



ANNIVERSARY



Technology Transfer



# Contents

<b>CIC at a glance</b>	<b>4</b>
<b>Core products and offerings</b>	<b>6</b>
▪ Current Transformers and Potential Transformers	6
▪ Resin Insulators	8
▪ Distribution Transformers	9
▪ Electronic Energy Meters	11
▪ Various Electrical and Electronic Products	12
<b>Advanced Electricity Lab</b>	<b>16</b>
<b>The CIC advantage</b>	<b>20</b>
<b>ISO certified</b>	<b>21</b>
<b>Where you can find CIC</b>	<b>22</b>



# CIC at a glance

Established in Taiwan since 1974, Challenge Industrial Co., Ltd., also known as CIC, specializes in the manufacture, supply, and distribution of a wide range of electrical apparatus, including instrument transformers, distribution transformers, motor-starting reactors, epoxy insulators, and electronic energy meters.





Empowered by advanced technology transferred from Germany's MWB Messwandler-Bau, CIC operates an accredited testing laboratory and multiple factories, where it uses only highest-quality materials to manufacture its products, all of which backed by customer support and a satisfaction guarantee. CIC products have been widely used in revenue and switchboard applications by power companies as well as major engineering and construction firms in the United States, Canada, Russia, Japan, and other countries. With decades of product application experience, CIC is able to provide customers worldwide with expert advice, together with optimal and cost-effective solutions. One of the most trusted and respected brands in the electronics and electrical power markets, CIC also welcomes requests for OEM/ODM services.

# Core products and offerings

## ■ Current Transformers and Potential Transformers

*Current Transformers and Potential Transformers* have been the foundation of CIC's development. In its early years, CIC relied exclusively on in-house technology to design and manufacture indoor current transformers and potential transformers. In 1990, in order to extend the range of its products, CIC successfully engineered outdoor revenue-type current transformers and potential transformers with technology transferred from Germany's MWB Messwandler-Bau.

Instrument Transformers  
CT / PT



Outdoor-Type Instrument Transformers  
including ERCT models



72 kV  
Outdoor  
Current  
Transformer



- ① Single-Pole Potential Transformer with Built-In Fuse
- ② SF<sub>6</sub>-insulated potential transformer for 220/161/110 kV GIS
- ③ Metal-Clad Potential Transformer
- ④ Low-Voltage Current Transformers  
*including ERCT models*



In 2010, to advance its technique in SF<sub>6</sub> application, CIC created SF<sub>6</sub> insulated potential transformers specifically for 220 kV and 161 kV gas-insulated switchgears. For more than ten years, CIC has also been able to furnish global customers with current transformers (up to 30000 A ) and potential transformers for use with generator sets. The primary insulation material in CIC Current Transformers and Potential Transformers is the Araldite® epoxy resin, known for its reliability. The outdoor models make use of cycloaliphatic epoxy resin - similarly to ensure high-quality insulation.

## ■ Resin Insulators

In 1990, to better serve the needs of its domestic and international clients, CIC imported Swiss-made equipment for the production of resin insulators, such as bushings, housings, and GIS spacers. This fruitful venture has enabled CIC to provide, for many years, resin-insulated replacement parts to its Japanese market. Another distinguished achievement was a special project in 2010, entrusted by Taiwan Power Company, for whom CIC successfully designed and produced support insulators for installation within 345 kV gas-insulated bus ducts. In the same year, CIC manufactured replacement operation cranks for Taiwan Power Company's 161 kV gas circuit breakers (GCB).



