



BESPOKE MARINE METALCLAD SWITCHGEAR SOLUTIONS



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A Growing Company with A Growing Reputation

- 1985 Company Established
- 1989 Began Manufacturing LV Switchboards
- 1994 New Manufacturing facility 28,500 Sq. Feet (3,000 Sq. Metres)
- 1996 Development of withdrawable M.C.C
- 1998 New Corporate Identity
- 1999 Full ASTA Certification
- 1999 ISO 9001 Accreditation
- 2000 Opening of new manufacturing facility Thailand
- 2003 ISO 9000-2000 Accreditation
- 2004 Full Arc Containment to IEC61641:1991-01
- 2013 Full Type Testing to BSEN61439-1
- 2014 Arc Type Test to IEC61641:2008-01, 85kA/690V, Criteria 1-7
- 2014 Further Development ongoing



history

Mission Statement

Our Mission

To be a world class manufacturer of Electrical HV and LV Switchboards, designing Systems which satisfy our customers bespoke applications and offer continuous support and obsolescence management

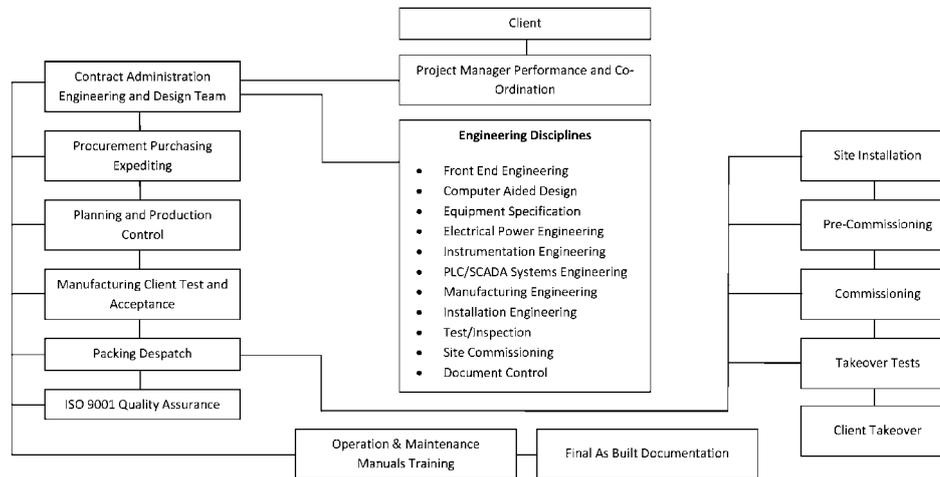
NCE Core Values

- Support, service and flexibility for our clients
- Quality in everything we do
- Professionalism & ethics in all our actions
- Global competitiveness and a will to win
- Continuous growth and development of the company for our employees

Our Objectives

- Continuous improvement of our products, through innovation and consultation with our customers
- Market leader in efficiency and productivity management style and practices that contribute to the well being and development of a fully responsible and accountable workforce

NCE capability is exemplified in the supply potential for electrical and instrumentation packages where responsibility is assumed for the design, manufacture, procurement, installation, testing, certification, commissioning, customised client/operator training (on/off site) together with logistical spares and service support



From initial brief we will promptly produce detailed technical switchboard specifications and drawings, as well as material and production schedules. These enable our clients to monitor their projects and initiate the manufacturing process without delay.

Capitalising on our core competencies and vast experience associated with these principal engineering disciplines, NCE is a single source system integrator that can provide complete, in-house solutions to satisfy the requirements of the Power and Control Switchgear industry. Throughout all of its activities NCE operates a quality system in accordance with the needs of its customers and which is accredited by BSI to ISO9001:2008.

Products and systems comply with the rules and guidelines of all major classification society and regulatory bodies including LRS, DNV (GL), BV, ABS, Norsok, RMRS, KR, CCS, RINA, ATEX, USCG and IMO.

