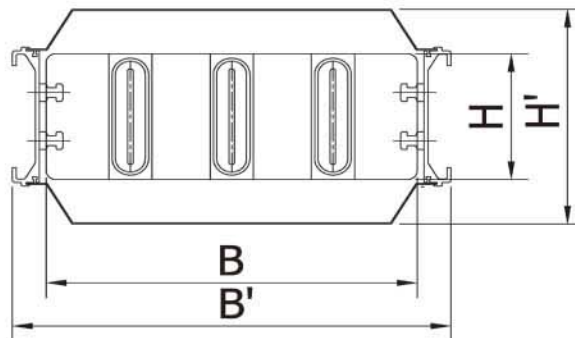
Model	PE10	PE10	PE10	PE16	PE16	PE16
Conductor Section(mm <sup>2</sup> )	600	800	1200	1600	1920	2400
Conductor Dimensions (mm)	w100xt6	w100xt8	w100xt12	w160xt10	w160xt12	w160xt15

Conductor Material	purity copper 99.9% , above 98% IACS					
Rated Current A (35/40 °C)	1950	2174	2637	3203	3500	4019
Rated Voltage V	24kV					
Frequency Hz	50/60					

Electrical Characteristics						
R at 20 °C $\mu\Omega / m$	28.9	21.7	14.4	10.8	9.3	7.4
R at 85 °C $\mu\Omega / m$	48.5	39.0	26.5	23.3	19.5	14.8
X $\mu\Omega / m$ f:60Hz	138.9	136.3	131.4	108.3	107.0	105.2
I <sub>cw</sub> kA / 1Sec	100	100	100	100	100	100
I <sub>peak</sub>	260	260	260	260	260	260
P <sub>loss</sub> W / m	553	553	553	717	717	717
IP/IK	IP67/IK10					

※Technical specifications may change without any further notice.

Product Dimensions (mm)



Width (B) / Height(H)	550x150			550x210		
B'xH'	650x360			650x360		
Product Weight kg/m	100	105	110	145	148	153

※Please contact us for specific layouts and connection details.

※For safety concern, aluminum cover is the standard design for PE type protection.

For detail please contact us or local dealers.

※Please refer to the temperature correction coefficient of rated current on page 2-27 while ambient temperature exceeds 40°C.





# Product Specifications PH

## Aluminum

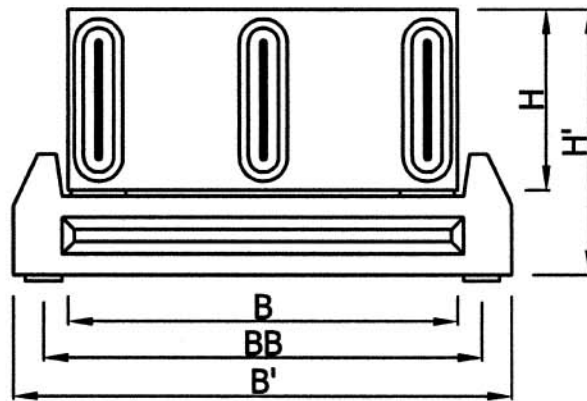
Type				
Model	PH10	PH10	PH10	PH10
Conductor Section(mm <sup>2</sup> )	600	800	1000	1200
Conductor Dimensions (mm)	w100xt6	w100xt8	w100xt10	w100xt12

Conductor Material	AL:1070			
Rated Current A (35/40 °C)	1607	1815	2030	2223
Rated Voltage V	17.5kV			
Frequency Hz	50/60			

Electrical Characteristics				
R at 20 °C $\mu\Omega / m$	47.2	35.4	28.3	23.6
R at 85 °C $\mu\Omega / m$	66.2	51.9	41.5	34.6
X $\mu\Omega / m$ f:60Hz	157.8	154.9	152.1	149.4
I <sub>cw</sub> kA / 1Sec	65	85	100	100
I <sub>peak</sub>	260	260	260	260
P <sub>loss</sub> W / m	513	513	513	513
IP/IK	IP67/IK10			

※Technical specifications may change without any further notice.

Product Dimensions (mm)



Width (B) / Height(H)	322x150			
BB	340			
B'xH'	415x225			
Product Weight kg/m	67	69	71	74

※Please contact us for specific layouts and connection details.

※PH type is advised to add aluminum cover for outdoor use and rated voltage greater than 12kV.

For detail please contact us or local dealers.

※Please refer to the temperature correction coefficient of rated current on page 2-27 while ambient temperature exceeds 40°C.



## Aluminum

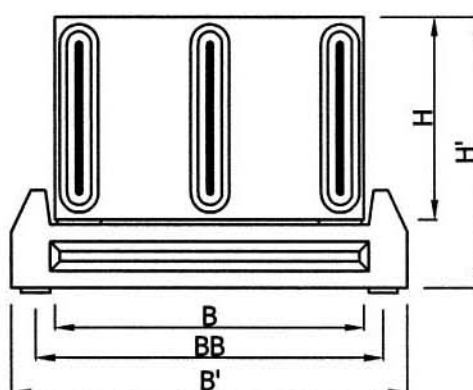
Type						
Model	PH16	PH16	PH16	PH20	PH20	PH20
Conductor Section(mm <sup>2</sup> )	1280	1600	1920	2000	2400	3000
Conductor Dimensions (mm)	w160xt8	w160xt10	w160xt12	2-w100xt10	2-w100xt12	2-w100xt15

Conductor Material	AL:1070					
Rated Current A (35/40 °C)	2502	2736	2897	3332	3580	4005
Rated Voltage V	17.5kV					
Frequency Hz	50/60					

Electrical Characteristics						
R at 20 °C $\mu\Omega / m$	22.1	17.7	14.7	14.2	11.8	9.4
R at 85 °C $\mu\Omega / m$	35.4	29.6	26.4	23.1	19.9	15.9
X $\mu\Omega / m$ f:60Hz	123.8	122.9	121.7	85.7	84.9	83.8
I <sub>cw</sub> kA / 1Sec	80	80	80	100	100	100
I <sub>peak</sub>	208	208	208	260	260	260
P <sub>loss</sub> W / m	665	665	665	765	765	765
IP/IK	IP67/IK10					

※Technical specifications may change without any further notice.

Product Dimensions (mm)



Width (B) / Height(H)	322x210			322x260		
BB	340			340		
B'xH'	415x285			415x335		
Product Weight kg/m	105	110	116	143	152	164

※Please contact us for specific layouts and connection details.

※PH type is advised to add aluminum cover for outdoor use and rated voltage greater than 12kV.

For detail please contact us or local dealers.

※Please refer to the temperature correction coefficient of rated current on page 2-27 while ambient temperature exceeds 40°C.





# Product Specifications PE

## Aluminum

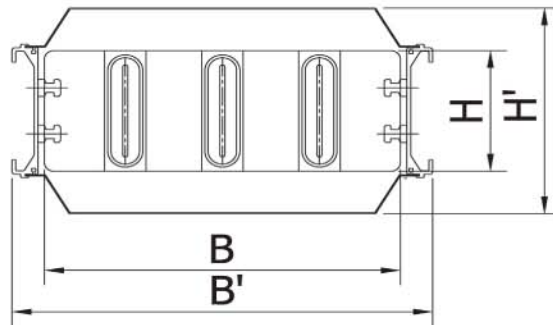
Type					
Model	PE10	PE10	PE10	PE16	PE16
Conductor Section(mm <sup>2</sup> )	600	800	1200	1600	2400
Conductor Dimensions (mm)	w100xt6	w100xt8	w100xt12	w160xt10	w160xt15

Conductor Material	AL:1070				
Rated Current A (35/40 °C)	1438	1660	2004	2667	3210
Rated Voltage V	24kV				
Frequency Hz	50/60				

Electrical Characteristics					
R at 20 °C $\mu\Omega / m$	47.2	35.4	23.6	17.7	11.8
R at 85 °C $\mu\Omega / m$	89.2	66.9	45.9	33.6	23.2
X $\mu\Omega / m$ f:60Hz	138.9	136.3	131.4	108.3	105.2
I <sub>cw</sub> kA / 1Sec	65	80	100	100	100
I <sub>peak</sub>	260	260	260	260	260
P <sub>loss</sub> W / m	553	553	553	717	717
IP/IK	IP67/IK10				

※Technical specifications may change without any further notice.

