



**Beyond**™

**MV CTTS**

Medium Voltage Closed Transition Transfer Switch



**LS** ELECTRIC

# Beyond X™

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Medium Voltage Closed Transition Transfer Switch

## Beyond X™ MV CTTS, the Optimal Choice for Uninterrupted Operation During Power Supply Failure

Stable power supply to critical infrastructure facilities is a fundamental and essential requirement for facility operation. To achieve this, safer and more reliable power solutions are needed. Power outages in key infrastructure, including data centers, airports, and hospitals, directly impact service quality. By integrating the design and management of emergency systems, service stability and operational efficiency can be improved. Through the uninterrupted synchronous transfer operation of commercial power and generators using our Beyond X™ MV CTTS, service failure risks resulting from power supply interruptions in major infrastructure can be eliminated, ultimately ensuring a stable power supply.





### Stable Operation

- Mitigating critical facility damage from uninterruptible grid transitions.
- Extends generator lifespan through real load testing in generator inspections (load bank unnecessary).
- Reduces unnecessary UPS battery usage and inverter malfunction risks.
- Minimizes inrush current during transformer magnetic field reformation.



### Equipment Protection

- Prevents power supply failures/disruptions caused by outages and accidents.
- Enables uninterrupted operation during equipment maintenance.
- Eliminates the need for reset operations between outages and restorations in operational equipment.



### Reduced Production Loss

- Reduction of operational losses from power supply issues.
- Enable service without delays and disruptions.

# Features and Main Functions

## Beyond X MV CTTS

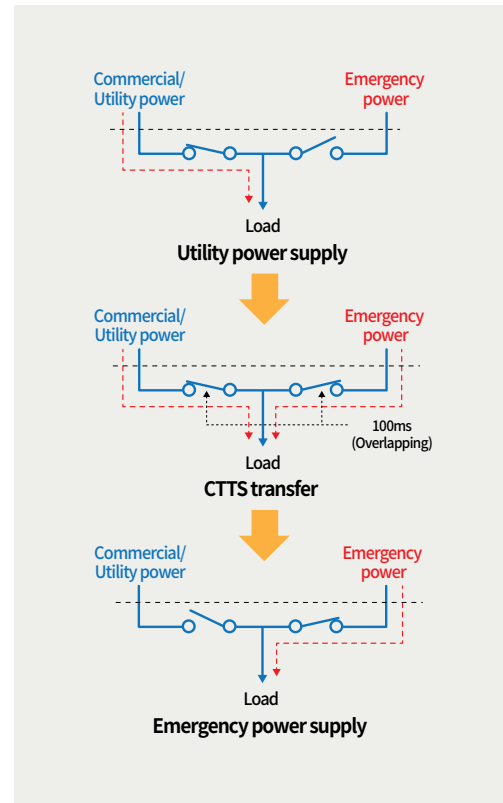
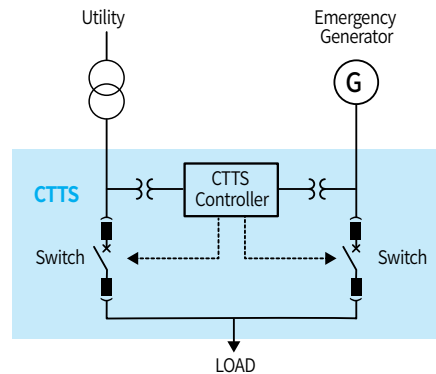
This is an uninterruptible automatic transfer switch that minimizes power supply failures by performing a closed transition after a temporary ( $\leq 100\text{ms}$ ) synchronous parallel operation between the utility power (KEPCO; main power) and the generator (emergency power) when restoring power after a planned outage or accident.

### Key Features

- **Stable Power Supply**
  - Synchronous transfer between main power and emergency power
  - Automatic control of open transition transfer and closed transition transfer
- **Enhanced Reliability**
  - Power quality monitoring  
(voltage, current, frequency, phase, active power, reactive power, and power factor)
  - Closed switchgear (MCSG) structure and arc-resistant performance for user safety
  - Reliability verification through KC and V-Check certifications
- **Easy and Safe Operation**
  - Communication interface (IEC 61850, Modbus RTU/TCP)
  - Remote control and setting functions
  - Intuitive status confirmation through controller HMI and LED lamps
  - Event storage and download function provided