- ① 24 kV epoxy housing for single-phase GCB (gas circuit breaker), for high-speed rail
- ② 220/161/110 kV GIS spacer
- ③ Support insulator for installation within 345 kV gas-insulated bus ducts (GIB)
- ④ Epoxy insulating frame for 24 kV vacuum circuit breaker (VCB)

### Epoxy Bushings and Insulators



24 kV epoxy housing for single-phase GCB (gas circuit breaker), for high-speed rail

## ■ Distribution Transformers

In 1992, CIC became the first manufacturer in Taiwan to successfully produce a non-ventilated low-potential transformer. This was done by placing the transformer in a metal enclosure, followed by insulation with an epoxy resin mixture. The heat dissipation afforded by the solidified epoxy resin mixture and by the surface area of the metal enclosure allowed the transformer to be compact. These transformers also had a reduced noise



Non-Ventilated Low-Voltage Transformers  
for Taipei 101

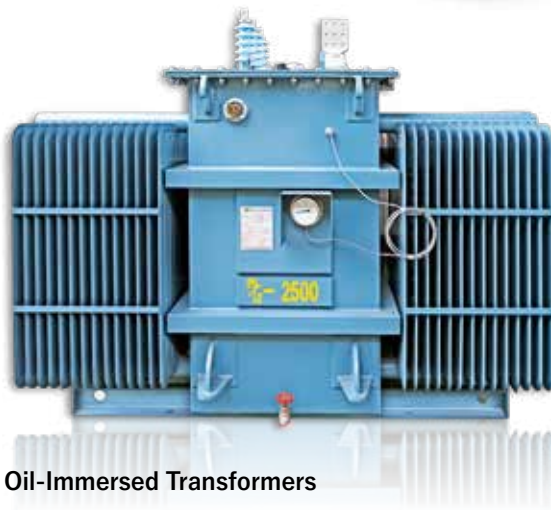


Pole-Mounted Transformers



MV Cast Resin Dry Type Transformers (CRT)

LV Dry-Type Transformers



MV Oil-Immersed Transformers



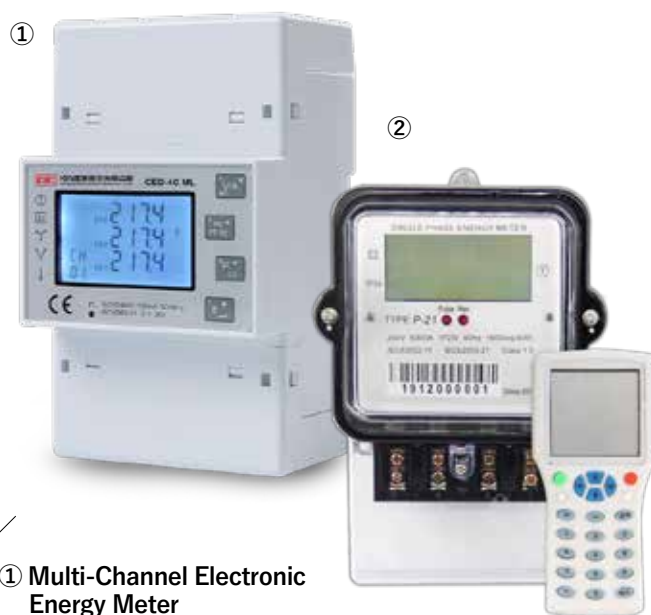
Pad-Mounted Transformers

level and could be installed in a number of different ways. The fire-resistant design further led these products to widely replace the oil-immersed transformers and tape-insulated dry-type transformers that were frequently used in large buildings and shopping centers at the time. The non-ventilated LV transformers have since been enhanced with new features, including temperature monitoring and overload protection, and have become even more widely adopted.

CIC offers additional types of distribution transformers, including pole-mounted transformers, oil-immersed transformers, cast-resin dry-type transformers (CRT), pad-mounted transformers, and others.

## ■ Electronic Energy Meters

Since 2011, CIC's electronic-product division has been offering numerous types of electronic energy meters, such as keypad, outdoor, RS485 communication, prepaid, and DIN-rail types. The accreditation and certification CIC has received concerning its meter range includes – but not limited to – calibration certificates, ISO certificates for the design and manufacture of electricity meters, and metrology licenses for manufacturing, servicing, and importing energy meters.