Product Dimensions (mm)



Width (B) / Height(H)	550x150			550x210	
B'xH'	650x360			650x360	
Product Weight kg/m	89	91	94	115	122

※Please contact us for specific layouts and connection details.

※For safety concern, aluminum cover is the standard design for PE type protection.

For detail please contact us or local dealers.

※Please refer to the temperature correction coefficient of rated current on page 2-27 while ambient temperature exceeds 40°C.



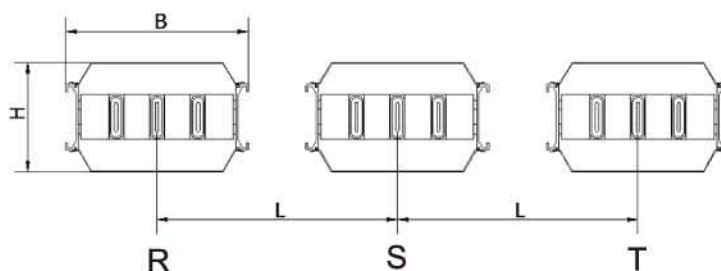
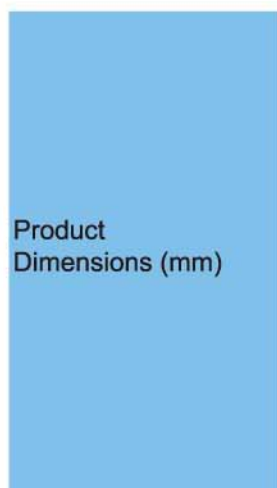
## Copper

Type	HCB10		HCB16	
Model	HCB10	HCB10	HCB16	HCB16
Conductor Section(mm <sup>2</sup> )	2400	3000	3840	4800
Conductor Dimensions (mm)	3-w100x8	3-w100x10	3-w160x8	3-w160x10

Conductor Material	purity copper 99.9% , above 98% IACS			
Rated Current A (35/40 °C)	5409	6055	7587	8491
Rated Voltage V	15.5kV			
Frequency Hz	50/60			

Electrical Characteristics				
R at 20 °C $\mu\Omega / m$	7.2	5.8	4.5	3.6
R at 85 °C $\mu\Omega / m$	18.8	15.0	11.9	9.5
X $\mu\Omega / m$ f:60Hz	45.6	43.5	37.8	36.1
I <sub>cw</sub> kA / 1Sec	100	100	120	100
I <sub>peak</sub>	260	260	312	312
P <sub>loss</sub> W / m	1650	1650	2055	2055
IP/IK	IP67/IK10			

※Technical specifications may change without any further notice.



Width (B) / Height(H)	610x360		610x420	
Distance between each phase(L)	800mm above			
Product Weight kg/m	315	331	409	435

※Please contact us for specific layouts and connection details.

※For safety concern, aluminum cover is the standard design for HCB type protection.

For detail please contact us or local dealers.

※Please refer to the temperature correction coefficient of rated current on page 2-27 while ambient temperature exceeds 40°C.





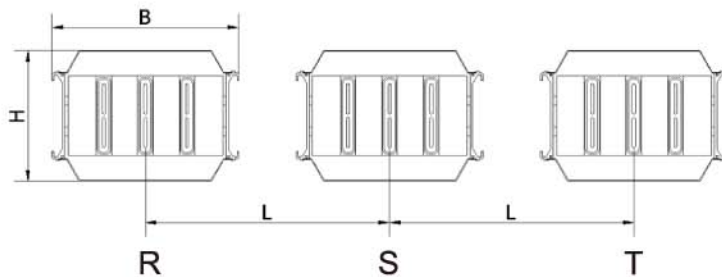
## Copper

Type				
Model	HCB20	HCB20	HCB24	HCB24
Conductor Section(mm <sup>2</sup> )	4800	6000	7200	8640
Conductor Dimensions (mm)	6-w100xt8	6-w100xt10	6-w120xt10	6-w120xt12

Conductor Material	purity copper 99.9% , above 98% IACS			
Rated Current A (35/40 °C)	9024	10315	12259	14116
Rated Voltage V	15.5kV			
Frequency Hz	50/60			

Electrical Characteristics				
R at 20 °C $\mu\Omega / m$	3.6	2.9	2.4	2.0
R at 85 °C $\mu\Omega / m$	9.8	7.5	6.1	4.6
X $\mu\Omega / m$ f:60Hz	30.4	29.1	23.4	22.8
I <sub>cw</sub> kA / 1Sec	120	120	120	120
I <sub>peak</sub>	312	312	312	312
P <sub>loss</sub> W / m	2394	2394	2750	2750
IP/IK	IP67/IK10			

※Technical specifications may change without any further notice.



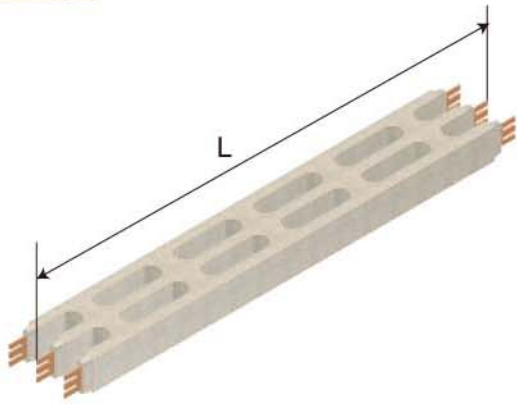
Width (B) / Height(H)	630x440		630x480	
Distance between each phase(L)	900mm above			
Product Weight kg/m	463	474	515	528

※Please contact us for specific layouts and connection details.

※For safety concern, aluminum cover is the standard design for HCB type protection.

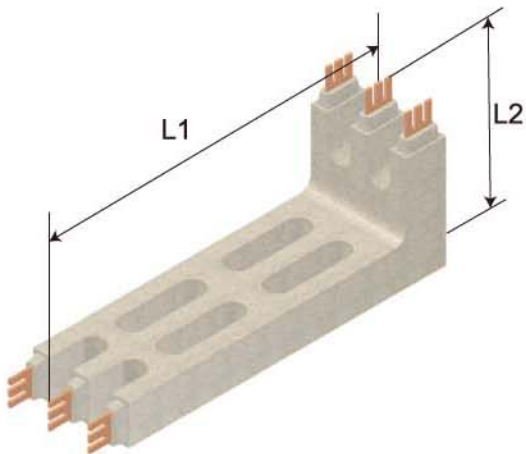
For detail please contact us or local dealers.

※Please refer to the temperature correction coefficient of rated current on page 2-27 while ambient temperature exceeds 40°C.