Engineered Solutions

NCE is best known for its core products and systems:

- Motor Control Assemblies
- Variable Speed Drives Assemblies
- LV Power Switchboards and Distribution Boards
- MV Power Switchboards
- LV & MV ship to shore connection panels
- LV retrofit and upgrade switchgear solutions

complete

Design Facilities

- Radan CAD/CAM Software (Manufacturing & Electrical)
- DNC Machine Control
- Auto Cad (Electrical)



Our design team's technical experience and skills are further enhanced by the use of state-of-the-art CAD/CAM equipment. Design stations are networked to printers, central data files and DNC/CNC production equipment with communications to external data sources. High quality drawings are produced on paper and can also be output/input on DXF/Iges or Auto Cad format.

Good design means more than studying an individual process to produce high quality, cost effective products. It means analysing your total system requirements to arrive at the appropriate solution to meet all your process control and energy distribution needs.

Metal Treatment & Coatings

- Powder Coating
- Stove Enamelling



Sheet Metal Fabrication

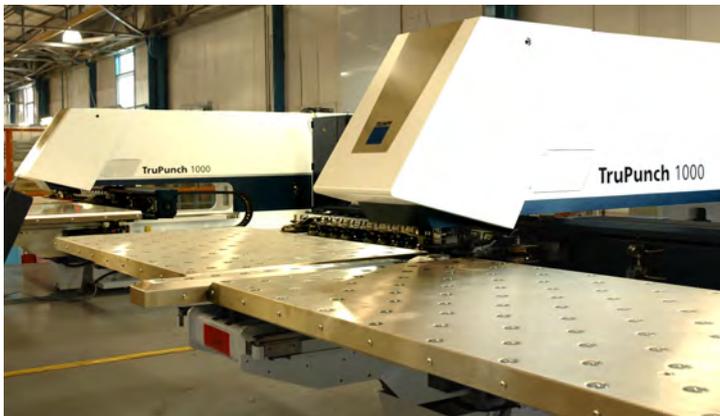
- Assembly & Welding



capability

Fabrication

- Trumpf 1000 Punching Machines
- Trumpf Brakepress



Electrical Assembly

- Electrical Wiring & Assembly
- Factory Test & Inspection
- Site Installation & Commissioning



Product Certification

All Company products are manufactured to the latest International Standard for Electrical Switchboards BSEN61439-1 and comply with the following council of European Communities Directive:

- 89336/EEC EMC Directive
- 7327/EEC Low Voltage Directive

Quality Management Systems

NCE has received accreditation to the quality management standard:



ASTA Certified Systems

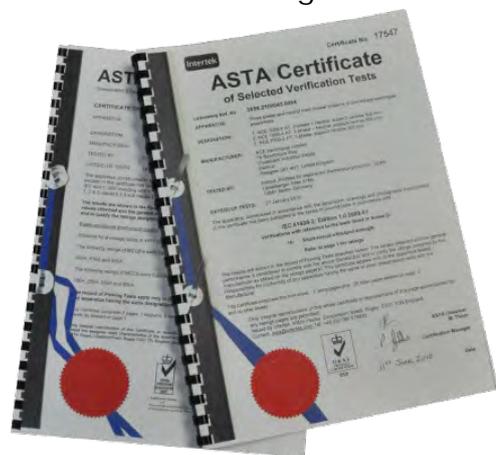
The Company has TYPE TESTED its switchboard systems to the following levels:

Busbar System:

- 50kA for 1 second and 3 seconds
- 65kA for 1 second
- 80kA for 1 second and 3 seconds
- 85kA for 1 second
- 120kA for 1 second

Incoming & Outgoing Cubicles & Fault Trip Test of:

- ACB's 1250A - 4000A
- MCCB's 125A - 800A



Withdrawable and Fixed Type MCC's

- Type 2 Co-ordination 50kA up to 100kA (both Fuse/Contactor and MCCB/Contactor short circuit combinations)

NCE Bespoke Marine and Naval Switchgear is designed in accordance with IEC International Standards together with Marine and Offshore classification society rules and regulations, namely LRS, DNV (GL), BV, RMRS, ABS, KR, CCS & RINA



standards

In 2014 NCE added Arc Type Test Certification IEC/TR61641:2008-01 to 85kA/690V, Criteria 1-7 to our list of Test Reports, extract depicted below.