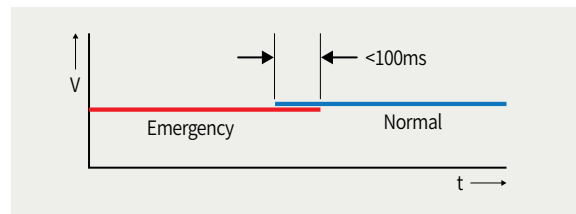
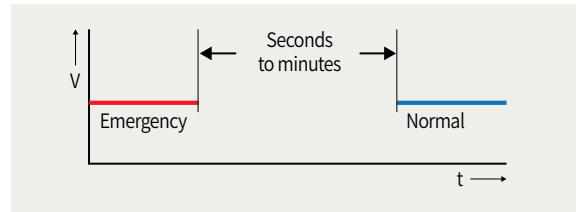
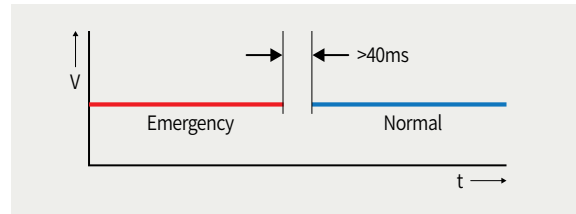
### Operation Process

- ❶ **Power outage and failure occur**
  - Emergency generator automatically starts.
- ❷ **Before generator produces normal output**
  - Uninterruptible power supply (UPS) is utilized for uninterrupted supply.
- ❸ **After generator produces normal output**
  - Switchover to emergency power and power supply
- ❹ **Power restoration**
  - Synchronize emergency power and utility power, then perform seamless switchover to utility power.
- ❺ **Planned power outage**
  - Seamless switchover to emergency power, then equipment inspection and maintenance.



## Operation Mode

- **OTTS : Open Transition(blackout)**
  - Utility power(KEPCO) circuit breaker opens first(>40ms), then emergency generator circuit breaker closes.
  - Emergency generator experiences a sudden power outage during power failures and accidents.
- **DTTS : Delayed(Deleting memory of rotor)**
  - Prevents direct simultaneous connection of two power sources to the load.
  - Releases stored energy through a separation time.
- **CTTS : Closed(Synchronous)**
  - Performs uninterrupted transfer after parallel operation (<100ms) between utility and emergency generator power.
  - Applicable during planned power outages and maintenance.



## MV CTTS Panel

- **Arc-resistant, pressure-relief structure**
  - IAC AFLR 40kA/0.5s
- **Independent compartment structure that eliminates the risk of cascading failures during accidents**
  - IEC 62271-200 LSC-2B structure
- **Various accessories for convenience and safety**
  - Equipped with mechanical interlock devices to prevent maloperation
- **Reduced installation space through optimized design**
  - Dual-tier circuit breaker structure
- **High-quality enclosure protection rating(IP4X)**
- **Stable control configuration**
  - Manual operation via front panel control switch
  - Electrical interlock circuit prevents simultaneous closing of two circuit breakers



Rated voltage	7.2kV
Commercial frequency withstand voltage	20kV/1min
Lightning impulse voltage	60kV(1.2x50μs)
Rated current	~2000A

