Lecon Energetics

An ISO 9001-2015 Certified Company

MOTOR STARTING SOLUTIONS

20 kW to 20,000 kW 415 V to 13.8 kV

- FCMA^{plus} Soft Starter
- PF Correction Panels and Detuned Filters
- Vacuum Circuit Breaker and Contactor Switchgear Panels

www.leconenergetics.com

MAKE IN INDIA

CERTIFIED ISO 9001:2015 COMPANY

IEC

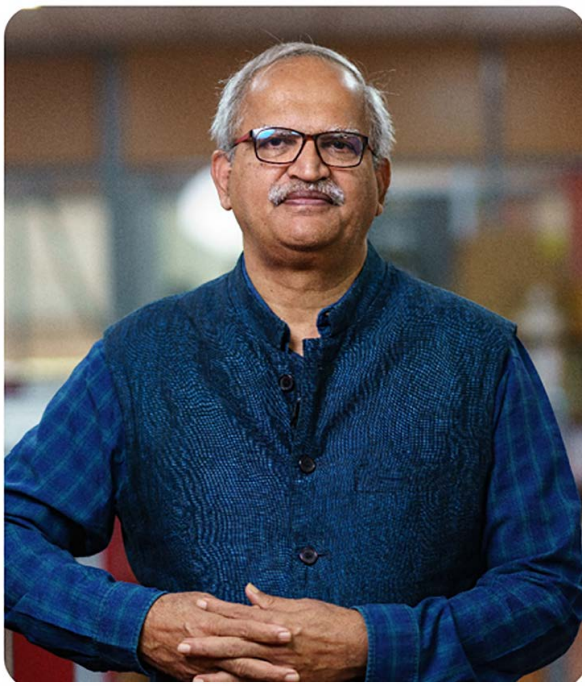
WELCOME TO LECON ENERGETICS PVT. LTD

Lecon prides itself on manufacturing the best motor starting solutions with a focus on customizability. We believe in adhering to the strictest quality standards in the motor starting solution space.

We design, engineer, and manufacture customized motor starting solutions from 20kW to 20,000kW (415 V/3.3 kV/6.6 kV/11 kV/13.8 kV voltage rating) using FCMA^{plus}/HFSR soft starters as per IEC 60076-6/IS555-3.

We also manufacture PF Correction and Capacitor Panels along with switchgear components such as Vacuum Circuit Breakers and Vacuum Contactor Panels.

We serve all major industries - Water Supply, Irrigation, Oil & Gas, Chemicals and Fertilizers, having a presence in 22 states, and seven countries worldwide Adapting to the COVID challenge.



> **Lecon's success lies in addressing every customer's requirements with the utmost care.**

Mr. Mukund Kulkarni
Managing Director

1000+
UNITS INSTALLED

25+
YEARS OF MOTOR STARTING EXPERIENCE

8+
YEARS OF MANUFACTURING EXCELLENCE

8
COUNTRIES SUPPLIED

35+
STRONG TEAM

BLR HQ
BENGALURU HQ WITH PAN-INDIA PRESENCE

OUR HISTORY

1993

Founding of Lecon Systems Engineering Consultancy

OCT 2014

Lecon Systems becomes Lecon Energetics and starts manufacturing

DEC 2014

Lecon commission's first order of a 1750 kW/ 6.6 kV for a pump application and 1600 W/11 kV rated for a compressor application

AUG 2016

Major Madhya Pradesh state irrigation project for L&T up to 3.3 MW/11 kV executed

DEC 2018

10.5 MW/11 kV synchronous motor for an Irrigation Pump commissioned as part of Telangana Bhaktaramadas LIS

SEP 2019

24 Large 11 kV FCMA^{plus}/HFSR soft starters rated 6.5MW along with 6 panels of 10.8 MVAR DYCOs executed in a Telangana LIS

OCT 2020

Lecon commissions a 1,350 kW/ 6.6 kV and 1,885 kW/6.6 kV rated 2-step HT & LT FCMA^{plus}/HFSR soft starter for a compressor application in Petroleum Development Oman.