ASTA TEST REPORT

Laboratory Ref. No: 2658.2140185.0073 Test Report No. xxxxx

APPARATUS: 4000 A / 690 V / 690 V / 12 kV ($I_{nA}/U_n/U_i/U_{imp}$), 50 Hz power switchgear and controlgear assembly consisting of: a three-phase and neutral main busbar system, a protective busbar, one incoming circuit with ACB, three outgoing circuits with ACB

DESIGNATION: 4000A Compact Switchboard

MANUFACTURER: NCE Switchgear Limited
79 Beardmore Way
Clydebank Industrial Estate
Dalmuir, Glasgow G81 4HT
United Kingdom

TESTED BY: Institut „Prüffeld für elektrische Hochleistungstechnik“ GmbH
Landsberger Allee 378A
12681 Berlin, Germany

DATE(S) OF TESTS: 9 April and 2 June 2014

The apparatus, constructed in accordance with the description, drawings and photographs incorporated in this test report has been tested in accordance with Client's instructions.

The test procedure and test parameters were based on IEC/TR 61641: 2008-01

Tests under conditions of arcing due to an internal fault with a short-circuit current of 85 kA at a rated operational voltage of 690 V and a duration of short-circuit of 300 ms applying criteria for an assembly providing personal and assembly protection under arcing conditions

&



approvals

electrical

NCE Switchgear have always carried out wiring and assembly services to the very highest national and international standards. Our policy of continuous training and regular investment in new equipment has kept us at the forefront of the new technical developments, without comprising the high quality of operator skills.

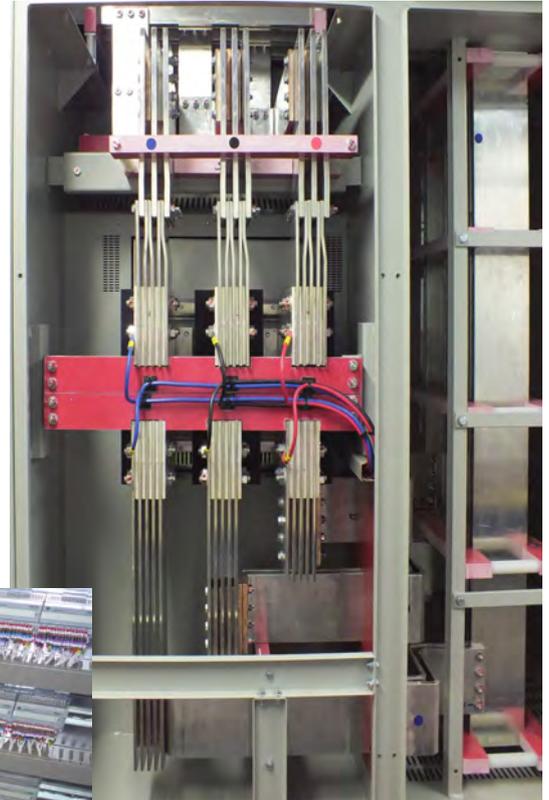
Quality of workmanship and adherence to the latest wiring standards guarantee that the result will be exactly as specified. Timing is always important and the company has maintained a policy of commitment to meeting completion deadlines whatever the demands of the production schedule.

wiring &

Naturally, safety and traceability are of paramount importance to our customers and, with this in mind, the company carries out some of the most thorough testing processes in the industry, including ASTA short-circuit testing of busbar arrangements, motor starter configurations and distribution feeders.

Installation

In addition to the design and manufacture of customised and standard products, NCE Switchgear will also undertake the installation and commissioning of the panels.



assembly

products

NCE has designed and built Marine class switchboards and Control Systems for Navy ships, drilling rigs, AHT supply vessels and shore power panels.