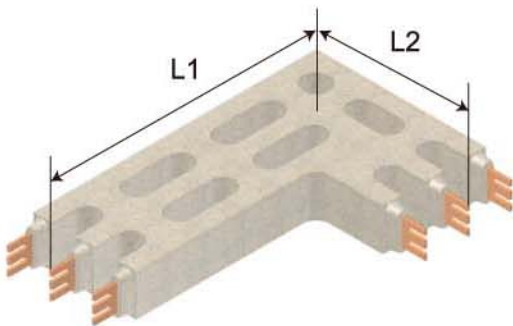
### Straight Element

Model	Length
RE	L=1000mm 、 2000mm 3000mm 、 4000mm



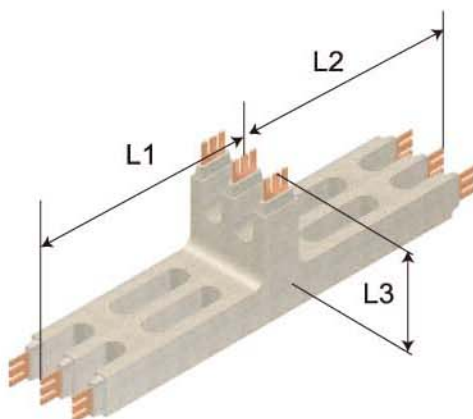
### Brazed Elbow Element

Model	Length
HL1	L1+L2=1000mm
HL2	L1+L2=2000mm
HL1	L1=550mm L2=450mm



### Bent Elbow Element

Model	Length
HB1	L1+L2=1000mm
HB2	L1+L2=2000mm
HB1	L1=550mm L2=450mm



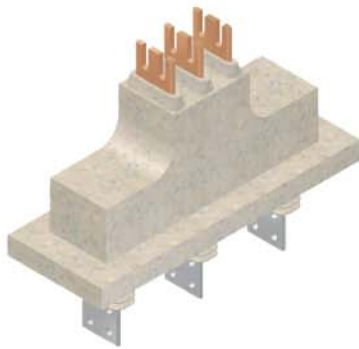
### Brazed T- Element

Model	Length
TL2	L1=L2=L3=500mm





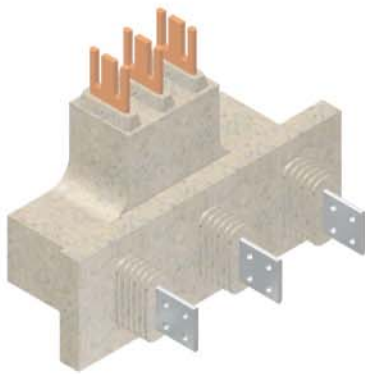
**Selection of Standard Parts**



**SH series (7.2kV)**

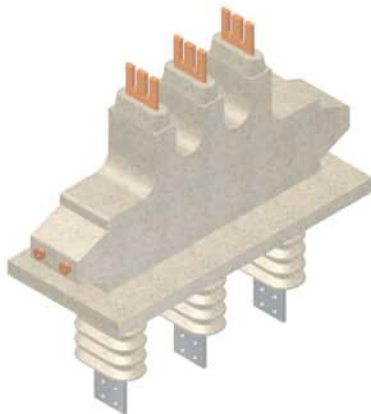
**AG Type Terminal Element**

Model	Length
AG1	Refer to 2-22



**AO Type Terminal Element**

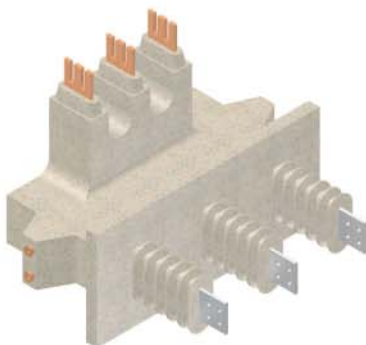
Model	Length
AO1	Refer to 2-23



**PH/PE series  
(17.5/24kV)**

**AG Type Terminal Element**

Model	Length
AG1	Refer to 2-22



**AO Type Terminal Element**

Model	Length
AO1	Refer to 2-23

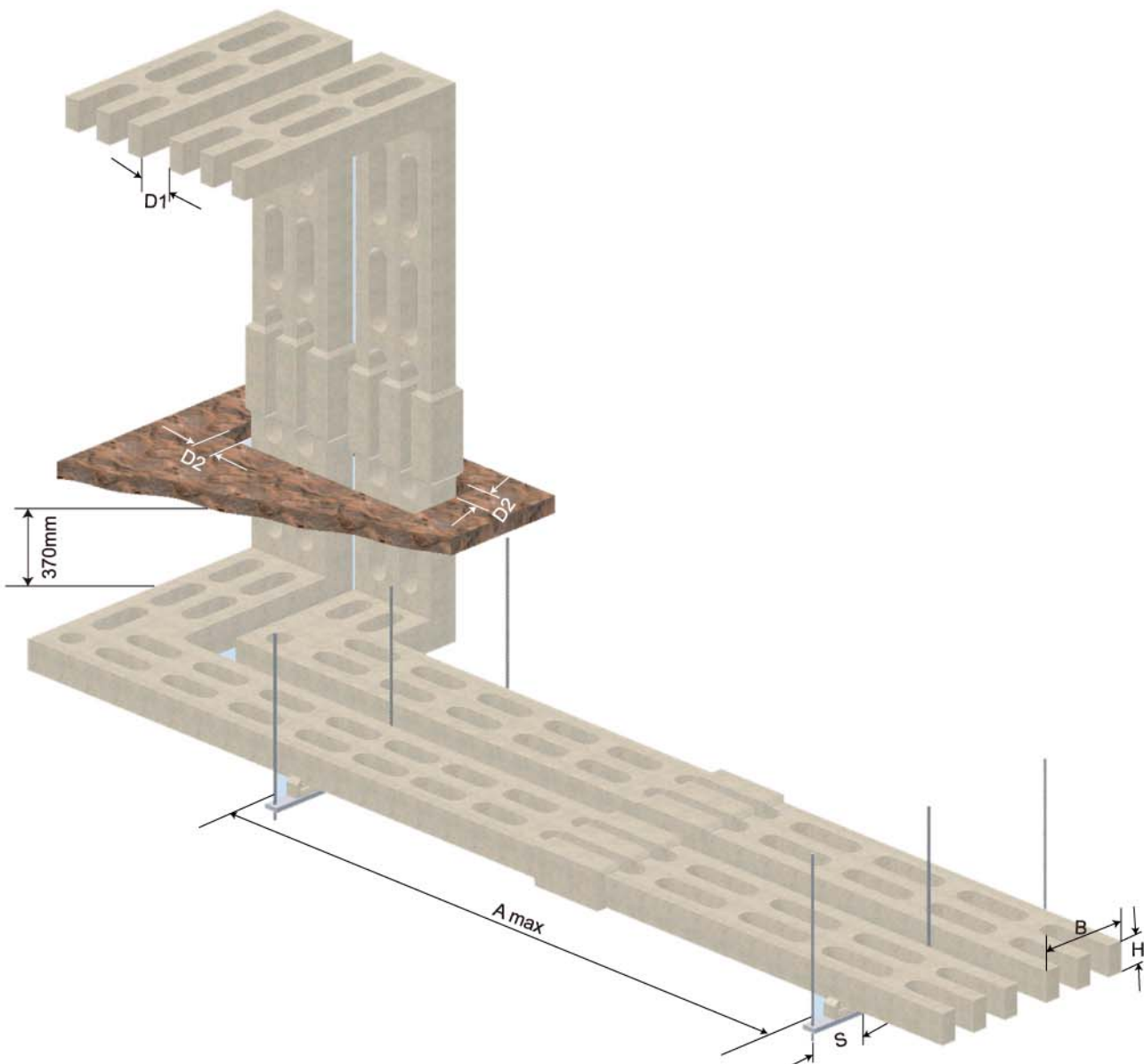


# Product Installation

單位:mm

Type	External Size	Limit of Hanger Installation Pitch A		Minimum pitch between busway		S: Distance between Hanger and Busway
	B×H	Horizontal Installation	Vertical Installation	Layout of Busway arrangement	Distance between opening and busway	
SH1	160×100	2000	3000			55
SH2	160×140					
PH10	322×150			150	100	75
PH16	322×210					
PH20	322×260					
PE10	550×150					
PE16	550×210					

Note: Distance between hangers and busway are allowed to be adjusted on site while required.







