



 **DIRECT**
 **RESPONSE**
Service Division

Service • Support • Maintenance • Retrofits

MARINE



GLOBAL SERVICE NETWORK

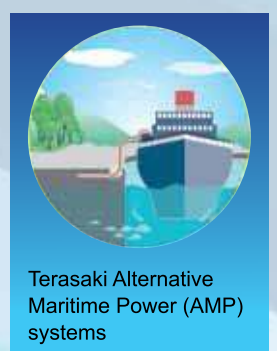
The Direct Response Service Division are a partner in Terasaki's Global Service Network. Wherever your vessel happens to be - they're never far away. Our engineers have offshore certification and medium voltage qualifications and can attend vessels to certify the operation of Terasaki equipment including:



Terasaki low voltage circuit breakers



Terasaki alarm and monitoring systems



Terasaki Alternative Maritime Power (AMP) systems



Terasaki medium voltage main switchboards



Terasaki low voltage main switchboards



Terasaki group starter panels



Terasaki generating plant management systems

TERASAKI'S MARINE AND OFFSHORE SERVICES INCLUDE:

- Ship surveys
- Planned maintenance
- Electrical Officer (ETO) Training
- 5 year docking inspection
- Thermal imaging
- Electrical repairs
- Emergency repairs
- Retrofitting circuit breakers

INDUSTRIAL AND COMMERCIAL SITES



DIRECT RESPONSE SERVICE DIVISION

Terasaki's preventative maintenance service is designed to ensure integrity of electrical supplies. We will tailor a program based on the structure of YOUR electrical system. We can provide the following services for switchgear on industrial and commercial sites:

- DISCRIMINATION ANALYSIS
- FAULT DIAGNOSIS
- DUCTOR TESTING
- SWITCHBOARD SERVICE AND MAINTENANCE
- PREVENTATIVE MAINTENANCE
- LV ARC HAZARD REDUCTION SOLUTIONS
- SPARES MANAGEMENT AND SUPPLY
- CIRCUIT BREAKER MAINTENANCE AND REPAIR



RETROFIT CONCEPT



Retrofitting refers to the addition of new technology to older systems. Retrofit ACBs can replace ageing, unsafe switches and circuit breakers.

TOP FIVE REASONS TO USE RETROFIT

1. IMPROVE SAFETY AND FUNCTIONALITY

Modern circuit breakers offer safer interlocks, remote switching and circuit monitoring.

2. OPTIMISE EXISTING PLANT

Static components in a switchboard (the steelwork and busbar system) can be retained. Only the functional, moving parts (the circuit breakers) are replaced. Retrofitting is typically 80% cheaper than switchboard replacement with minimum downtime.

3. GUARANTEED SPARES AVAILABILITY

Terasaki guarantee spare parts availability for at least 10 years after the withdrawal from sale of a circuit breaker.

4. MODERNISE THE PROTECTION SYSTEM

Old protection relays can be removed and replaced with modern microprocessor protection which is integral to the ACB. It is then easier to interface the ACB with automatic plc controls.

5. REDUCE ARC FLASH HAZARD

Modern ACBs clear short-circuits much faster than older types. This means that the incident arc energy is correspondingly lower.

THE PERFECT FIT



Mounting brackets are designed and manufactured from site measurements to ensure a perfect mechanical interface. Where possible our designs pick up original switchboard fitting locations, thereby avoiding cutting and drilling on site.

RELIABLE CONNECTION



Copperwork interfaces are designed using short-circuit evaluation software. Electrical connection busbars and supports can be tested to IEC 61439 (busbar withstand test).

FULL FUNCTIONALITY



Withdrawable functionality and safety interlocks of original devices can be retained and improved. Fixed pattern devices can even be replaced with withdrawable devices.

TERASAKI'S TEMPOWER 2 RETROFIT ACB

TERASAKI'S TEMPOWER 2 RETROFIT ACB

TERASAKI

ELLISON

GEC

MERLIN GERIN

SIEMENS

UNELEC

SQUARE D

MITSUBISHI

SACE

ABB

HYUNDAI

AEG

ENGLISH ELECTRIC



TERASAKI AH6B



MERLIN GERIN SELPACT



TERASAKI TEMPOWER 2
RETROFIT ACB



UNELEC CN-CS2



MERLIN GERIN DA 4000



TERASAKI TEMPOWER AT



ELLISON GEA

We design retrofit ACBs on request. If you are interested in a brand which is not shown above we would be happy to examine it. New designs are continually added to our portfolio. Check the latest list by clicking the "application notes" download at http://www.terasaki.co.uk/services/1414_retrofit.htm

We also produce retrofit MCCBs and replace fuse switches with MCCBs.

TERASAKI'S RETROFIT SERVICES

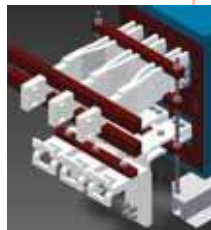
We prefer to conduct a site survey for every retrofit project - even if the breaker to be replaced is already on our design database. This ensures that the installation is as quick as possible, with minimum disruption to the client's supply.

Mechanical and electrical interfaces are modelled using state-of-the-art 3-D CAD.

We can arrange for busbar interface connections to the switchboard to be independently short-circuit tested. This provides reassurance to the client that the fault capability of the retrofitted circuit breakers and connections will equal or exceed that of the original system.

Manufacture, assembly and routine testing is carried out at Terasaki's facility in Glasgow, Scotland. The factory and processes are certified to the ISO 9001 quality management standard.

Our engineers are renowned for fast and efficient working. Some of our retrofit designs can be installed without a shutdown. Where this is not possible, our team will ensure that disruption is minimised.



CLIENTS

INDUSTRIAL

EdF AND MAGNOX NUCLEAR
POWER PLANTS
STANDARD LIFE
RIO TINTO
RBS
TELEVISION DE CATALUNYA
CONOCO PHILLIPS
BANK OF CANADA
CREDIT SUISSE

MARINE

CONVERTEAM
CALMAC
WIGHTLINK
FML SHIP MANAGEMENT
ANGLO EASTERN
GC RIEBER SHIPPING
TIDEWATER MARINE
SHELL



TESTED TO CURRENT STANDARD

ASTA tested to IEC 61439 for short-circuit withstand (Icw)

GEC MPact
Ellison
English Electric



LOW VOLTAGE ARC HAZARD REDUCTION

1. Remote switching using umbilical cord controller
2. Faster opening time reduces incident arc energy. TemPower 2 ACB can be set to open a short-circuit in less than 30 milliseconds (typically at least twice as fast as the device it will replace).



MODERN PROTECTION

The AGR protection relay can replace the functions of several devices in an existing switchboard to provide:

- restricted earth fault protection
- overcurrent protection
- data communication to BMS or SCADA
- plc control



TERASAKI GLOBAL SERVICE NETWORK



Direct Response Service Division are members of Terasaki's Global Service Network (GSN). The GSN provides fast and efficient service for your Terasaki equipment regardless of its location. Providers are based in Asia, Europe, the Middle-East, Australia and South America. Contact us for details of your nearest Global Service Network provider.



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