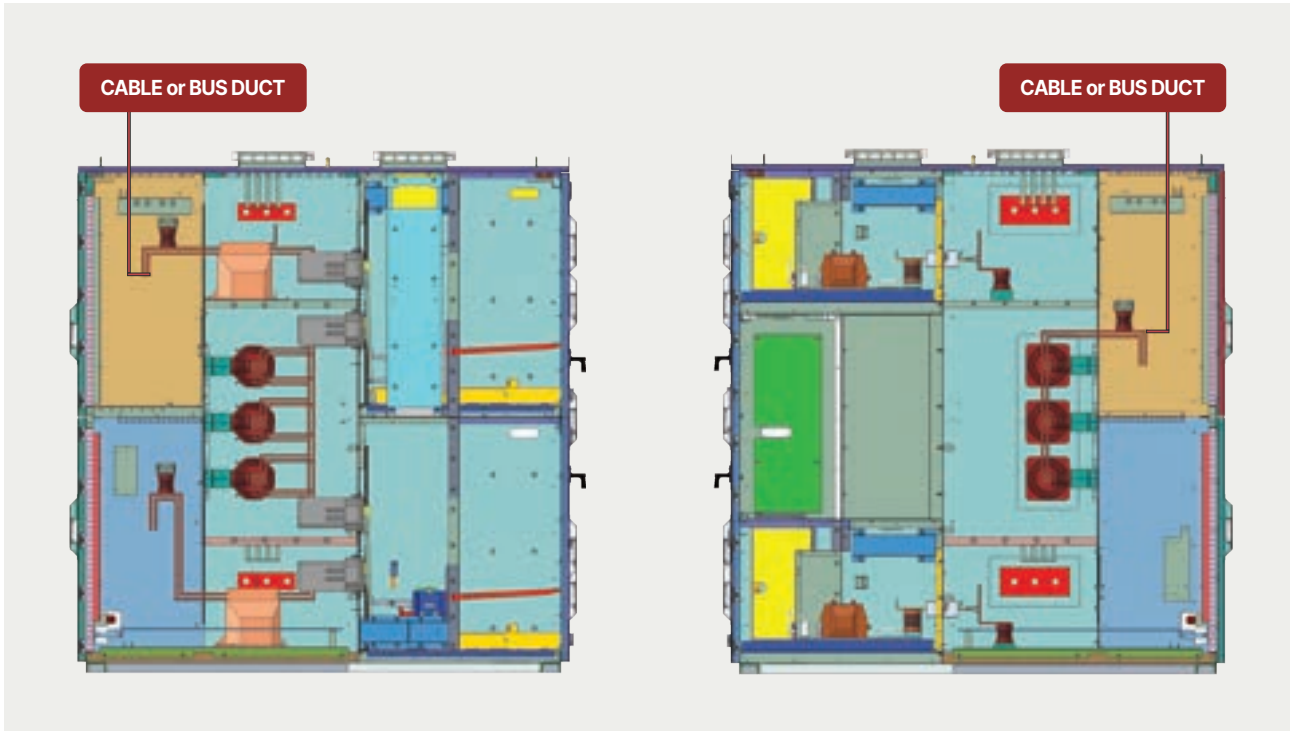
Short-time current	~40kA/3s
Arc-resistant current	~40kA/0.5s(A-FLR)
Protection rating	IP4X
* Size (H X W X D)	2450 X 1600 X 2400mm

\* The above indicates the standard panel size, which can be modified based on site conditions.

# Features and Main Functions

## BUS DUCT Connectable Structure

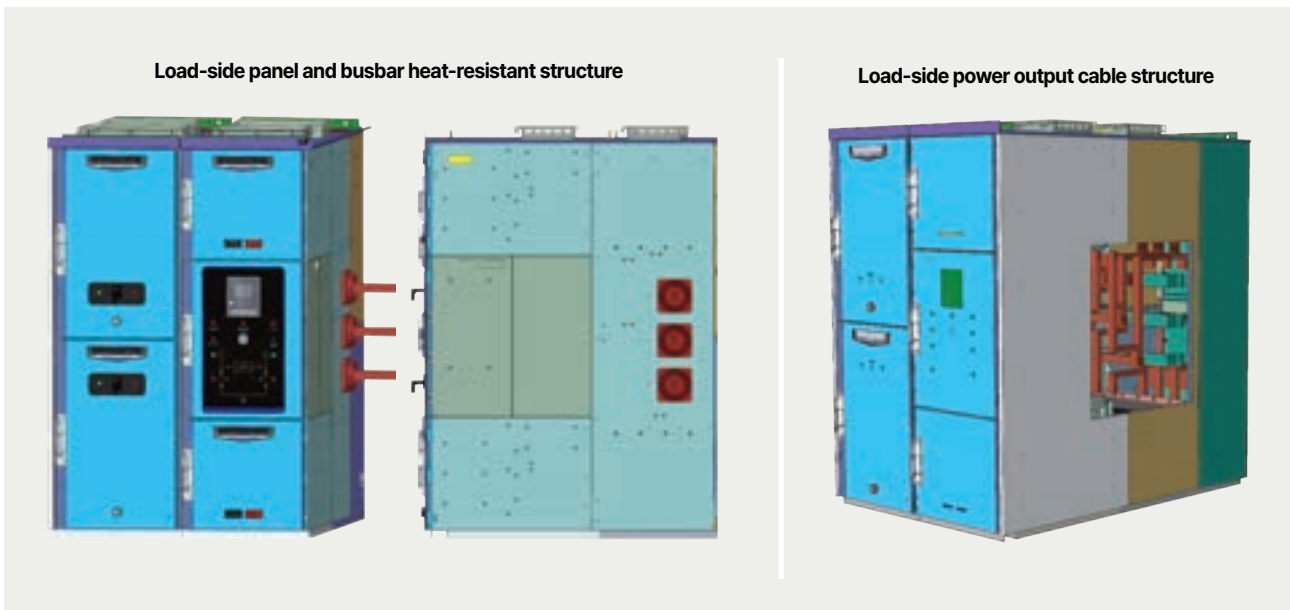
- Power input to the upper VCB[Generator] can be connected via cable or BUS DUCT.
- Power output from the load side can be connected via cable or BUS DUCT.