We provide complete mechanical and electrical engineering design and custom solutions for every application. Every NCE Marine class panel is built to rigorous standards and fully inspected and tested to ensure customer satisfaction. From design to build, NCE is a proven supplier, whether your project is new construction or retrofit, NCE's expert mechanical and electrical design team have years of experience to bring to your application.



Busbar Short circuit 50kA
800A Busbars, 440V



Busbar Short circuit 65kA
3200A Busbars, 480V

NCE offers a broad range of equipment for low voltage marine applications including:

- Generator Control Panels
- Distribution Switchboards & Switchgear
- Shore Power Panels
- Air Circuit Breaker Replacement
- Main Bus Bar Replacement/Modifications

NCE Bespoke Switchgear is designed in accordance with IEC International Standards together with Marine and Offshore classification society rules and regulations, namely LRS, DNV (GL), BV, RMRS, ABS, KR, CCS & RINA



Busbar Short circuit 85kA
3000A Busbars, 690V



Shore Connection Panel 2000A Busbars, 450V AC 360V DC

Our major strength is our adaptability to design and configure our manufactured products to produce a complete custom system for your unique project. We further enhance our system packages by customising a variety of components from leading equipment manufacturers including Terasaki, ABB, and Schneider.

Ease of Maintenance

Front mounted components and plug-in circuit breakers assure maintenance accessibility.

Custom Design Engineering

We adapt to your application with custom designs and innovative problem solving.

Nce designs are thorough and precise using Radan CAD/CAM drafting software.