# Assembly Diagrams of Medium Voltage Busway Junction



► Distance between two elements are within 20mm (inclusive). The distance can be flexibly adjusted on site by the requirement of construction.



► The assembly bolt of Junction must be secured by torque wrench.

Torque of bolt during work:		
Specs	M10	M12
Torque value (N-m) for Cu	43	74
Torque value (N-m) for Al	30	60

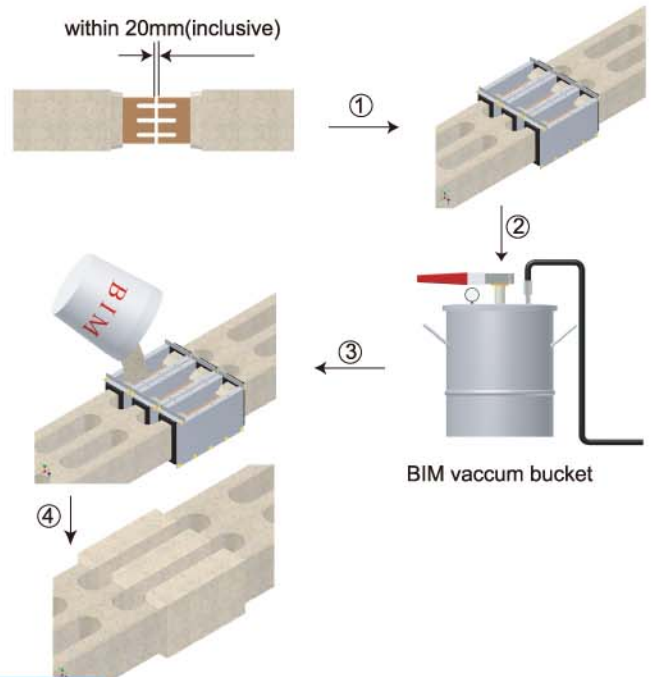


► Illustration of JUNCTION assembly.

### Method of cast-resin work on-site.

Refer to installation guide for casting method on site

within 20mm(inclusive)



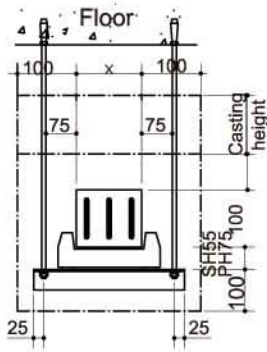
### Illustration of cast-resin after completion.



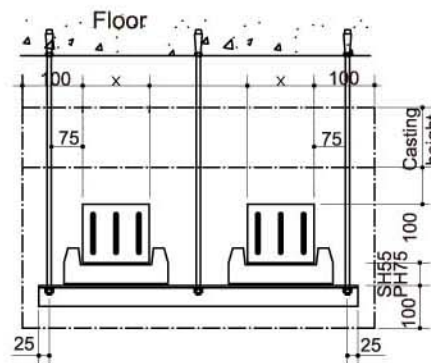


單位:mm

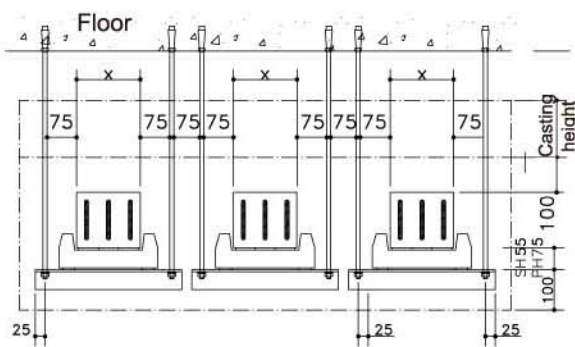
# Medium Voltage Busway Horizontal Hanger Standard



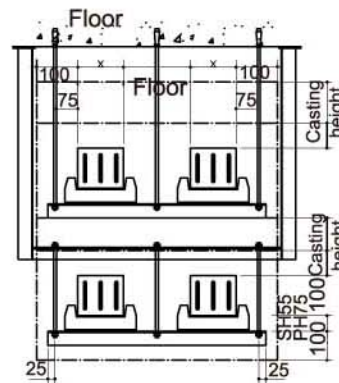
**Cross-sectional Diagram of Single-Busway**



**Cross-sectional Diagram of Dual-Busway**

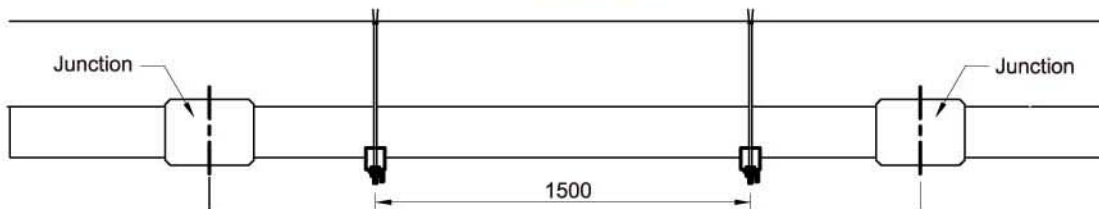


**Cross-sectional Diagram of Triple-Busway**

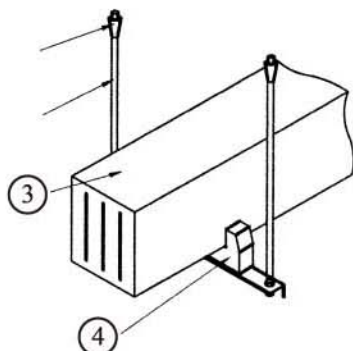


**Cross-sectional Diagram of Quadruple-Busway**

## Side view



1. The installation pitch between each hanger has to comply with the standard as above. If the work condition can not meet the standard, it may be adjusted according to the condition on site. However, it must meet the requirement described in page 18 of the installation guide: minimum pitch requirement of the busway.
2. The space required for installing busway is shown in the diagram. The safety space above the busway should have 100mm + casting height of 270mm = 370 mm for clearance standard of installation space. In addition, the height of the floor should be within 5m above the ground to allow expansion of bolts, full-thread bolts, and channel, etc. to install at the bottom of the floor.
3. The installation distance of the hanger and corner iron should be in accordance with "x" dimension of busway and dimension listed in the diagram.
4. One set of L-shape stopping plate part.

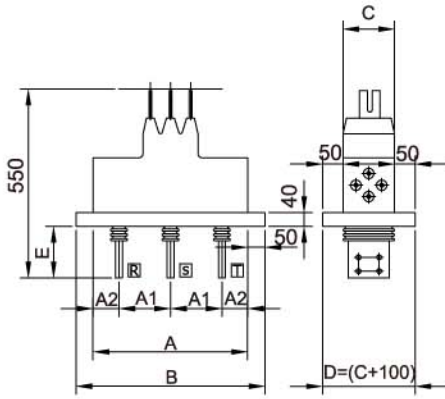


No.	Name of Part	Specs	Remark
①	Inner thread inflated screws	1/2"*2"	Zinc-plated item.
②	Full thread bolts	1/2"	Zinc-plated item.
③	BUSWAY		TECOBAR
④	Insulation support	BIM(Refer to Product Specifications)	TECOBAR