- \* Please inquire for cases where the power input to the lower VCB[KEPCO; utility power] is via BUS DUCT.
- \* CT is only applied when the SLTS function is selected. (Option)

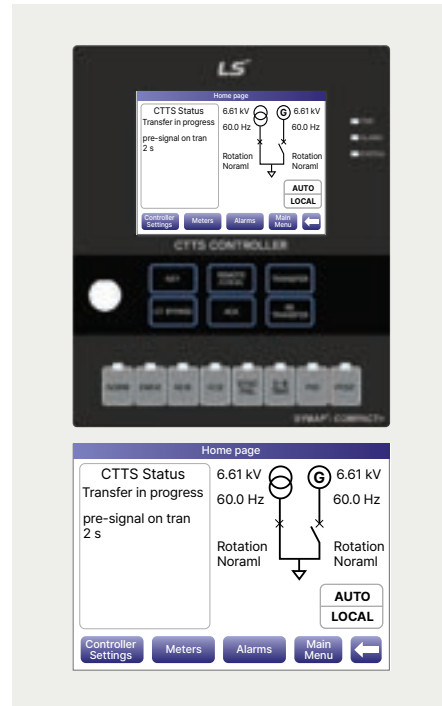
## Load-Side Panel and Busbar Heat-Resistant Structure

- Supports load-side system connections tailored to various conditions.



## MV CTTS Controller

- **4.5-inch color touch display**
  - Resolution 320 × 240 pixels
- **Voltage and frequency detection and display**
  - Pickup, dropout, and trip setting functions
- **Synchronization check and parallel operation between two power sources(Utility/emergency)**
  - Conditions: voltage difference within 5%, frequency difference within 0.2Hz, and phase angle within 5 degrees
- **Uninterrupted(Without power interruption) transfer or re-transfer between utility and emergency power sources**
- **Electromagnetic compatibility(EMC) and Korea Certification(KC) for electrical product safety**
- **Communication interface**
  - IEC 61850, Modbus RTU/TCP
- **Main Functions**
  - 1) CTTS: Close-Then-Open  
(transfer after synchronous operation ≤100ms)
  - 2) OTTS: Open-Then-Close  
(instantaneous power interruption) – Option
  - 3) DTTS: Delayed Open-Then-Close(OTTS)  
with extended transfer delay – Option(considering rotator memory characteristics)
  - 4) SLTS: Close-Then-Open(CTTS) with additional active power sharing adjustment  
(Eliminates transient phenomena after transfer) – Option
  - 5) Engine Exercise: Periodic emergency generator operation mode
  - 6) Load Shed/Add: Selective load connection when generator power is insufficient – Option



## Technical Table

Description	Specification	
Design	Flush-mounted housing for front panel cutout	
Display	Graphical LCD display / Touchscreen(320×240 pixel), Screen refresh rate: 250ms, cyclic	
Dimensions(W×H×D)	210×250×90mm	
Front panel cutout(W×H)	192×232mm	
Weight	Approx. 2.5kg	
Installation position	Vertical, +/-34°	
Power supply	Default : DC 110V / AC 110V *AC 24~230V	
Power consumption	<20W	
Rechargeable battery	2×100mAh, Removable batteries, Accessible on the housing rear	
External fuse	4A, T-type	
Boot phase	Duration between switching on power supply to activation of device functions(Full functionality) is 100s	
Protection type	Front panel Back housing	IP54(IEC 60529) IP20(IEC 60529)
Cross section(Max.)	Spring-loaded terminals Measuring input terminals(CT, PT)	Max. 1.5mm <sup>2</sup> Max. 6mm <sup>2</sup>