products

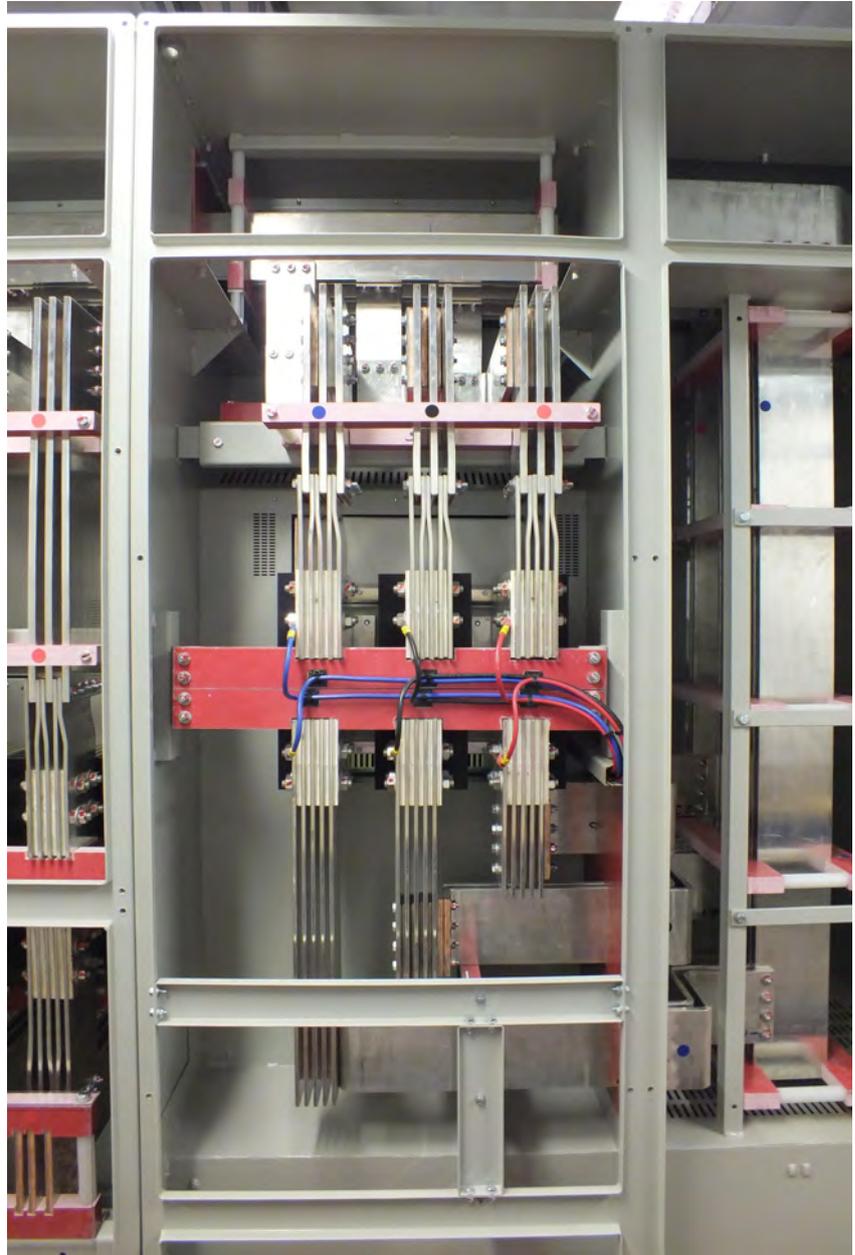
service

NCE Service division, provide a comprehensive package to ensure the critical uptime for all types of switchgear.

With our fully qualified and industry experienced team NCE Service are the first choice partners for all aspects of increasing the longevity of switchgear in an increasingly health and safety focused environment.

NCE Service offer technical support and maintenance for all 3rd party switchgear, from obsolescence management studies, site surveys, bespoke upgrade solutions, extensions, to 3rd party legacy designs

With a dedicated engineering support team offering 24/7 telephone assistance in the protection of people and assets, and fully flexible on-site approach able to offer 24/7 planned call out services.



NCE's offer fully type tested designs to the latest international standards, Inc, IEC, ANSI, CAS and Marine Classification Society Rules.

NCE Service division can apply all of these services at any stage of the switchgears lifecycle, with a full and comprehensive report including detailed analysis and conclusions for the most cost effective approach to maximising uptime, MTBF, safety and security with scheduled interruptions to supply.

extensions

retrofit



Retrofit solutions can be a cost effective and highly efficient process ensuring legacy switchgear is compliant with current legislation.

NCE Service division can offer a total solution, from detailed analysis to (ISO9001-2008) 3D design, full in house manufacture, assembly, and test, with a dedicated site team providing peace of mind installation and commissioning.

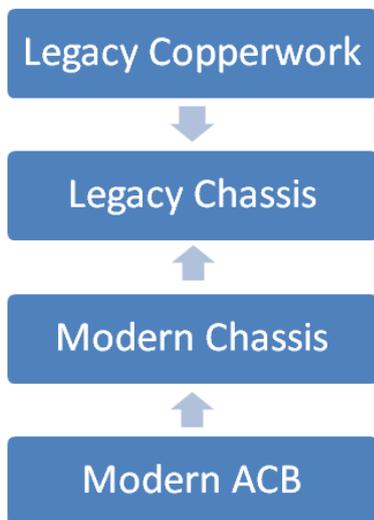
With extensive experience of retrofit conversions NCE Service division can provide full compatability retrofitting current ACB's for legacy ACB's.

From simple relays, meters, MCCB's, to up rating busbars, NCE Service can provide a one stop shop.

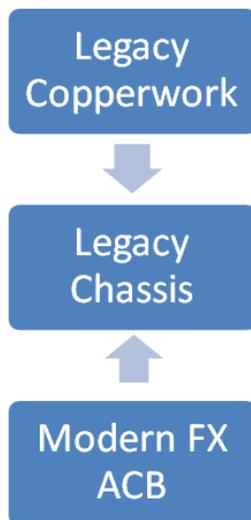
Legacy ACB's can be retrofitted with any current manufacturer of ACB's, using NCE Service division's unique designs.

With 3 systems for retrofit solutions NCE Service will provide a tailored system for minimum downtime, and maximum efficiency.