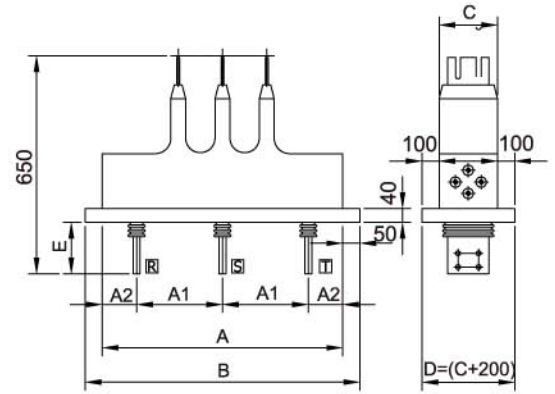




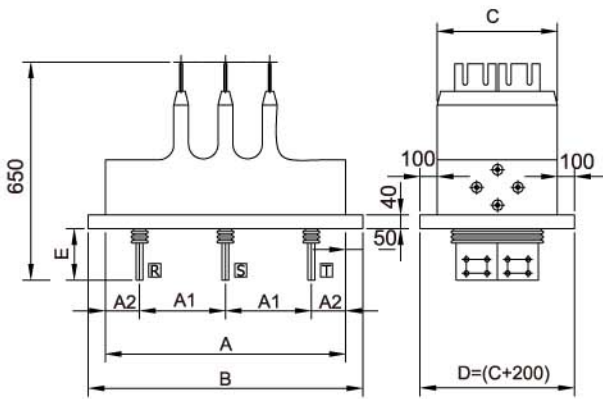
**AG Type Terminal Elements**



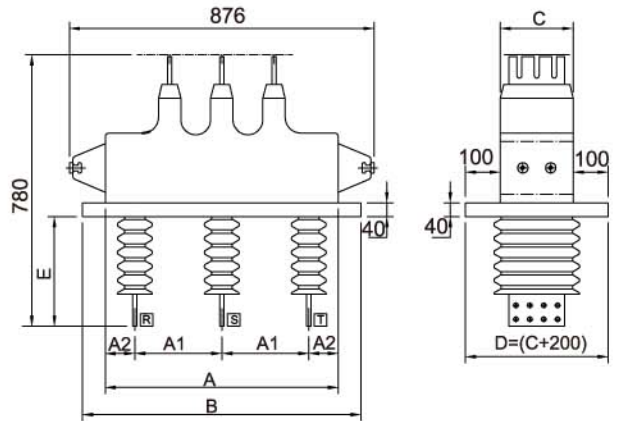
**Figure 1**



**Figure 2**



**Figure 3**



**Figure 4**

Unit:mm

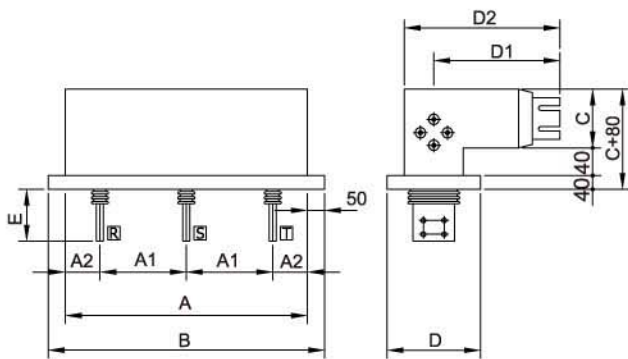
Figure No.	Type	3 Φ 3w						
		A	A1	A2	B	C	D	E
Figure 1	SH1	450	150	75	550	100	200	150
	SH2	450	150	75	550	140	240	150
Figure 2	PH10	700	250	100	800	150	350	220
	PH16	700	250	100	800	210	410	220
Figure 3	PH20	700	250	100	800	260	460	220
Figure 4	PE10	670	250	85	800	150	350	312
	PE16	670	250	85	800	210	410	312

Note 1 : The design is in accordance with IEC-815 standard, pollution class is classified as class II .

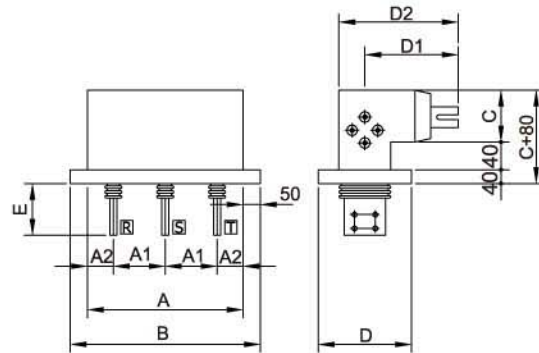
Note 2 : The design needs to be revised if require pollution class is greater than II .



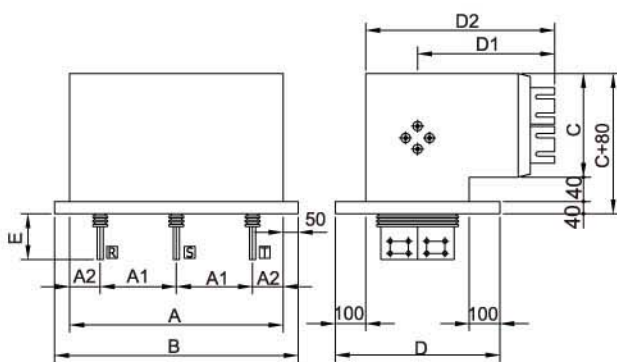
## AO Type Terminal Elements



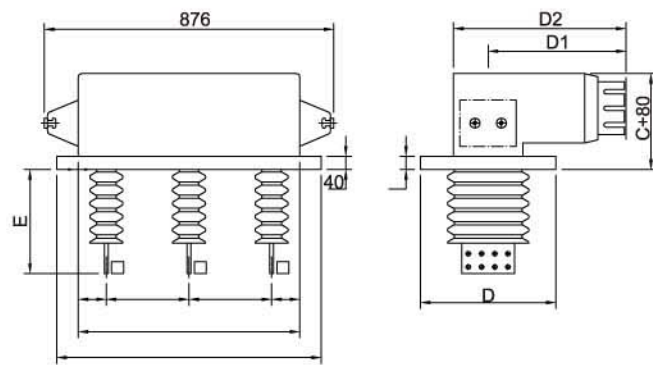
**Figure 1**



**Figure 2**



**Figure 3**



**Figure 4**

Unit:mm

Figure No.	Type	3 Φ 3w								
		A	A1	A2	B	C	D	D1	D2	E
Figure 1	SH1	450	150	75	550	100	200	450	500	150
	SH2	450	150	75	550	140	240	420	500	150
Figure 2	PH10	700	250	100	800	150	350	355	450	220
	PH16	700	250	100	800	210	410	385	510	220
Figure 3	PH20	700	250	100	800	260	460	410	560	220
Figure 4	PE10	670	250	85	800	150	350	355	450	312
	PE16	670	250	85	800	210	410	385	510	312

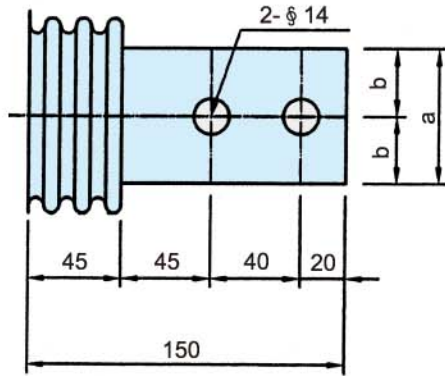
Note 1: The design is in accordance with IEC-815 standard, pollution class is classified as class II .

Note 2 : The design needs to be revised if require pollution class is greater than II .