JAN 2021

5.5 MW/13.8 kV, 60Hz soft starter exported to Ma'aden Gold, Saudi Arabia. Installed base of Lecon exceeds 3,000 panels and spans customer base in 22 states and 6 countries

MAR 2021

Lecon register 35% growth in FY-2021 despite COVID headwinds

MAR 2022

40kA – short circuit test type tested VCB panels.
75 kV pulse Impules Test. Tested @ CPRI, Bengaluru

MAY 2022

Lecon crosses installed base of 1000+ units across the world

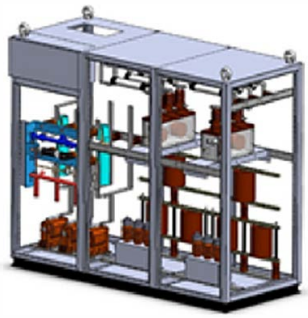
LECON PORTFOLIO

Low voltage FCMA^{plus}/HFSR SS

Range: 20 kW to 1,500 kW, 415V 50 Hz/60Hz

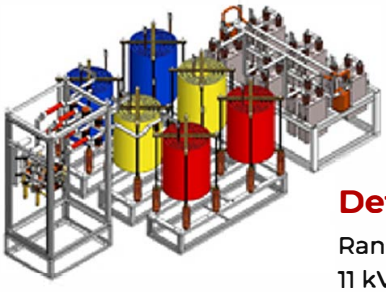
Medium Voltage FCMA^{plus}/HFSR SS

Range: 200 kW to 20,000 kW, 3.3 kV, 6.6 kV, 11 kV - 13.8 kV 50 Hz/60Hz



APFC Panel

Range: 3.3 kV, 6.6 kV, 11 kV - 13.8 kV 50 Hz/60Hz



Detuned Filters

Range: 6% - 14% 3.3 kV, 6.6 kV, 11 kV - 3.8 kV 50 Hz/60Hz

VCB Panels

Range: 3.3 kV, 6.6 kV, 11 kV - 13.8 kV 50 Hz/60Hz

LT FCMA^{plus}/HFSR Special Model – 1 – 1.5I$_{FL}$

Range: 300 kW - 2,000 kW 415V - 13.8 kV 50Hz/60Hz

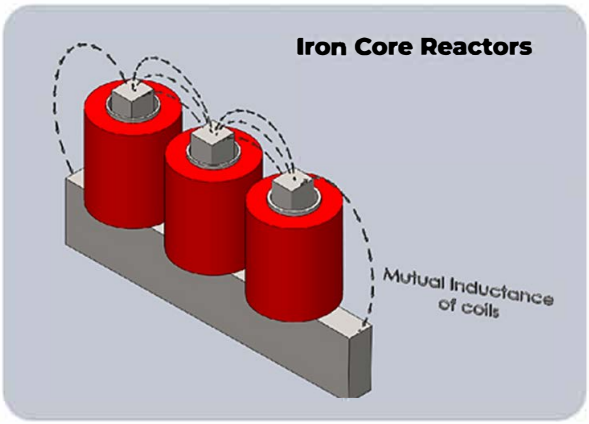
MV FCMA^{plus}/HFSR Special Model Starters with 1.5I$_{FL}$

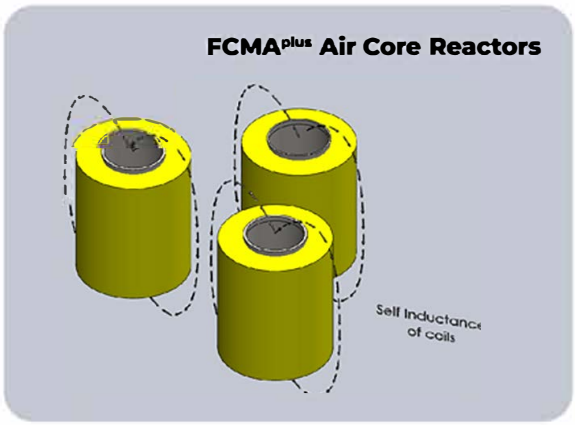
Range: 200 kW to 20,000 kW, 3.3kV, 6.6kV, 11kV - 13.8kV 50 Hz/60Hz

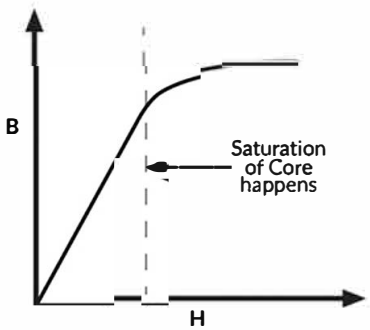
THE LECON DESIGN EDGE

Air-core dry-type reactors provide a linear response, that is - they retain constant inductance at varying current. This is an important feature for motor starting reactor applications. It allows Reactance measurement at low voltage / currents.