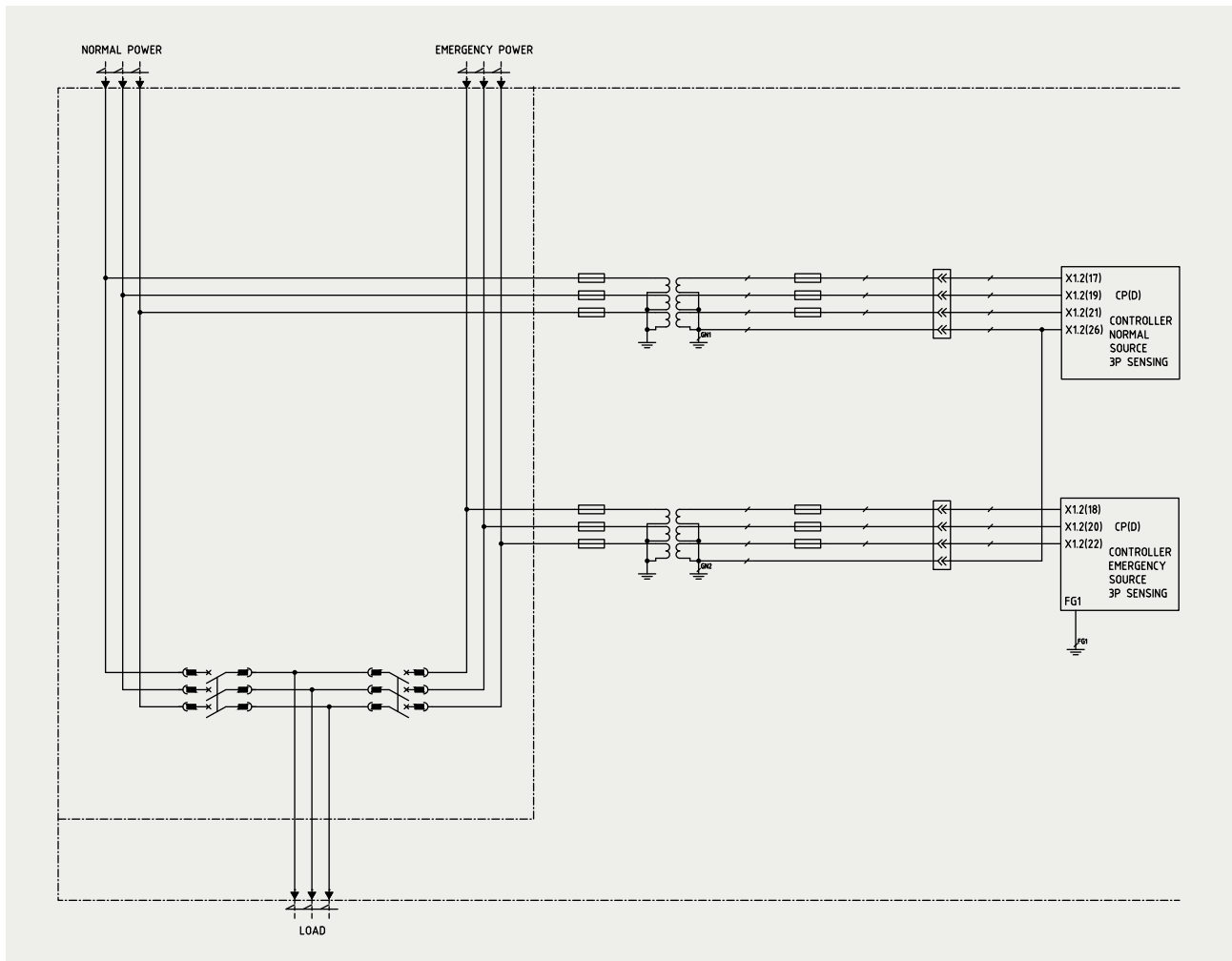
\* Please inquire for specifications other than Power Supply DC/AC 110V.

