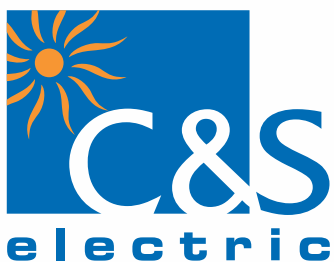


Custom Build Modular Solution  
**Draw-out & Non Draw-out  
Closed Door (Cube)**



An ISO 9001 : 2001 Company



**C&S Electric Limited**  
Low Voltage Switchboards

We touch your electricity everyday!

## C&S Electric

C&S Electric Ltd. is amongst the leading suppliers of electrical equipment in India and is India's largest exporter of industrial switchgear. Its wide range of electrical and electronic products find application in power generation, distribution, control, protection and final consumption.

C&S Electric is amongst the top 4 players in the LV switchgear business & the market leader in the Power Busbar Business. In addition the company also has product offerings for MV switchgear, Energy Efficient Lighting solutions and Diesel Generating Sets. C&S Electric has an electrical contracting business which performs turnkey solutions for industrial and commercial electrification, substations and power plants. C&S Electric also the 2nd company to design and execute a grid connected solar PV power plant in India.

C&S employs over 5900 people including 600 engineers, and has 18 state-of-the art manufacturing plants in India, Belgium & China. It has 24 sales/marketing offices across India and its products are exported to over 85 countries.



C&S Electric is among the top 3 leading switchboards manufacturers in India. The business is supported by world class manufacturing plants located at Noida. The manufacturing facilities are equipped with state-of-the-art machinery, tools and equipment. The world class quality systems and manufacturing technologies are employed to ensure the highest level of quality and customer satisfaction.

C&S Electric offers complete range of PCC (Power Control Center) and MCC (Motor Control Center) allied products. It has produced India's first bolted type design - fully type tested upto 65kA for fixed in draw-out switchboards.

C&S Electric has approval with all major power consultants and power utilities. It has supplied the switchboards to almost all the major power plants and petrochemical projects in India. It has long standing relationship with all major power utilities and EPC contactors. India's largest refinery at Paradip, Majority of NTPC power plants and infrastructure - All trust C&S switchboards.

C&S Electric switchboards are exported across the globe including Middle East, Bangladesh, Russia and many other countries.

### Come and join us in our journey of the legend

*Journey started in 1966--From the first Control Panel built in a garage factory to India's one of the largest manufacturer of world-class Switchboards & LV Switchgears.*

## Our Vision, Mission & Values

### OUR VISION

- To be the most trusted, respected and preferred brand
- To be closest to its customer
- To manage power in India's biggest industries, in its highest buildings, in its most critical infrastructures and in millions of its homes
- To serve as a role model to others
- To make "MADE IN INDIA" a respected label world over

### OUR MISSION

- To create a unique alchemy of outstanding products, operational excellence, path breaking customer services and compelling marketing
- To create the best place to work where employees are empowered, cared, developed and provided unlimited opportunities
- To continuously innovate, enhance our core technologies and develop new world class products
- To be India's largest exporter of industrial power distribution and control equipment
- To everyday experience, the sheer joy of delighting our internal and external customers
- To earn healthy return on investment

### OUR VALUES

- Stretch for your customer
- Be frank, be honest
- Be obsessed with quality
- Work hard, smart and swift
- Succeed as a team and as an individual
- Discover your strength and those of others



India is poised for significant growth and ready to carve its place in the global economic landscape - we at C&S are well positioned to be an integral part of this journey.