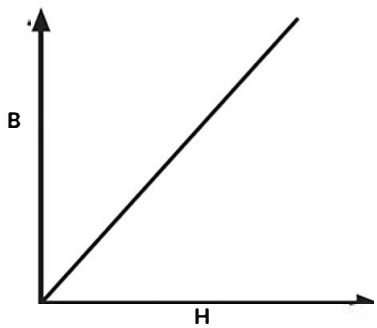
Impedance Measurement - Starting current simulated with 98% Accuracy at design stage.







Magnetic Characteristic of Gapped Iron Core

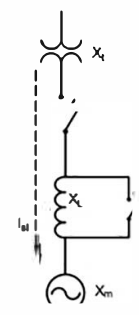


Magnetic Characteristic of Air Core

X_L value cannot be measured in Iron Core Reactors. Only Air Core reactors assure the starting current to the customer.

We separate ourselves from the competition by measuring the impedance of the reactor coils which guarantees the starting current of the motor as promised to the customer.

We follow strict quality norms outlined in IEC-60076-6.



System Power SLD

ANALYSIS OF STARTING CURRENT :

X_t = Transformer Impedence

X_L = Reactor impedence measured at shop floor

X_m = Motor impedence at start

$$I_{st} = \frac{V_{ph}}{(X_L+X_m+X_t)}$$

Note :

I_{st} = Starting current will be established accurately if X_L is measured at shop floor

LECON MANUFACTURING EDGE

VERSATILE DESIGN OFFERING 5 VOLTAGE TAPS

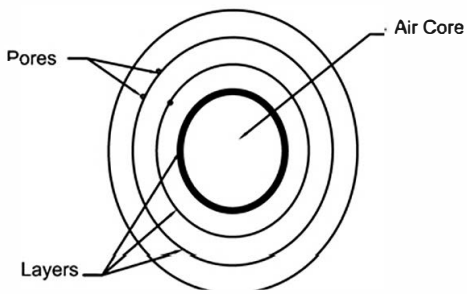
- Motor manufacturers specify design tolerance of 20% as per IEC-60034 for starting current and starting torque.
- Further, the driven equipment will also have some tolerances due to change in the environmental and operating conditions including the valve positions.
- Thus, the best designed soft starter will need to have flexibility to accommodate above variations in motor and driven equipment.

Lecon offer versatile design with 5 different voltage tap designs (DT) (DT +5%, DT +10%, DT +15%, and DT +20).

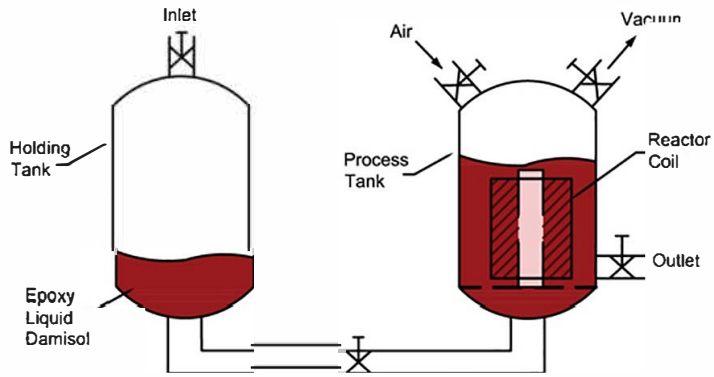
VPI – VACUUM PRESSURE IMPREGNATION

VPI is the gold standard in MV equipments. We adopt a unique process of impregnating our coils with resin to ensure that it enters each turn, layer and interstice.

This allows the coil to be a single rigid mass, allowing for unmatched rigidity and insulation integrity. It also results in good heat dissipation properties.