# Features and Main Functions

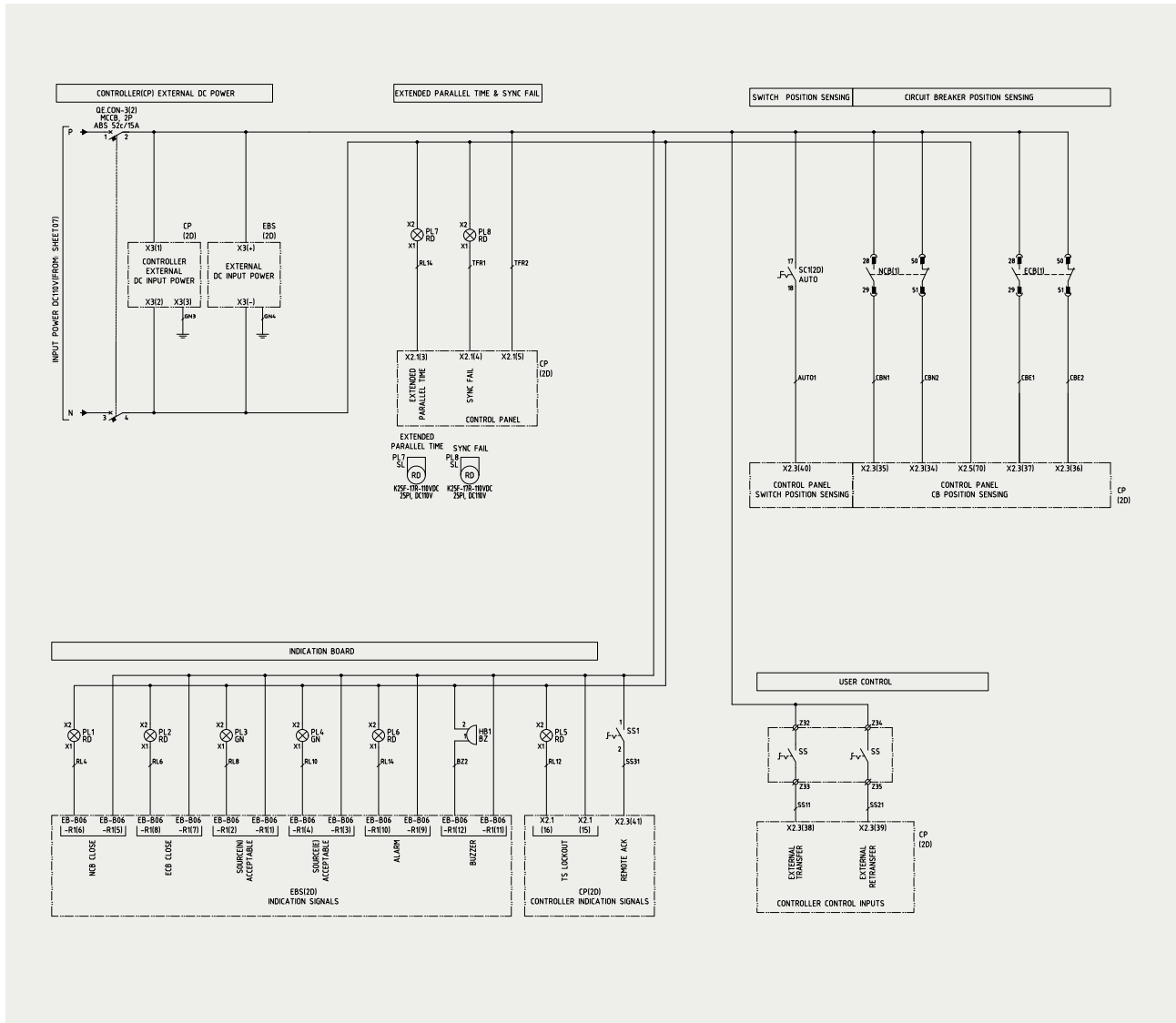
## Controller Features and Key Advantages

- **User convenience**
  - Intuitive display centered on the MV CTTS circuit diagram(Mimic)
  - Visual synchronization check display during synchronous transfer
  - Intuitive touch-based menu configuration
- **Engine Exerciser mode**
  - Regularly operates the emergency generator under no-load or transfer load and re-transfer conditions according to pre-entered schedules
  - Defines and enables/disables six routines
  - During Engine Exerciser execution, if an actual operating situation occurs, Engine Exerciser control is suspended and operates according to the actual situation flow
- **Event storage**
  - Records setting changes, transfer operations, fault occurrences, input/output state changes, etc.
  - Records event and fault details along with the occurrence time
  - Event recording capacity: up to 10,000 events
- **Self-diagnosis function**
  - CPU abnormality monitoring: displays alarms upon CPU abnormality
  - Firmware compatibility monitoring
  - Memory abnormality monitoring: displays alarms upon memory abnormality
  - DI, DO abnormality monitoring
  - Communication abnormality monitoring
  - Battery discharge monitoring
  - EBS communication & calibration error
- **Remote/Local operation mode**
  - Field or remote control possible depending on Remote/Control setting
  - Remote control items: Transfer, Re-transfer, Alarm Reset, etc.
- **Securing standards and certification requirements**
  - Meets IEC 60255 test(temperature, shock, and vibration) and electromagnetic compatibility(EMC) standards
  - Holds KC certification and V-Check certification.