## State-of-the-art Manufacturing Facilities



### Design & Engineering

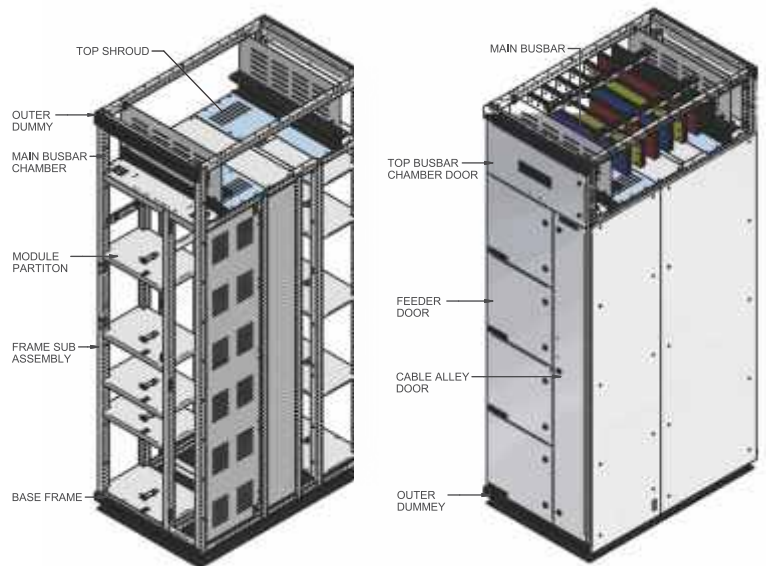
C&S Electric has 4 Govt. approved R&D centers where more than 70 engineers are continually working on product upgradation & technology development.

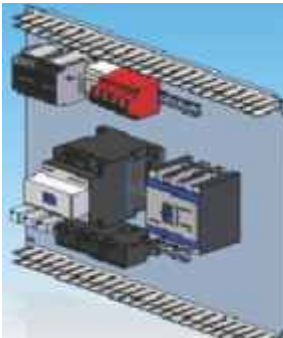
The design & engineering team at C&S is one of the most experienced work force to meet the customers requirements.

The engineers are equipped with latest software which contains the high level of details from sheet metal to the final product.

C&S invest 2% of its revenue in Research & Development. It has focused team for new product development, product life cycle management and value engineering.

A strong spirit of enterprise, passion for brilliance and dedication to innovation makes it an invincible force in Industry.





## Manufacturing Range

- Power Motor Control Centers (PMCC)
- Motor Control Centers (MCC)
- Power cum motor control centers
- Intelligent MCC's
- APFC Panels
- Control desk, Soft starter, Drive & Automation panel
- Feeder pillars
- DG synchronizing & load sharing panels
- Crane control panels

World class products with state-of-the-art facilities and no efforts or investments are spared to ensure that our customers get the finest products.

### Specifications:

System	3P or 3W, 4W 50 Hz. 415V
Current	Upto 6300A
Rated Insulation	1000V
STC	upto 100KA -1 Sec
IP Protection	upto IP54
Form of separation	upto 3B or 4B Type 7
Type test	STC. Temp Rise, DOP, Seismic test
Feeder configuration	Fully Draw-out, Semi Draw-out, Non Draw-out



Pre punched holes provides complete flexibility



Foam- 4, Type - 7 construction





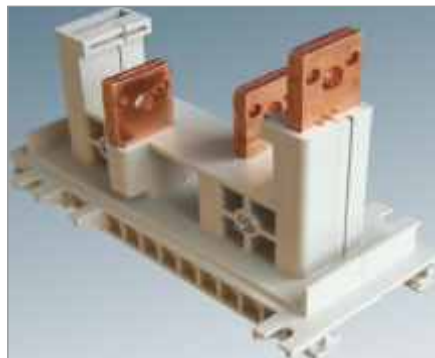
## Low Voltage Switchboards



### Cube - Close Door Design



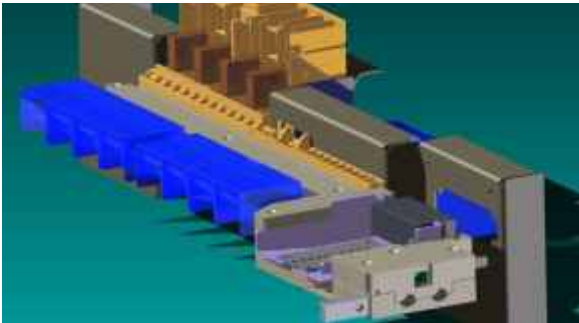
### Mechanism





All units combined and in function

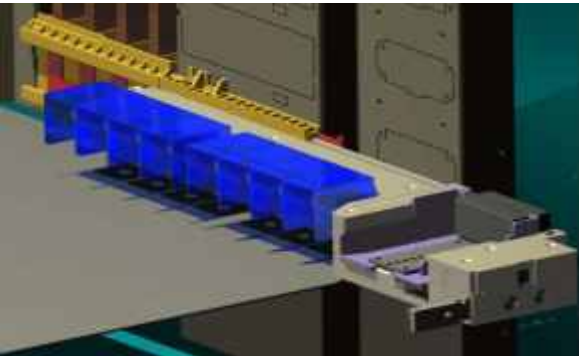
Functional Units



Contacting-module VBS and cable-module together form up an arc-fault-free-zone



The drawer is only a simple metal sheet, combined with the contacting- module it forms up a drawer unit at highest level of safety and functionality



Movable contacting module with mechanical-interlocking for Test-Disconnected and operate position



Sample for a completed drawer-set with all the necessary equipment.