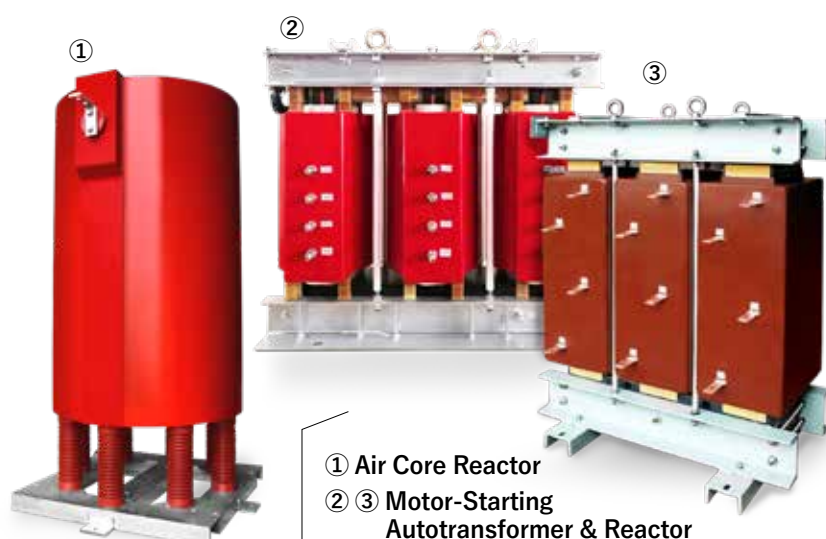
- ① Multi-Channel Electronic Energy Meter
- ② Single-Phase Energy Meter



**AMI SMART METERS**  
ANSI & Taipower standards

# Various Electrical and Electronic Products

## LV & MV Reactors / Motor-Starting Autotransformers



Electric Vehicle Chargers

## LV Power Capacitors

- ④ LV Tubular Power Capacitors
- ⑤ ⑥ LV Intelligent Capacitors for Power Factor Correction & Energy Saving

④



⑤



⑥



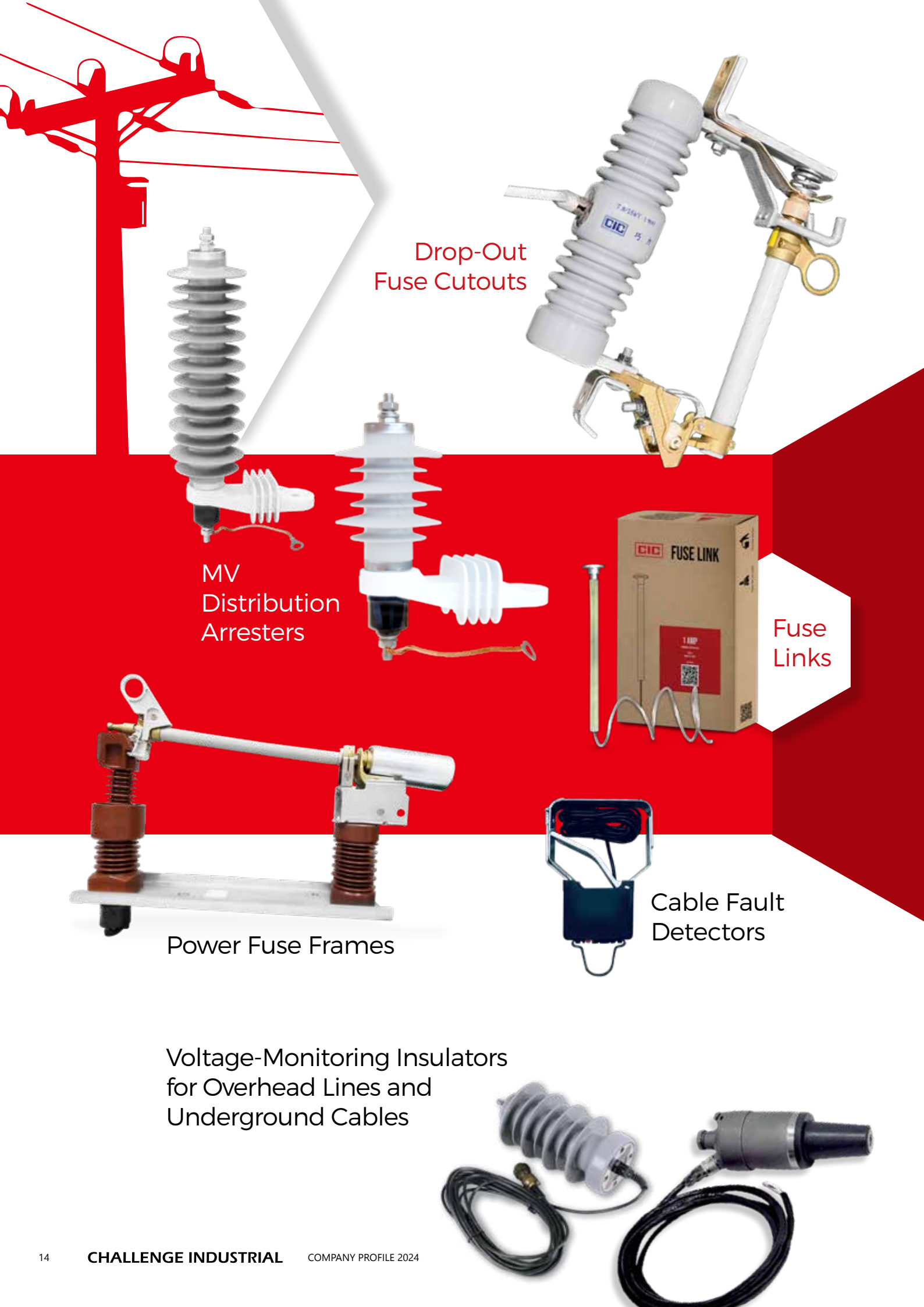
## Instrument Transformer Testing Equipment