## Circuit Diagram



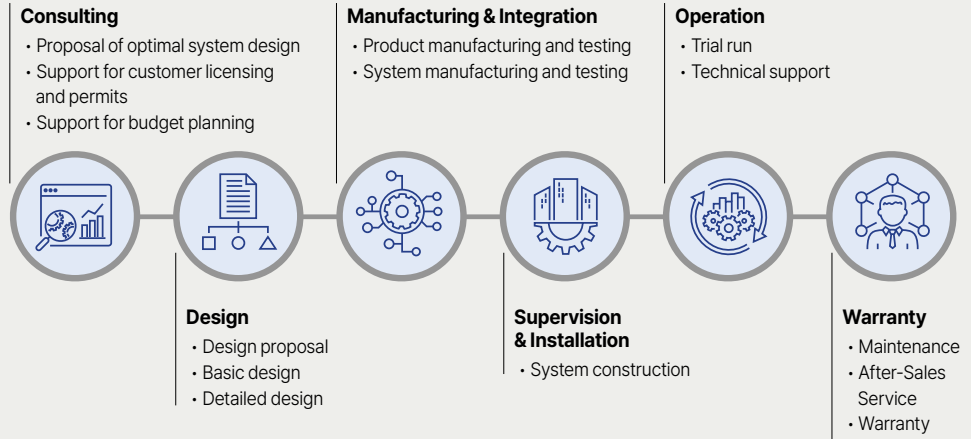
## Configuration Diagram



# Quality and Management

## One-Stop Turn-key Service

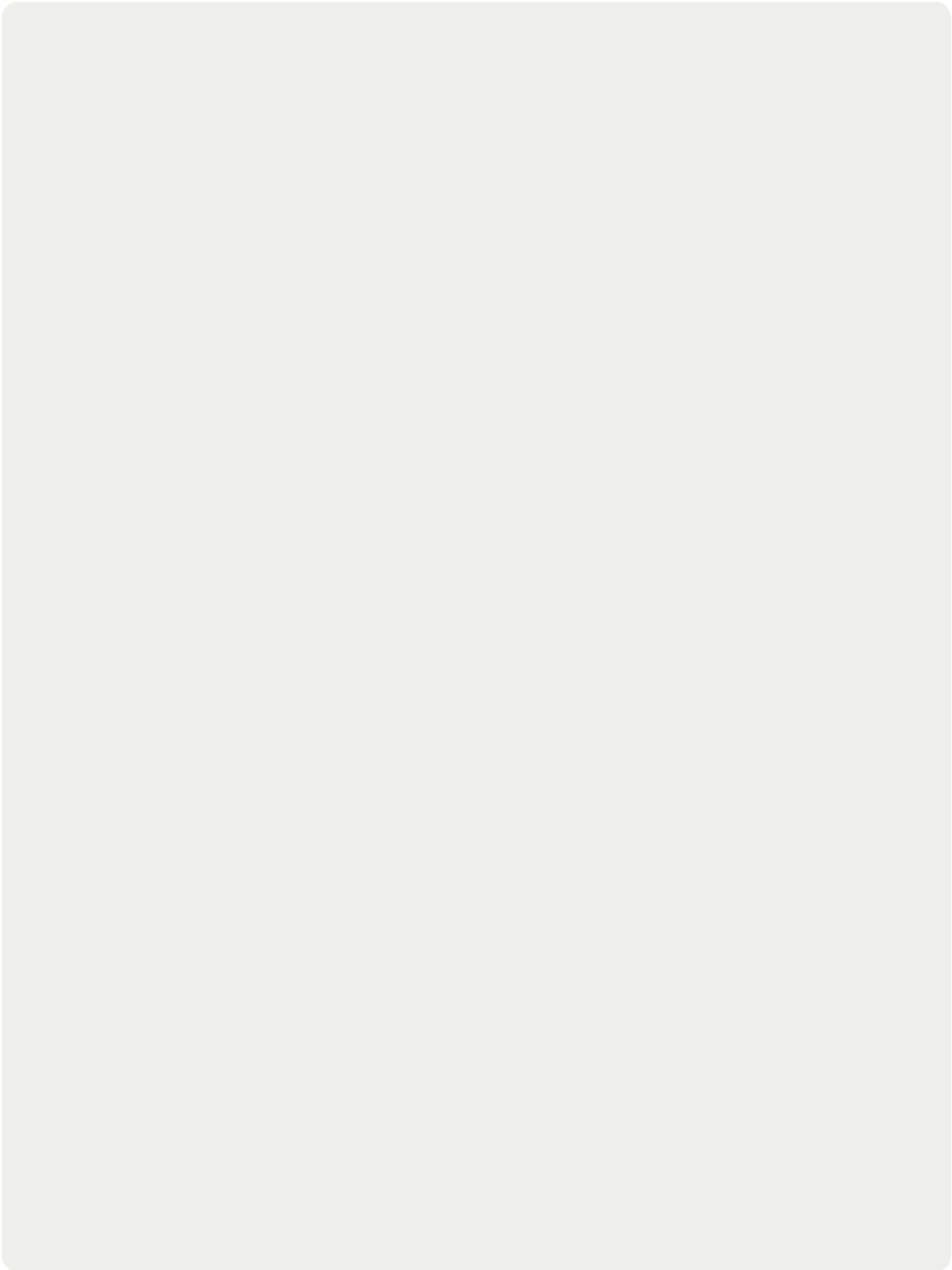
LS Electric has a specialized organization capable of executing all business processes to provide One-Stop Service.