# Draw-out Trolley & Accessories

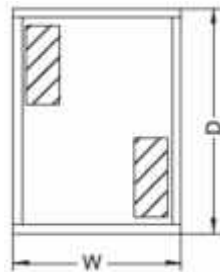
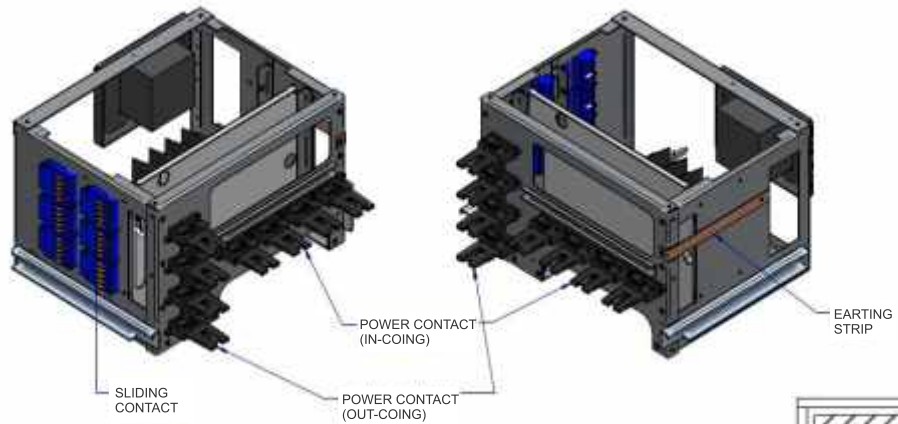


Guide Rails for Trolley

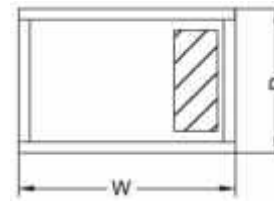


Power & Control Connections

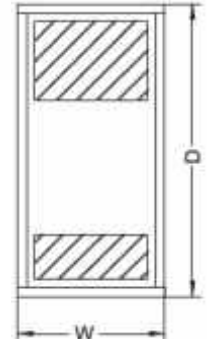
## Draw-out Trolley & Accessories



MCC DOUBLE FRONT



MCC SINGLE FRONT



FOUNDATION VIEW

## General overall dimensions of MCC in mm\*\*

BUSBAR RATING	MCC						PCC	
	HEIGHT SF/DF (H)	WIDTH SF/DF (W)	CABLE ALLEY	DEPTH (D)		CABLE ENTRY	W	D
				SF	DF			
UPTO 1250A	2450	750/800/900/950 1000	250	500	1000	Bottom or Top	650	1000/1300
			300	700	1000			
			450					
1600A	2450	750/800/900/950 1000	250	750	1000	Bottom or Top	650	1000/1300
			300	1200	1000			
			450					
2000A/ 2500A	2450	750/800/900/950 1000	250	1000	1200	Bottom or Top	800/950	1500/1700
			300	1200	1000			
			450					
3200A/ 4000A	2450	750/800/900/950 1000	250	1000	1200	Bottom or Top	950	1500/1700
			300	1200	1000			
			450					



PCC PANEL

MCC PANEL

\*\* Data is subject to change to meet customer requirements & design optimisation



## Quality System

We design and manufacture equipment as per customer requirements, conforming to applicable standards, safety and quality parameters.

We continually upgrade our quality system in line with national / international standard to achieve world class quality & customer satisfaction.