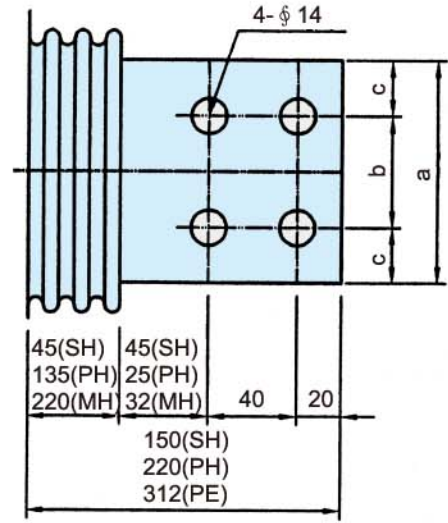




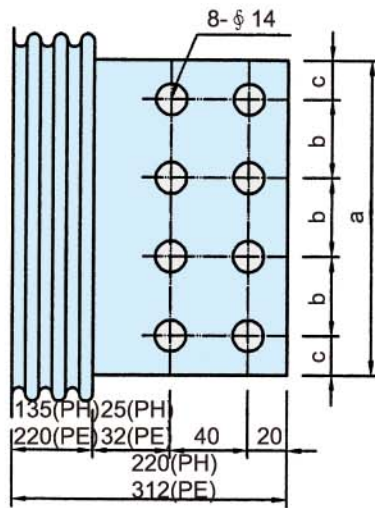
# Dimensions of Standard Terminal Elements Copper Plate for Medium Voltage Busway



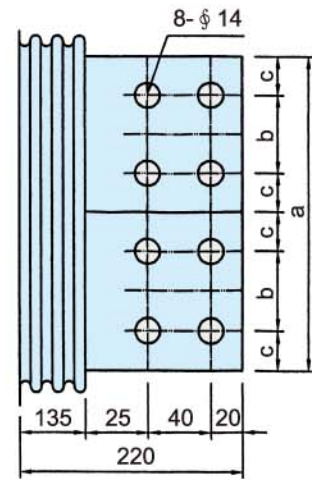
**Figure 1**



**Figure 2**



**Figure 3**

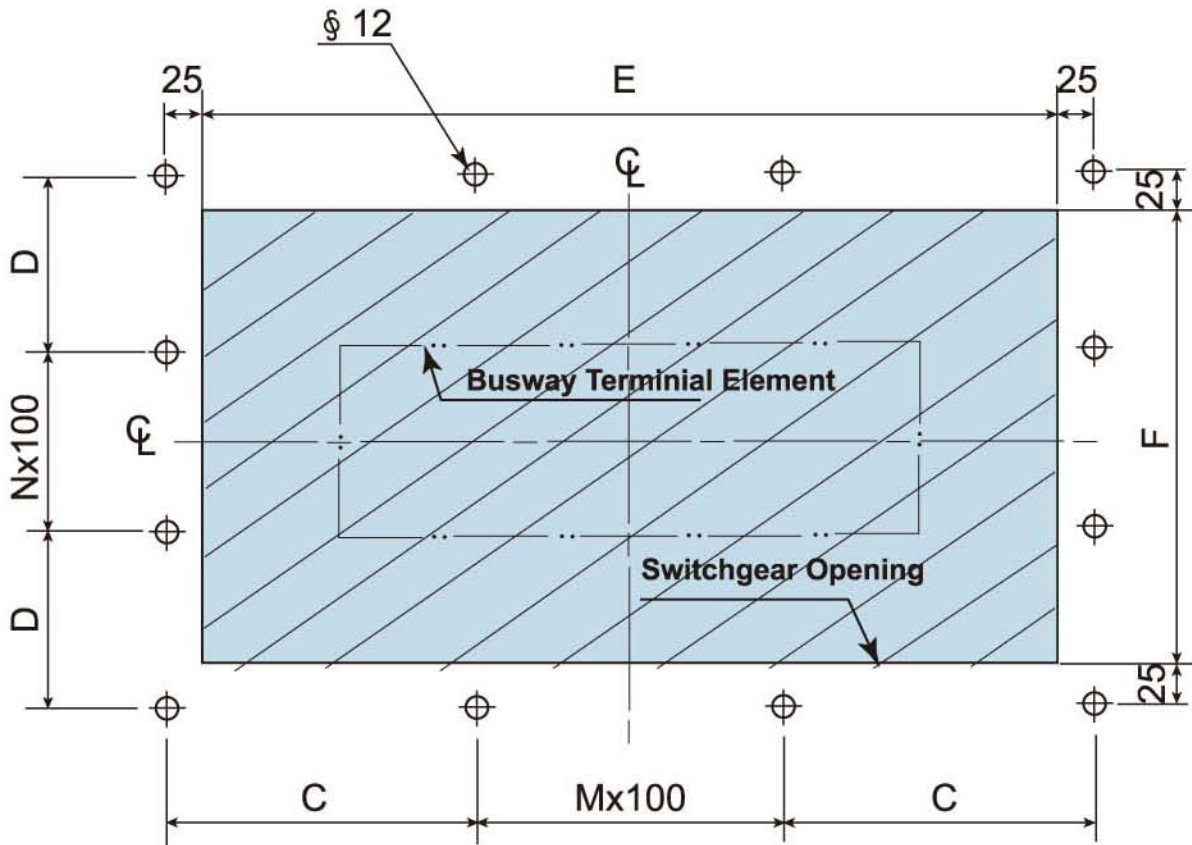


**Figure 4**

Figure	Type	Type of Terminal Elements	Dimensions(unit:mm)		
			a	b	c
Figure 1	SH1	AG/AO	60	30	-
Figure 2	SH2	AG/AO	100	40	30
	PH10 PE10	AG/AO	100	40	30
Figure 3	PH16 PE16	AG/AO	160	40	20
Figure 4	PH20	AG/AO	200	40	30



# Opening Requirement of Standard Terminal Elements and Switchgear for Medium Voltage Busway



**Busway Terminal Elements Opening Dimensions**

Unit: mm

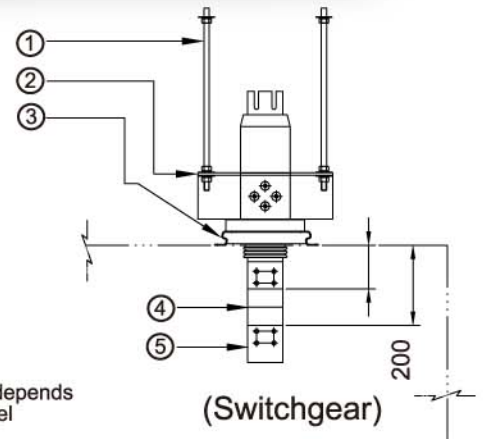
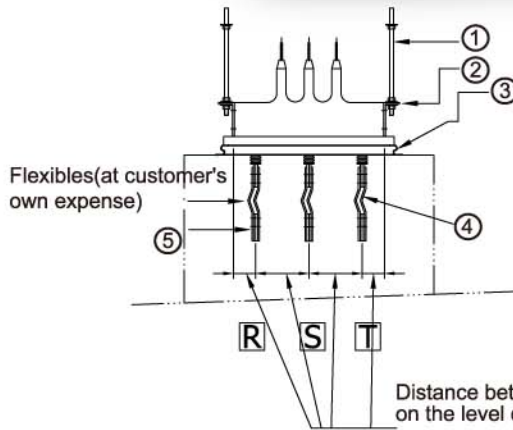
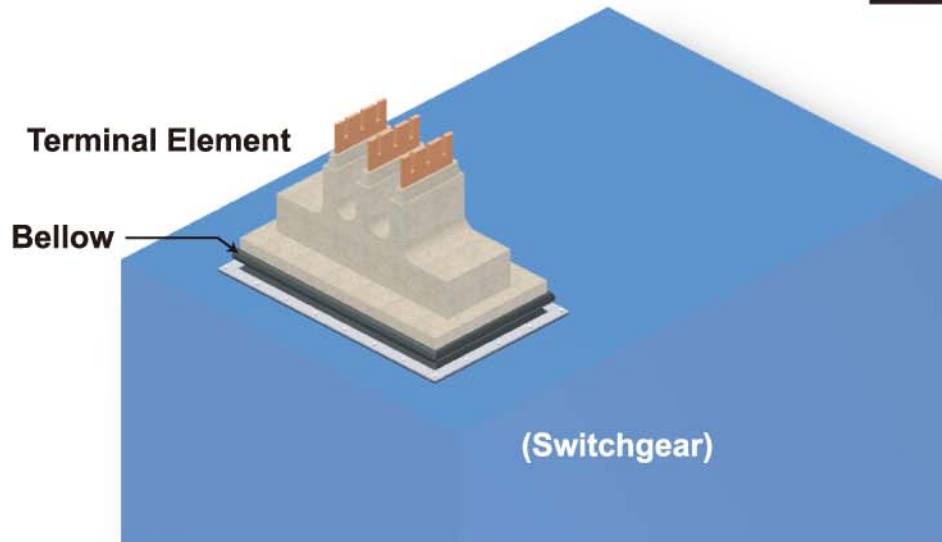
Type	AG Type Terminal Elements						AO Type Terminal Elements						Remark
	C	D	E	F	M	N	C	D	E	F	M	N	
SH1	100	75	450	100	3	-	100	75	450	100	3	-	with flange
	-	-	510	160	-	-	-	-	510	160	-	-	without flange
SH2	100	95	450	140	3	-	100	95	450	140	3	-	with flange
	-	-	510	200	-	-	-	-	510	200	-	-	without flange
PH10/PE10	125	100	700	150	5	1	125	100	700	150	5	1	with flange
PH16/PE16	125	130	700	210	5	1	125	130	700	210	5	1	with flange
PH20	125	105	700	260	5	2	125	105	700	260	5	2	with flange