## Project Management

Our project execution team is comprised of highly experienced Project Managers, ensuring successful project delivery. We employ a well-defined internal project management process and continuously evaluate and enhance PM capabilities through PMM(Project Management Maturity) index management and specialized training.







## Headquarter

127 LS-ro (Hogye-dong) Dongan-gu, Anyang-si, Gyeonggi-Do, 14119, Korea

## Seoul Office

LS Yongsan Tower, 92, Hangang-daero, Yongsan-gu, Seoul, 04386, Korea  
Tel. 82-2-2034-4916, 4684, 4429

## China

LS ELECTRIC(Dalian) Co., Ltd.  
+86-411-8730-5872  
china.dalian@lselectric.com.cn

LS ELECTRIC(Wuxi) Co., Ltd.  
+86-510-6851-6666  
china.wuxi@lselectric.com.cn

LS ELECTRIC(Lishui) Co., Ltd.  
+86-578-6866-780  
china.lishui@lselectric.com.cn

Shanghai Office  
+86-21-5237-9977  
china@lselectric.com.cn

Beijing Office  
+86-10-5095-1631  
china@lselectric.com.cn

Guangzhou Office  
+86-20-3818-2883  
china@lselectric.com.cn

Qingdao Office  
+86-532-8501-2065  
china@lselectric.com.cn

Chengdu Office  
+86-28-8670-3201  
china@lselectric.com.cn

Nanjing Office  
+86-25-84 67-0005  
china@lselectric.com.cn

## India

India Office  
+91-80-6142-9108  
Info\_india@ls-electric.com

## Indonesia

PT. LS ELECTRIC INDONESIA  
+62-21-2933-7614  
indonesia@ls-electric.com

PT SYMPHOS ELECTRIC  
+62-81-1900-1474  
marketing@symphos-weltraf.com

## Italy

Italy office  
+39-030-8081-833  
italia@ls-electric.com

## Japan

LS ELECTRIC Japan Co., Ltd.  
+81-3-6268-8241  
japan@ls-electric.com

Tokyo Office  
+81-3-6268-8241  
tokyo@ls-electric.com

## Netherlands

LS ELECTRIC Europe B.V.  
+31-20-654-1424  
europartner@ls-electric.com

## Russia

Moscow Office  
+7-499-682-6130  
info@lselectric-ru.com

## Singapore

Singapore Office  
+65-6958-8162  
singapore@ls-electric.com

## Spain

LS ELECTRIC IBERIA S.L.U.  
+34-910-28-02-74  
iberia@ls-electric.com

## Thailand

Bangkok Office  
+66-2-128-0295  
thailand@ls-electric.com

## Türkiye

LS ELECTRIC Türkiye Co., Ltd.  
+90-212-806-1252  
turkiye@ls-electric.com

## U.A.E

LS ELECTRIC Middle East FZE (Dubai)  
+971-4-886-5360  
middleeast@ls-electric.com

## USA

LS ELECTRIC America Inc.  
+1-800-891-2941  
sales.us@lselectricamerica.com

LS ENERGY SOLUTIONS LLC  
+1-704-587-4051  
cmfeldman@ls-es.com

MCM Engineering II  
+1-435-865-0125  
sales.us@lselectricamerica.com

America Western Office  
+1-949-333-3140  
america@ls-electric.com

America Bastrop Campus  
+1-800-891-2941 EXT 2  
power\_support.us@lselectricamerica.com

## Vietnam

LS ELECTRIC Vietnam Co., Ltd.  
+84-222-2221-110  
vietnam@ls-electric.com

Hanoi Sales Office  
+84-24-6275-8054  
vietnam@ls-electric.com

Ho Chi Minh Sales Office  
+84-3823-7890  
vietnam@ls-electric.com

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[www.ls-electric.com](http://www.ls-electric.com)

Distributed by Gross Automation | +1 (262) 252-1600 | [sales@grossautomation.com](mailto:sales@grossautomation.com)