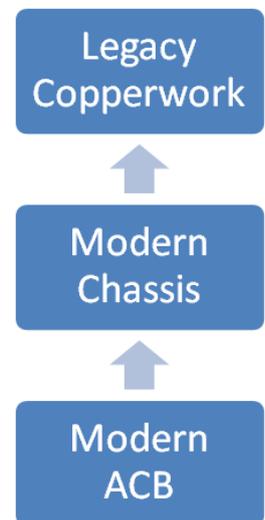
upgrade



System 1



System 2



System 3

arc



Triple Stack ACB Section



Safety

Operator and equipment safety are prime considerations in NCE design.

We adopt Arc Fault Containment in all our Marine Switchgear which further illustrates our goal to supply the best and safest Switchgear to our customers.

containment



PM-45190



Scottish  Engineering



MCC Technology

Solutions made simple



SAFETY FOR ALL

Arc containment tested to 85kA
Categories 1-7 IEC61641

Busbar systems to 1200A to
6000A
from 50kA to 120kA

MCC

Fully ASTA Certified

Certification:

Fuse Switch/Contactor &
MCCB/Contactor solutions, type 2
Co-ordination to 50kA & 80kA
MCC to IECEN61439-1 & IEC61641

Construction:

2mm fully welded zintec sheet
Steel cubicle with integral
Faraday communication transits
Proven communications without
noise interference

Paint Finish:

Powder coat (texture) or stove
enamel finish RAL 7035 as
standard, other RAL or BS
colour available on request

Specification:

All forms of separation from
Wardrobe Form 1 to Form 4 Type 7
Fixed or Drawout
Safety is our goal



MCC Technology

MCC Technology

Outgoing Circuits: D.O.L., Start Delta, Soft Start, Variable Speed drives and Thyristor Control Starters
Integral PLC, Telemetry and Marshalling Cubicles

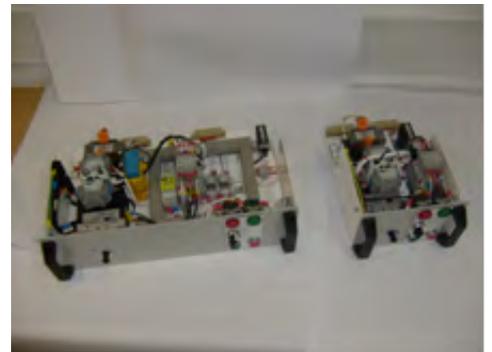


Ingress Protection: IP41 to IP54

Cable Terminations: Front/Rear Access
Top and Bottom entry



Padlock Facility: Front Door with or without tray
Main Isolator



Versatility in size: Full and half drawer
Design for economic
Space restrictions

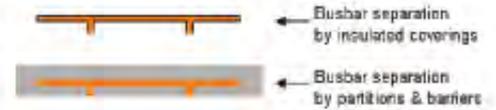
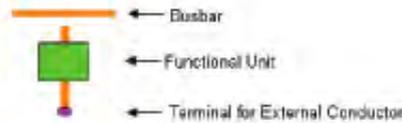
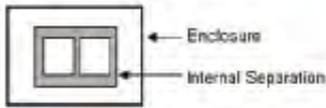
Safety on isolation: Complete isolation for
Withdrawn starters trays



| | | | |
|----------------------------|----------------------------------|--|-------------|
| MAIN FEATURES | | Insulation Voltage (U) | 1000V |
| | | Rated operational voltage (Ue) | 690V |
| ELECTRICAL DATA | RATED VOLTAGE | Rated impulse withstand voltage (Uimp) | 6/8/12kV |
| | | Rated Frequency | 50/60Hz |
| | | Main Busbar | Up to 6000A |
| | | Distribution Bars | Up to 1250A |
| | RATED CURRENT | Rated Short time current (1 Sec) | up to 85kA |
| | | Rated Peak Current | Up to 220kA |
| | ARC FAULT WITHSTAND | Permissible Current (Ip arc) | 85kA |
| | | Permissible Arc Duration | 300mSec |
| | WITHDRAWABLE DRAWER PLUG RATINGS | AUX CONTACTS | 20A |
| | | NO AUX CONTACTS | 10, 20, 30 |
| | | 63A, 250A, 500A | |
| DIMENSIONS | Height | 1800/2000/2200/2400 | |
| | Width | 610 | |
| | Depth | 750/1000 | |
| MATERIALS | Internal Main Carcass | Aluzinc Metal Sheet Zintec Sheet powder Coated | |
| | DRAWER SIZES | 200, 250, 300, 400, 600 | |
| MECHANICAL CHARACTERISTICS | IP PROTECTION RATINGS | Inside Outside | |
| | ACCESS | Front/rear | |
| | FORM OF SEPARATION | Form 3, or Form 4 | |
| | POWDER COATING | Powder Ral 7035 | |
| | PLASTIC COMPONENTS | Halogen-free, flame retardant | |
| | BUSBAR | Plain, silver or tin plated and/or fully insulated | |
| | | | |
| | | | |