Note 1: M + N=No. of Intervals among drillings.





# Medium Voltage Busway Terminal Element and Switchgear Standard Guideline



No.	Name	Specs	Remark
1	Full threaded screw	1/2"	Zinc-plated product (Included in installation work)
2	Angle Steel	6t×50×50mm	Zinc-plated product (Included in installation work)
3	Terminal element seal	t=5mm	M10 screws(Outdoor type)
4	Flexibles	The 200mm reserved space between terminal element and switchgear are connected by flexibles.	Materials of this portion and connection work does not belong to the busway contractor.
5	Connection copper plate of switchgear	Depends on Switchgear design.	The drillings on copper plate are designed, processed and connected by switchger contractor.

Note: This diagram is the standard connection interface.  
Actual location of connection is determined case by case.



### 1. Temperature correction coefficient for rated current

Maximum ambient temperature °C	20	25	30	35	40	45	50	55	60
Daily average ambient temperature °C	15	20	25	30	35	40	45	50	55
Correction coefficient	1.18	1.14	1.09	1.05	1.00	0.94	0.88	0.82	0.75

### 2. Voltage drop calculation

- $\Delta U = \sqrt{3} \times I_s \times L \times (R \cos \theta + X \sin \theta) \times 10^{-6}$
- $\Delta U$  = Voltage drop (Volts)
- $I_s$  = Load current (Amps)
- $L$  = Line length (m)
- $R$  = Resistance ( $\mu \Omega/m$ )
- $X$  = Reactance ( $\mu \Omega/m$ )
- $\cos \theta$  = Power factor
- $\sin \theta = \sqrt{1 - \cos^2 \theta}$

### 3. Product model identification

**PH 10 E C 3 - 1000**

PH	Product series code	SH: 7.2kV PE: 24kV	PH: 17.5kV HCB: isolated phase bar 15.5kV
10	Copper bar width	08 w=80mm , 10 w=100mm , 16 w=160mm , 20 w=200mm	
E	Single/Double conductor of each phase	E Single line	D Double line
C	Conductor type	C Copper conductor	A Aluminium conductor
3	No. of conductors		

1000 Cross sectional area of conductor(mm<sup>2</sup>) 1000mm<sup>2</sup>

### 4. For calculation of general product data or technical information, please contact with manufacturer or local agency.





**A. Medium voltage busway dielectric tests: Insulation resistance test and power frequency voltage withstand test**

Electrical tests		Insulation resistance test	Power frequency voltage withstand
Standards		IEC 60060	IEC 60270
Type	Ur	Ud at 60 Hz	q at 1.1 Ur
	kV	kV /1min	pC
SH series	7.2	20	≤ 20
PH series	17.5	38	≤ 20
PE series	24	50	≤ 20
HCB series	15.5 (IEEE C37.23)	50 (IEEE C37.23)	≤ 20

Ur : Rated voltage    Ud : Power frequency voltage  
q : Volume of partial discharge(pico-Coulomb)

**B. Appearance inspection**

The appearance of each element must be inspected. Result to be mentioned in final inspection report.

**C. Dimension inspection**

All dimensions are to be compared with customer's order sheet. Result to be mentioned in final inspection report.

**D. Outgoing test report**

Medium voltage parts shall be tested prior to shipment and attached with outgoing test report.



1. The results of the test carried out at 20°C and completely submerged for at least one year is shown in the table below.
2. For special environment use, please contact us.

Chemical Agents		Result		
		E	G	F
Boric acid	H <sub>3</sub> BO <sub>3</sub>	O		
Hydrochloric acid 10%	HCl			O
Citric acid 10%	C <sub>3</sub> H <sub>4</sub> OH(CO <sub>2</sub> H) <sub>3</sub>			O
Lactic acid 10%	CH <sub>3</sub> -CHOH-CO <sub>2</sub> H			O
Alcohol (ethyl-)	C <sub>2</sub> H <sub>5</sub> OH		O	
Beer		O		
Ketone (acetone)	H <sub>3</sub> CCOCH <sub>3</sub>			O
Calcium chloride 50%	CaCl <sub>2</sub>	O		
Combustible solvent (gasoline, oil)		O		
Water (distilled)	H <sub>2</sub> O	O		
Water (mineral)		O		
Esters			O	
Ether	C <sub>2</sub> H <sub>5</sub> OC <sub>2</sub> H <sub>5</sub>			O
Formalin 37%	HCOH		O	
Glycerin			O	
Lubricating grease and oil		O		
Greases and oil		O		
Vegetable oil		O		
Aliphatic hydrocarbide (petroleumether)	C <sub>5</sub> H <sub>12</sub>	O		
Aromatic hydrocarbide (toluene)				O
Chloride carbon	CCl <sub>4</sub>			O
Ammonium Hydroxide 10%	NH <sub>4</sub> OH		O	
Ammonium Hydroxide 30%	NH <sub>4</sub> OH			O
Milk(fresh or sour)				O
Soda-lime 10%	NaOH		O	
Soda-lime 50%	NaOH		O	
Blood		O		
Soap and detergents		O		
Sugar (saturated solution)		O		
Urine		O		

E= Excellent, suitable even for uninterrupted and prolonged exposure.

G= Good, suitable for prolonged exposure.

F= Fair, suitable for repeated but brief exposure.