### Important testing facilities

- AL & CU conductivity
- Salt spray
- Dielectric test
- Temperature rise
- Relay testing
- Insulation tests

### Extensive quality assurance- Inspection at each step

- Vendor evaluation / approval
- Received good stage
- In process
- Final product
- Customer feedback
- Vendor rating

### Quality Checks (In-Process / Finished Goods)

- Visual
- Bill of material
- Shade adhesion and DFT (Dry film thickness)
- Degree of protection
- Hardware - size & torque tightness
- Clearance and creepage distance
- Continuity of electric circuit
- Secondary injection test
- High voltage and insulation resistance measurement
- Control circuit – complete scheme - functional test
- Mechanical operation

Customer inspection prior to dispatch

Testing as per filled quality plan before commissioning



## Low Voltage Switchboards

- Modular and Power Control Centres
- Intelligent PCCs and MCCs

### MCC-2014

MCC-2014 draw-out motor control centers are used for distribution, control, metering and protection of electrical power. MCCs are normally used in thermal, hydro, nuclear and combined cycle power generating stations in paper, cement, petrochemical, steel and fertilizer plants and also in every other process industry. MCCs also find their application in ships due to higher level of protection & reliability required in the system.

MCC is designed to handle any switching, isolating, distribution or control functions. It is a result of more than 45 years of manufacturing experience. As such, it is ensured that the product is matchless in quality and is able to fulfill the project requirements in totality.

Series 2014, MCCs are supplied in fully draw out, semi draw out and non-drawout construction. These MCCs are of sheet steel modular construction and each vertical section is segregated into the various sections / foam using metallic barriers.

### Flexi Module PCC

#### PCC-2014 power control centre

PCC-2014 Power Control Centre are used as main low voltage switchboards in power stations, large industrial plants., process industries and other heavy plants for distribution and control of power. PCCs can be supplied with Air Circuit Breakers, MCCBs, Fuse Switch Units, Isolators etc. With busbars rated upto 4000A. PCCs with higher busbars ratings are also supplied for special applications.

PCC -2014 are designed to cater diverse system requirements with higher efficiency and have edge over conventional design available in the market. The design ensures highest degree of reliability in operation, complete flexibility and proper adoption of project requirements.

#### Other custom built control relay panels

Our custom made control & Relay Panels are packaged into modular steel enclosures, designed, manufactured, tested and commissioned. Our inhouse test facilities (which include HV Load Test and Functional Testing capabilities, are unique in the market place.

We also integrate power / energy management system, sub-station automation, generator protection and synchronization system with 415V panels.

Panels designed by C&S include hardware, software for integration of numerical relays, metering & control system for centralized control & monitoring and communication networking.

Application software is available to meet the specific requirement as per system architecture, engineer's / operator's requirements of station operators and engineering.

#### Main / Horizontal Busbar size

S. No.	Rating	Busbar Size Aluminium (E91E)	
		Phase (mm <sup>2</sup> )	Neutral (mm <sup>2</sup> )
1	4000A	6(150X6)AL or 4 (150x6) CU	3(150X6)AL or 2(150x6) CU
2	3200A	6(125X6)AL or 4(125x6) CU	3(125X6)AL or 2(125x6) CU
3	2500A	4(150X6)AL or 2(150x6) CU	2(150X6) AL or 1(150x6) CU
4	2000A	4(100X6) AL or 3(100x6) CU	2(100X6) AL or 1(100x6) CU
5	1600A	3(150X6) AL or 2(150x6) CU	2(150X6)AL or 1(150x6) CU
6	1250A	2(150X6) AL or 2(75x6) CU	1(150X6)AL or 1(75X6) CU
7	1000A	2(100X6)AL or 2(75X6) CU	1 (100X6) AL or 1(75X6) CU
8	800A	2(75X6)AL or 2(50X6) CU	1(75X6) AL or 1(50X6) CU
9	500A	2(50X6)AL or 2(50X4.5) CU	1(50X6)AL or 1(50X4.5) CU

\*\* Change is for good & these data are subject to change to meet customer requirement & design optimization.





Isolate position



Test position



Service

## Important design features

- Main busbar / horizontal busbar chamber at the top of cubical (Busbars at the bottom can also be supplied on request).
- Vertical busbars / droppers chamber behind the equipment modules.
- Auxiliary busbar chamber at the top front side in front of main busbar chamber.
- Equipment modules or withdrawable Trolleys.
- Cable alley covering full height of each MCC cubicle for termination of power and control cables.

The MCCs are available in SINGLE FRONT and DOUBLE FRONT or BACK to BACK execution to meet any specific requirement. Therefore, Flexi module provide complete solution for modern industrial applications and power distribution.