Guide to Forms of Separation

Key:



Notes:

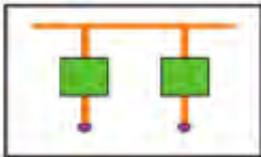
Forms of Separation can be achieved by using:

- (i) Partitions/barriers of metallic or non-metallic material
- (ii) The integral housing of the device

All diagrams from figures AA 1, 2, & 3 from Annex AA
Text from UK National Annex
Both from BS EN 61439-2

Form 1

Form 1

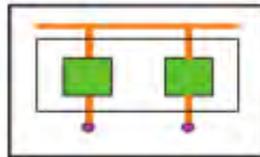


Form 1:

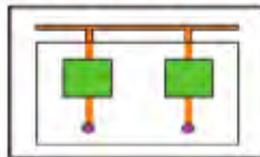
No internal separation is provided.

Form 2

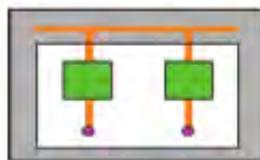
Form 2a



Form 2b Type 1



Form 2b Type 2



Form 2:

Functional unit separate from the busbars

The 'a' designation denotes terminals are not separate from the busbar

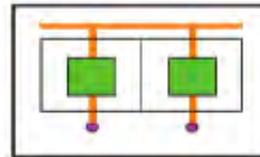
The 'b' designation denotes terminals are separate from the busbar

Type 1 utilises insulated coverings for busbar separation

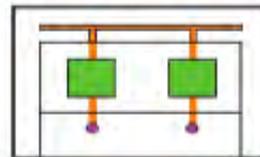
Type 2 utilises insulated partitions and barriers for busbar separation.

Form 3

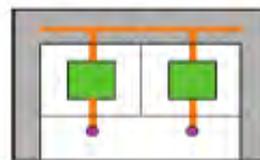
Form 3a



Form 3b Type 1



Form 3b Type 2



Form 3:

As Form 2 plus:

Functional units separate from other functional units

The 'a' designation denotes terminals are not separate from the busbar

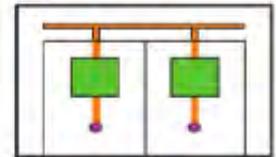
The 'b' designation denotes terminals for external conductors are in a separate compartment to the functional unit.

Type 1 utilises insulated coverings for busbar separation

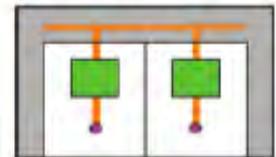
Type 2 utilises insulated partitions and barriers for busbar separation.

Form 4

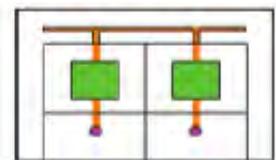
Form 4a Type 1



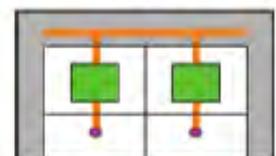
Form 4a Type 2 & Type 3



Form 4b Type 4



Form 4b Type 5, 6 & 7



Form 4:

As Form 3 plus:

Terminals for external conductors separate each other

The 'a' designation denotes terminals within the functional unit

The 'b' designation denotes terminals for external conductors are in a separate compartment to the functional unit

Types 1 & 4 utilises insulated coverings for busbar separation

Types 2, 3, 5, 6 & 7 utilise partitions and barriers for busbar separation

Types 3 & 7 feature integral glanding

Type 5 utilises insulated coverings for terminals for external conductors.