# Projects Reference List

No.	Project	Industry Type	No.	Project	Industry Type
1.	Winbond Electronics Corp. MV	Wafer Foundry	22.	Mega MV Project	Power Plant
2.	Vertex Precision Electronics, Inc., Chungli Factory	Electronic industry	23.	Wenzhou Power Plant Phase 2 - #02A High Voltage Substation Insulated Busway System Retrofitting Project	Power Plant
3.	Corning Incorporated	Electronic industry	24.	Wenzhou Power Plant Phase 2 V Unit 4 6kV Non-segregated Busway Retrofitting System	Power Plant
4.	Corning Incorporated V Central Taiwan Science Park, Phase 1	Electronic industry	25.	Zhanjiang Orimulsion Oil Power Plant 2*600MV Project of Replacement of Oil with Coal, 6kV Coal Conveying Section Insulated Busway System	Power Plant
5.	Corning Incorporated V Central Taiwan Science Park, Phase 2	Electronic industry			
6.	Corning Incorporated V Central Taiwan Science Park, Phase 3	Electronic industry	26.	Project of Replacement of Orimulsion with Coal - Switch Cabinet for the Technical Revolution Plan	Power Plant
7.	Taisil Electronic Materials Corp. V Bus Bar Construction Project	Electronic industry	27.	Guangzhou Xintang Bleaching & Dyeing Industrial Environment Protection - General Control and Management of Encouragement of Large Projects and Discouragement of Small Energy-inefficient Power Plants for Cogeneration of Heat and Power (Lixin)	Power Plant
8.	Taisil Electronic Materials Corp. V Transformers	Electronic industry		Wenzhou Power Plant Phase 2 - High	
9.	United Microelectronics Corporation - A12 Additional Work	Electronic industry	28.	Voltage Substation Insulated Busway Retrofitting System	Power Plant
10.	HannStar Display Corp.	TFT-LCD Factory	29.	Taishan Nuclear Power Plant Phase 1 - LOT11K 12kV Cast Resin Busway System	Power Plant
11.	Da-She Cogeneration Plant	Power Plant			
12.	Sixth Naphtha Cracking Plant - Cogeneration Plant	Power Plant	30.	Wenzhou Power Plant Phase 3 - #03B High Voltage Substation 6kV Non-segregated Insulated Busway Retrofitting System	Power Plant
13.	China Petroleum & Chemical Corp., Tou-Fen Cogeneration Plant	Power Plant	31.	Hubei Xingrui Chemical Co., Ltd. - Energy Management Platform Project 10kV Cast Resin Insulated Busway System (Xingrui Cogeneration Plant)	Power Plant
14.	Hsin Yu Energy Development Co., Ltd. Cogeneration Plant	Power Plant			
15.	Bihai Power Plant	Power Plant	32.	Mingtian Hydroelectric Power Plant	Hydroelectric Power Plant
16.	Datan Power Plant	Power Plant	33.	Bihai Power Plant	Hydroelectric Power Plant
17.	Suzhou Power Plant	Power Plant	34.	Li-Yu Lake Hydroelectric Power Plant	Hydroelectric Power Plant
18.	Taizhou Power Plant	Power Plant	35.	Gengda Hydroelectric Power Plant - 15kV 3-Phase Compact Betobar-R Busway System	Hydroelectric Power Plant
19.	Taizhou Power Plant - Additional Work	Power Plant	36.	Ying Xiu Wan Hydroelectric Power Plant, Ying Xiu Wan Substation V Post-disaster (8.13) Restoration & Recovery Project	Hydroelectric Power Plant
20.	Dajia River Power Plant V Ku-Kuan Substation Recovery Work	Power Plant			
21.	Suzhou Power Plant	Power Plant	37.	Yang Jiang Nuclear Power Plant - 220kV Auxiliary Transformer 6.6kV Low Pressure Side Cast Resin Busway	Nuclear Power Plant





No.	Project	Industry Type	No.	Project	Industry Type
38.	Kuosheng Nuclear Power Plant V Startup/ Standby Disconnecting Switch and Busway	Nuclear Power Plant	63.	Hsinchu Incinerator	Incinerator
39.	Yang Jiang Nuclear Power Plant Phase 1 - LOT73C Intermediate Pressure Cast Resin Busway System	Nuclear Power Plant	64.	Kaohsiung Jen-Wu Incinerator	Incinerator
40.	Biochemistry Laboratory of Academia Sinica	Office Building	65.	Nan-Hsien Corp. - EG1 Sixth Naphtha Cracking Project	Petrochemical industry
41.	Taiwan Prosperity Chemical Corporation	Office Building	66.	Formosa Chemicals & Fibre Corp. - PTA2 Sixth Naphtha Cracking Project	Petrochemical industry
42.	Taiwan Prosperity Chemical Corporation	Office Building	67.	Nan-Hsien Corp. V EG2 Sixth Naphtha Cracking Project	Petrochemical industry
43.	LCY Chemical Corp	Office Building	68.	Nan-Hsien Corp. V ASP Sixth Naphtha Cracking Project	Petrochemical industry
44.	Kang-Hsi Water Treatment Plant	Waterworks	69.	China Petrochemical Development Corp. Kaohsiung Hsiao-Kang Plant	Petrochemical industry
45.	Nan-Hua V Pei-Ling Pump	Waterworks	70.	Polyester Fiber Division of Nan Ya Plastics Corp. V Lin-Kou Plant	Petrochemical industry
46.	Ping-Ting Water Pumping Station	Waterworks	71.	Oriental Petrochemical (Shanghai) Corp.	Petrochemical industry
47.	Kao-Tan Water Treatment Plant	Waterworks	72.	Formosa Chemicals & Fibre Corp. V Ningbo Plant	Petrochemical industry
48.	Ping-Ting Water Pumping Station Phase 2	Waterworks	73.	UPC Group	Petrochemical industry
49.	Chao-Ming Pump Station	Waterworks	74.	Yen-Chang Petrochemical Corp.	Petrochemical industry
50.	Min-Sheng Pump Station	Waterworks	75.	CNPC Fushun Petrochemical Plant - 6.3kV Busway System	Petrochemical industry
51.	Pan-Nan Pump Station	Waterworks	76.	Shanghai Coking & Chemical Corporation - Additional Project	Petrochemical industry
52.	Jenn An Steel Co., Ltd.	Iron & Steel	77.	Fushun Petrochemical Plant V Large Ethylene Project	Petrochemical industry
53.	Feng Hsin Iron & Steel Co., Ltd.	Iron & Steel	78.	Mai-Liao MA New Electrical Planning Project	Petrochemical industry
54.	National Cheng Chi University	School	79.	China Petrochemical Development Corp. (CPDC Tou-Fen Plant)	Petrochemical industry
55.	National Defense University, Shuai-Chen Sub-Project (MV)	School	80.	San Fu Gas Co., Ltd. - Taichung Harbor Construction Project	Petrochemical industry
56.	Kaohsiung Southern District Incinerator	Incinerator			
57.	Kaohsiung Jen-Wu Incinerator	Incinerator			
58.	Pa-Li Incinerator	Incinerator			
59.	Taichung Hou-Li Incinerator	Incinerator			
60.	Changhua Hsi-Chou Incinerator	Incinerator			
61.	Taoyuan Southern District Incinerator	Incinerator			
62.	Wu-Jih Township Incinerator	Incinerator			





# Projects Reference List

No.	Project	Industry Type	No.	Project	Industry Type
81.	San Fu Gas Co., Ltd. V Shan-Hua Plant	Petrochemical industry			
82.	National Museum of Marine Biology and Aquarium	Museum			
83.	Yu-Yuan Co., Ltd., Chang-Pin Factory	Factory			
84.	Cheng Loong Corp., Hou-Li Factory	Factory			
85.	Formosa Energy & Material Technology Co. Ltd. - Lithium Iron Phosphate Battery Project, Phase 2	Factory			
86.	Taiwan Fertilizer Co., Ltd., Taichung Harbor Factory New Construction Project	Factory Building			
87.	Taiwan Prosperity Chemical Corp. V Lin-Yuan Factory	Factory Building			
88.	New Pan-Chiao Station (Co-construction Project of MRT, Taiwan Railway System, and High Speed Rail System)	TRA Station			
89.	Songshan Station	Songshan Station			
90.	Nangang Station	Nan Kang Station			
91.	Nangang Public Housing	Residential Building			
92.	Northern Taiwan Liquefied Natural Gas Receiving Terminal V Harbor Plant Project	LNG Terminal			
93.	Lan-Hai Gas Corp. - Taichung LNG Air Separation Plant	LNG Terminal			
94.	CPC Corporation, Taiwan V Taoyuan Oil Refinery	Oil Refinery			
95.	Indonesia Surabaya Paper Mill	Paper Mill			