## Surge Protection Devices (SPD)



including UL-certified products



Drop-Out  
Fuse Cutouts

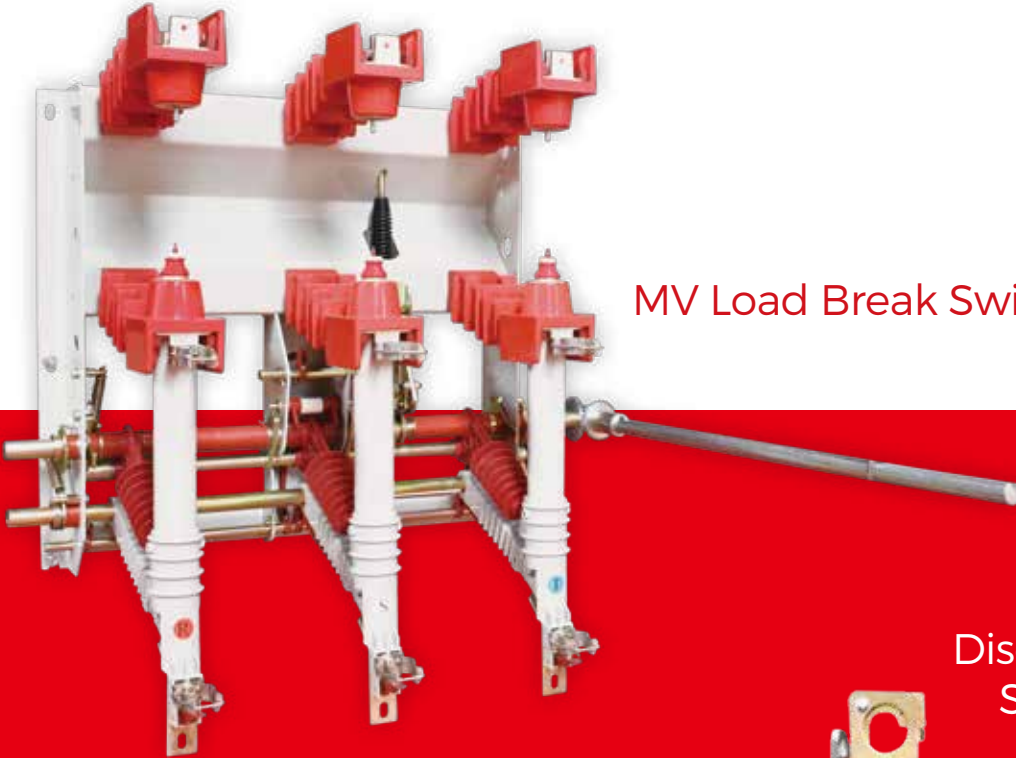
MV  
Distribution  
Arresters

Fuse  
Links

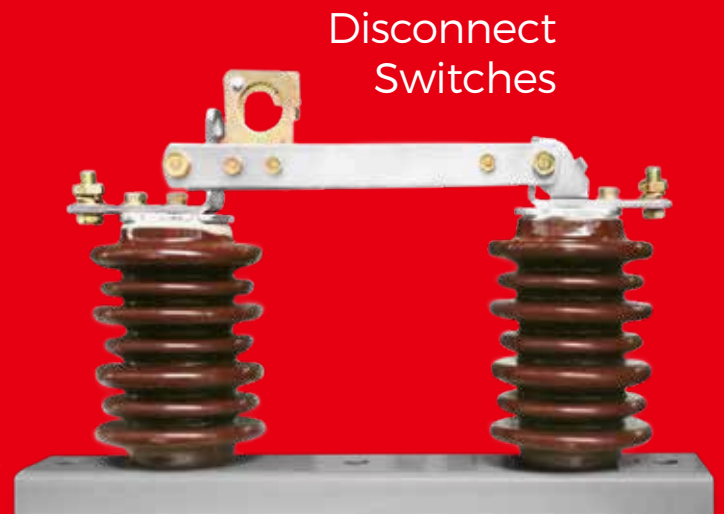
Cable Fault  
Detectors

Power Fuse Frames

Voltage-Monitoring Insulators  
for Overhead Lines and  
Underground Cables



MV Load Break Switches



Disconnect  
Switches



Street Light  
Switches



Reclosers



Cable  
Termination  
Kits



# Advanced Electricity Lab

## Introduction



The **Advanced Electricity Lab** (AEL), of **Challenge Industrial Co., Ltd.** (CIC), was established in 2003 in Taoyuan City, Taiwan, for the purpose of performing reliable electrical testing according to various international standards such as IEC, IEEE/ANSI, CNS, etc., both for CIC's own products and for the testing needs of other manufacturers.



Since 2003, the laboratory has received accreditation by the Taiwan Accreditation Foundation (TAF), a member of the International Laboratory Accreditation Cooperation (ILAC) and a signatory to the ILAC Mutual Recognition Arrangement (ILAC MRA).



## Laboratory Information

<b>Organization</b>	Challenge Industrial Co., Ltd.
<b>Laboratory</b>	Advanced Electricity Lab
<b>TAF Accreditation Number</b>	1181