## Salient features of control flexi module switchboards:

- Fully compartmentalized construction ensures safety.
- Latest design which matches functionality with colours and shapes.
- Draw-out modules are with drawable with three distinct positions.
- Draw-out units are fully interchangeable.
- Safety shutter for vertical bus chamber.
- Main busbars are easily approachable.
- Self connecting and disconnecting power & auxiliary contacts.
- Highly flexible to meet all site requirements.
- Closed door feature

## Service, test and isolated positions

Every draw-out module has the following positions

- Service power and control terminals engaged. (Door interlock allows door opening only after switching off).
- Test control engaged, power terminals disconnected. (Easy racking out with a racking handle)
- Isolated both power and control terminals disconnected. Mechanical indicator clearly shows the corresponding positions of the module. A spring loaded latching device provided on the module automatically makes sure of all the three positions and avoids accidental withdrawal.

## Interchangeability

We manufacture & design module with interchangeability feature. All identical motor starter and switch fuse feeders are provided with self aligning power, control terminals and telescopic guide rails to ensure smooth and effort free insertion and withdrawal while ensuring complete interchangeability. Operational reliability as well as easy servicing are two of the most essential demands of the offshore Industry today. the C&S Electric panel 2014 draw out system meets these demands and has obtained world wide approval.





## Some of our Prestigious Customers

FGD-CLOSE DOOR PROJECTS	
CUSTOMER NAMES	PROJECTS
MITSUBISHI HITACHI POWER SYSTEMS INDIA PVT. LTD	NTPC MOUDA, 2x660MW - STPP STAGE-II
MITSUBISHI HITACHI POWER SYSTEMS INDIA PVT LTD	NTPC RIHAND, 4x500MW - STPP FGD SYSTEM STAGE II & III
MELCO INDIA PVT LTD	DSI SYSTEM AT NTPC DADRI SPARES
BHEL - EPD BANGLORE	NTPC DADRI , FGD - STAGE -II 2x490 MW
GE POWER	GE GHATAMPUR - 3x660MW-ESP
L&T HYDROCARBON	MANGULA UPGRADATION STAGE-2
ISGEC	KUDGI & GADARWARA
INFRA-PROJECTS	
CUSTOMER NAMES	PROJECTS
DHVBN	TATA PROJECT- NOIDA
	L&T- ECC
INDORE SMART CITY	ANUBHAVI CONSTRUCTION
DDUGJY	GODREJ ELECTRICAL
	VIJAI ELECTRICALS
	FEEDBACK INFRA
	VISHWANATH PROJECTS
JKPDD	BENZAFAB PVT LTD
RAWANDA	VIJAI ELECTRICALS
ROOF TOP SOLAR	GEM FORGING
	TATA SOLAR