System and Switchboard

Existing systems cannot be upgraded without the support of expert engineering. NCE can provide that support from initial system studies through to project completion.

With experienced switchboard/circuit breaker operatives we can upgrade your aging system and breath new life back into it safely. Some older breakers employed asbestos in the manufacture of their arc control systems. NCE can aid you in the removal of such breakers and replace with modern devices that provide piece of mind to your operatives.

Worldwide Coverage

With a global presence NCE is uniquely placed to serve the offshore industry. Located close to the major shipping geographic markets we are able to be flexible and responsive wherever our customers need us. It will never be enough just to claim global coverage with large numbers of employees based in various locations throughout the world. What really matters is the extent to which the right people with the right skills are employed at the right

Europe

NCE Switchgear
79 Beardmore Way
Dalmuir
Glasgow, G81 4HT
Scotland

Tel: +44(0) 141 952 1166
Fax: +44(0) 141 952 1188
Email:
sales@nceswitchgear.com

Service & Support - Beyond the Call

Our investment in our service and support organisation is just one of the ways in which NCE demonstrates a commitment and understanding of the needs of our industry.

The NCE Service organisation offers comprehensive support during the product lifecycle phases including spares and repairs, training, routine service contracts 24/7 breakdown support, upgrade and enhancement projects.

NCE has developed an attitude to customer service that goes beyond just waiting for their call. Our philosophy is to be proactive in providing a service and support function which recognises the varying needs of your business:

Our service and support operation is based on two strategically located offshore Service centres:

- Glasgow (UK)
- Thailand Far East

Training - A Vital Ingredient Using and maintaining systems and equipment safely and efficiently is a vital part of any successful project implementation.

Asia

New Circuit Engineering Co., Ltd
106/39 Moo 5 T.Plutaluang
A. Sattahip Chonburi 20180
Thailand

Tel: 066(038) 070601
Mobile: 066(086) 3342108
Fax: 066(038) 070602
Email:
sales@nceswitchgear.com

NCE provides comprehensive training facilities for the equipment and systems that it supplies. The content, duration and location of training are flexible to suit the specific needs of the customer.

Customer

Commitment

NCE customers can expect an all-encompassing support, from initial system studies and design through to manufacture and project completion. NCE is comprehensively committed to provide excellence in every aspect of its operations.

It's About you - We Listen

When you want to discuss and develop your specifications, concepts and ideas with a world leading expert then it is time to approach NCE.

When you do make contact with us you will expect to talk to people who listen and understand your needs. NCE people are ready and able to help you to turn your concepts into realities.

By listening we develop relationships, it is these relationships that endure throughout the project and often continue across more than one project. In many instances we notice that these relationships continue throughout individuals entire careers. We believe that this is the outcome of mutually beneficial and respectful interactions between professionals.

Sales Team Contacts

John Kirkwood: jmk@nceswitchgear.com
David Pert: dp@nce-marine.com
David White: dw@nceswitchgear.com
David Loughlin: dl@nceswitchgear.com

Certificate of Registration

QUALITY MANAGEMENT SYSTEM - ISO 9001:2008

This is to certify that:

New Circuit Engineering Ltd
T/A NCE Switchgear
Clydebank Industrial Estate
79 Beardmore Way
Dalmuir
Glasgow
G81 4HT
United Kingdom

Holds Certificate Number: FM 45190

and operates a Quality Management System which complies with the requirements of ISO 9001:2008 for the following scope:

The design and manufacture of HV and LV switchboards. Sheet metal fabrications to customer specification.

For and on behalf of BSI:



Gary Fenton, Global Assurance Director

Originally registered: 02/03/1999

Latest Issue: 12/05/2014

Expiry Date: 30/07/2015

Page: 1 of 1



...making excellence a habit[®]

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