<b>Address</b>	No. 96, Shueibian 1st Road, Tayuan City, Tayuan Hsien 330, Taiwan
<b>Accreditation Criteria</b>	ISO / IEC 17025: 2017; CNS 17025: 2018



## Testing Services Available

- CIC' s Advanced Electricity Lab has been accredited by TAF to perform the following tests:
  - Routine Tests and Type Tests for Current Transformers and Potential Transformers
  - Routine Tests for Distribution Transformers
  - Routine Tests for Electricity Meters
  - Routine Tests for Surge Protection Devices (SPD)
  - Damp Heat, Steady State Test for Electrical Products
- Standards according to which the above accredited tests are performed may include the following:
 

IEEE / ANSI, IEC, CNS, etc. (Tests for Electricity Meters are according to CNMV 46.)



# Detailed Listing of Testing Services

▪ Testing Field Accredited by TAF:

Note: ● Routine Test ◎ Type Test

**Current Transformers**  
(≤ 72 kV)

- Verification of terminal markings
- Induced overvoltage test  
(Inter-turn overvoltage test)
- Power-frequency withstand tests
- Polarity test
- Determination of errors
- Partial discharge measurement
- ◎ Exciting current test
- ◎ Temperature-rise test
- ◎ Lightning impulse voltage test
- ◎ Secondary winding open-circuited
- ◎ Short-time current test