<b>NTPC LIMITED</b>	<b>EIL</b>	<b>BUILDINGS/ INFRASTRUCTURE</b>	ASSAM, KOCHHI
UNCHAHAR TPS	OPEL DAHEJ	CPWD- PARLIAMENT HOUSE	BPCL KOTA, MUMBAI
SIMHADRI - 2x500 MW	IOCL PANIPAT	CPWD- SOUTH BLOCK	GAIL HAZIRA, PATA, AURIYA
RIHAND - 2x500 MW	PARADIP	CPWD - NORTH BLOCK	MANGLORE REFINERY
VINDHYACHAL - 2x500MW	HPCL VIZAG	<b>POWER PLANTS</b>	CPCL CHENNAI
BARH-I - 3x660MW	GAIL LAKWA ASSAM	RELIANCE ENERGY- PANIPAT	EIL -BPCL
BARH-II-2X660MW	NRL NUMALIGARH	YAMUNANAGAR, ROSA, PARICHHA	MANALI PETRO
BONGAIGAON - 3x250MW	ASSAM, KOCHHI	ABB - GIRAL, SURATGARH, JSW, KRISHNAPATTNAM	<b>EXPORT ORDERS</b>
MUJAFFARPUR - 2x195MW	BPCL KOTA, MUMBAI	mitsui - TEESTA HEP ( 3x170MW)	BHEL - 2X120 MW TPP
MEJA - 2x660MW	GAIL HAZIRA, PATA, AURIYA	UJVNL -MANERI BHALI HEP	ISGEC - WHITENILE SUGAR (SUDAN)
GADARWARA - 2x800MW	MANGLORE REFINERY	PUNJ LLOYD -CHHABRA, GVK TPP	C&S PROJECT - SYRIA
DARLIPALLI- 2 x 800 MW	CPCL CHENNAI	GEA / BGR - DHOLPUR CPP	ABB SINGAPUR- MEGHNAGHAT BANGLADESH
<b>BHARAT HEAVY ELECTRICALS LIMITED</b>	EIL - BPCL	TRNLNCO - AMARKANTAK, UDUPI	ABB UGANDA - KCBL PROJECT
BAKRESWAR TPP- 2x210 MW	MANALI PETRO	KONDAPALLI, ANUPPUR	ENERTEC - GAS PROJECT SYRIA
TUTICORAN - 2x500 MW	<b>STEEL PLANTS</b>	ALSTOM - UTRAN, SUBANSIRI, URI, CHAMERA	AJ TRINICS -TANJANIA
KODERMA TPS - 2X500MW	BHILAI STEEL PLANT	ADANI -TIRODA, KAWAI	A1 ELECTRICAL - UGANDA
DURGAPUR TPS - 2X500MW	BOKARO STEEL PLANT	DOOSAN -GMR RAIPUR	<b>OTHERS (MISC)</b>
MEJIA TPS - 2X500MW	BHUSHAN STEEL	<b>CEMENT INDUSTRIES</b>	TATA- MAFI ( IAF)
SINGARENI TPP - 2X 600MW	MERAMANDALI	CHETTINAD CEMENT	BHEL JAGDEESHAPUR
MONNET TPP - 2X525MW	THERMAX - RSP PROJECT	AMBUJA CEMENT-DARLAGHAT	HINDALCO MAHAN & ADITYA
SIKKA TPP - 2X250MW	VISA STEEL-JAJPUR	AMBUJA CEMENT- AMBUJANAGAR	NMDC CHATTISGARH
BOKARO TPP 1X500 MW	INDORE-USHA MARTIN	<b>OIL &amp; GAS</b>	MARUTI SUZUKI GURGAON
SHREE SINGA JEE	SAIL BURNPUR	OPAL DAHEJ	BSES YAMUNA & RAJDHANI
ADILABAD	VIZAG STEEL PLANT	IOCL PANIPAT, MATHURA, PARADIP	HINDUSTAN ZINK LTD.
<b>NUCLEAR POWER CORPORATION OF INDIA</b>	ISSCO STEEL PLANT	HPCL VIZAG	NALCO ANGUL, DAMANJODI
RAPP KOTA UNIT- 7 & 8	NEELANCHAL ISPAT	GAIL LAKWA ASSAM	
KAPP KAKRAPAR (MAH.)		NRL NUMALIGARH	

Our Association with NTPC



**ALL NTPC Power Plants has C&S make more than 18000 verticals with LVC**

- ★ Anta
- ★ Auraiya
- ★ Barh- I&II
- ★ Badarpur
- ★ Bongaigaon
- ★ Dadri
- ★ Darlipalli
- ★ Durgapur
- ★ Farakka
- ★ Faridabad
- ★ Gandhar
- ★ Gadarwara
- ★ Jhajjar
- ★ Kahalgaon
- ★ Kawas
- ★ Korba
- ★ Lara
- ★ Muzaffarpur/Kanti-I&II
- ★ Nabinagar-I&II
- ★ Rihand
- ★ Ramagundam
- ★ Singrauli
- ★ Tanda
- ★ Unchahar
- ★ Vallur
- ★ Vindhyachal

★ NTPC Power Plants



Map not to scale

## Our Credentials



IEC-61439 FOR 800A TTA PANEL			
Sr.No.	Test Description	Test Report no.	Date
1	<b>Strength of material and parts</b>		
	Resistance of corrosion	RP-1819-031294	13.11.2018
	<b>Properties of Insulating material</b>		
	Thermal Stability	RP-1819-029291	25.10.2018
	Resistance of abnormal heat and fire due to internal electric effects.	RP-1819-026940	10.10.2018
	Resistance to Ultra-violet (U/V) radiation		Not applicable for indoor application
	Lifting	RP-1819-026938	10.10.2018
	Mechanical impact	RP-1819-026935	10.10.2018
2	Degree of protection of enclosures	RP-1819-030817	02.11.2018
	Clearances	RP-1819-013148	04.07.2018
5	<b>Protection against electric shock and integrity of protective circuits</b>		
	Effective continuity between the exposed conductive parts of the assembly and the protective circuit	RP-1819-047401	06.03.2019
6	Short circuit withstand strength of the protective circuit.	RP-1819-036871	24.12.2018
	Incorporation of switching device and component	No verification required by testing as per IEC-61439	
7	Internal electrical circuit and connections		
8	Terminals for external conductors		
9	<b>Dielectric properties</b>		
	Power frequency withstand voltage	RP-1819-019254	16.08.2018
10	Impulse with stand voltage		
	Temperature Rise Test	RP-1819019255	16.08.2018
11		RP-1819-026926	10.10.2018
	Short circuit withstand strength-50KA for 1 Sec.	RP-1819-036871	24.12.2018
12	Electromagnetic compatibility (EMC)		
13	Mechanical operation	RP-1819-026930	11.09.2018

IEC-61439 FOR 4000A TTA PANEL				
Sr.No.	Test Description	ERDA Sample no.	Test Report no.	Date
1	<b>Strength of material and parts</b>			
	Resistance of corrosion	ERDA-00277903	RP-1819-031294	13.11.2018
	<b>Properties of Insulating material</b>			
	Thermal Stability	ERDA-00277902	RP-1819-029291	25.10.2018
	Resistance of abnormal heat and fire due to internal electric effects.	ERDA-00289277	RP-1819-037088	25.12.2018
	Resistance to Ultra-violet (U/V) radiation			Not applicable for indoor application
	Lifting	ERDA-00289277	RP-1819-035343	12.12.2018
	Mechanical impact	ERDA-00289277	RP-1819-034665	07.12.2018
2	Degree of protection of enclosures	ERDA-00305208	RP-1920-000068	01.11.2019
	Clearances	ERDA-00251545	RP-1819-036243	19.12.2018
5	<b>Protection against electric shock and integrity of protective circuits</b>			
	Effective continuity between the exposed conductive parts of the assembly and the protective circuit	ERDA-00251545	RP-1819-034574	06.12.2018
6	Short circuit withstand strength of the protective circuit.	ERDA-00289277	RP-1819-043202	05.02.2019
	Incorporation Of Switching Device And Component			No verification by testing required as per IEC-61439
7	Internal Electrical Circuit And Connections			
8	Terminals For External Conductors			
9	<b>Dielectric properties</b>			
	Power frequency withstand voltage	ERDA-00308208	RP-1920-001633	12.11.2019
10	Impulse with stand voltage	ERDA-00289277	RP-1819-034664	07.12.2019
	Temperature Rise Test	ERDA-0297206	RP-1819-044258	12.02.2019
11	Short circuit withstand strength-50KA for 1 Sec.	ERDA-00289277	RP-1819-043199	05.02.2019
		ERDA-00289277	RP-1819-043200	05.02.2019
		ERDA-00289277	RP-1819-043201	05.02.2019
12	Electromagnetic compatibility (EMC)			Not applicable as per IEC 61439 Clause no. - 10.12 (J9.4.2)
13	Mechanical operation	ERDA-00251545	RP-1819-034607	06.12.2018



Major Govt EPC Reference



Major EPC Customer Reference



Major Consultant Reference



### Organization built on exemplary services

- Specialized, well trained and experienced team for design / manufacturing / services
- Separate teams for erection / commissioning and after sales & service
- Separate stocks for service spares
- Strong service network at regional locations for local support
- Strong service network at regional locations for local support and immediate response
- 100% erection and commissioning at site (On request)
- 24 hours service support across India
- Post warranty AMC services – on site and off site. (On request)

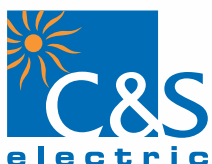
Our service philosophy:

Customer's system should be up & running, investigations can follow



### Noida Plant

C-59, Phase –II, Distt: Gautam Budh Nagar, Noida - 201305 INDIA  
Ph: 0120 3894325-26, Email: .servicing.panel@cselectric.co.in



### C&S Electric Limited

Corporate & Central marketing Office :-  
222, Okhla Industrial Estate, Phase- III, New Delhi - 110 020, India  
Tel.: +91 11 3384 9000-09, Fax.: +91 11 2684 7342, 2682 9063  
Email: info@cselectric.co.in  
Customer Care Toll Free Number: 1800-572-2012