**Potential Transformers, also called Inductive Voltage Transformers**  
(≤ 72 kV)

- Verification of terminal markings
- Induced overvoltage test  
(Inter-turn overvoltage test)
- Power-frequency withstand tests
- Polarity test
- Determination of errors
- Partial discharge measurement
- ◎ Temperature-rise test
- ◎ Lightning impulse voltage test
- ◎ Short-circuit withstand capability test

**Distribution Transformers**  
(≤ 24 kV)

- Measurement of winding resistance
- Measurement of voltage ratio and check of phase displacement
- Measurement of short-circuit impedance and load loss
- Measurement of no-load loss and current
- Separate source AC withstand voltage test
- Induced AC voltage tests
- Design and visual checks
- Measurement of insulation resistance

2024.10



Note: ● Routine Test ◎ Type Test

## Electricity Meters

(60 A)

## Surge Protection Devices (SPD)

40 kA max. (8×20 μs)  
15 kV max. (1.2×50 μs)

## Electrical & Electronic Products

20°C to 85°C  
40%RH to 95%RH

- Construction check
- Insulation resistance test
- Creeping test
- Starting current test
- Accuracy test

- Residual voltage with current impulses
- Front-of-wave sparkover voltage
- Limiting voltage with the combination wave

- ◎ Damp heat, steady state

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## ▪ Testing Field Awaiting Accreditation:

### Electrical & Electronic Products

Change of temperature  
-40°C to +110°C

### Tension Test

0 ~ 3000kg

### Torsional Strength Test

≤ 20kgf - m

### Environmental Reliability Test

- Accelerated aging by exposure to light  
IEEE C62.11
- Accelerated aging by exposure to electrical stress  
IEEE C62.11 (12 kV)

### Motor Starter Compensator

≤ 12 kV 2500kW

### Reactor Teat

≤ 25 kV 180kVA

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Additional tests and services are available upon request.



# The CIC advantage

- **50 years of manufacturing expertise.**
- **Advanced technology** transferred from Germany's **MWB Messwandler-Bau.**
- Superior **customer service** and **technical support** based on decades of product application experience.
- CIC's own **internationally accredited electrical laboratory** allows **in-house Type Testing** for CIC products. This unique advantage and convenience, eliminating the need of a third party for product testing, results in **considerable savings on time and cost** for the customers.
- The entire production procedure for CIC's instrument transformers – including mold design, product manufacture, Type Testing,





CIC Taipei Head Office team



and pre-delivery Routine Testing – takes place within CIC’s streamlined manufacturing plants. This crucial benefit ensures **efficiency** in product development, **shortens product lead time**, and **reduces production costs**.

- By choosing CIC as the provider of comprehensive electrical product solutions, customers can be assured of receiving both **uncompromising quality** and **exceptional value**, while enjoying **total confidence** in collaborating with one of the most trusted and reputable brands in the electrical power industry.

## ISO certified

Dedicated to the precision and quality of its products, CIC has been certified to ISO 9001, a standard for quality management systems. CIC is also certified to ISO 14001, an environmental certification.





# Where you can find CIC



## ■ Head Office

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### Taiwan

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1F, #46, Lane 80, Section 3, Nangang Road, Nangang District,  
Taipei City 115, TAIWAN

## ■ Manufacturing Plants

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### Taiwan

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#### **CIC Factory at Taoyuan District, Taoyuan City**

#98, Shuibian 1st Road, Taoyuan District, Taoyuan City 330, TAIWAN

#### **CIC Factory at Zhongli District, Taoyuan City**

#33, Lane 433, Section 2, Zhongzheng Road, Zhongli District, Taoyuan City 320  
TAIWAN

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### China

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#### **Challenge Electric Co., Ltd. (Jiaxing)**

North of 7th Building, No. 1 Bazi Road, Xiuzhou District, Jiaxing City, Zhejiang  
Province, CHINA

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### Malaysia

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#### **Challenge Industrial Co. Malaysia Sdn. Bhd.**

No. 39, Jalan SS 26/13, Taman Mayang Jaya 47301, Petaling Jaya, Selangor  
Darul Ehsan, MALAYSIA



## ■ Subsidiary Companies





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