Reactor Coils

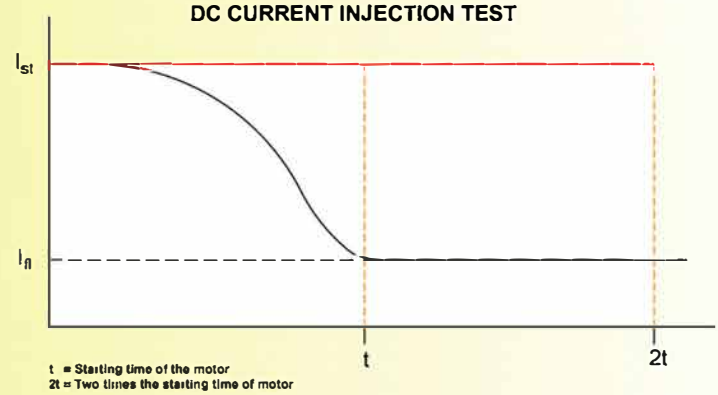


VPI Arrangement

LECON VPI PROCESS

SHORT TIME TEMPERATURE RISE TEST

We inject DC current to ensure that coils withstand the starting current for twice the amount of acceleration time that the coils are designed for. This simulates the site starting condition with two consecutive starts



TEST GUARANTEES TWO CONSECUTIVE STARTS OF MOTOR

CPRI (BANGALORE, INDIA) TYPE TESTS

S.NO	NAME OF TYPE TEST	TEST DETAILS
01	Lightning impulse test, - FCMA^{i} coil	76 kv peak impulse voltage
02	Dc current injection test, current injection - FCMA^{plus} coil	1200amps for 120s
03	FCMA^{plus} soft starter panel	IP 55 Category 2 test
04	Short circuit test - FCMA^{plus} soft starter with bypass breaker	40kA RMS for 100kA peak on main circuit
05	Lightning impulse test, Test voltage - Motor feeder panel (Isolator- Fuse- VC)	75KV peak
06	Lightning impulse test FCMA^{plus} coil	95 kv peak impulse voltage
07	Lightning impulse test, Test voltage – VCB Panel	75 kV peak
08	Short circuit test – VCB panel – 40 kA VCB Panel	40kA RMS for 3s for 100kA peak on main circuit

OUR ESTEEMED CUSTOMERS

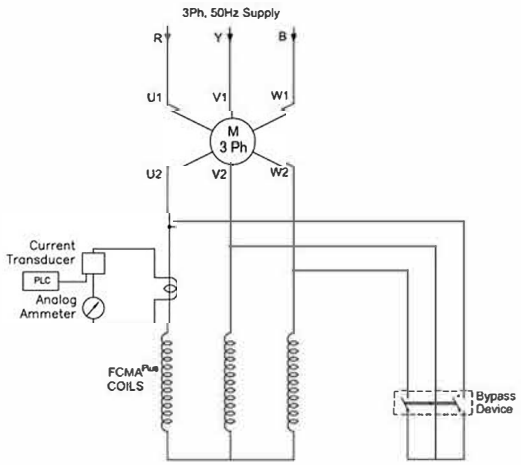
FCMA^{PLUS}/HFSR LT/MV SOFT STARTER

- We provide reduced voltage starting method of motor with air core FCMAplus/HFSR technology as per IEC 60076-6 and IS-5553 (Part 3)
- FCMAplus/HFSR soft starters are designed specific to each motor, analysing motor and load torque speed curves, current speed, and moment of inertia. Starting current can be reduced from 3- 3.5IFL, which are typical starting current values based on design and customer experience.

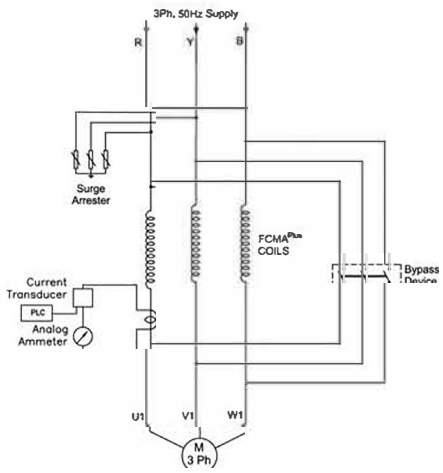
FCMA^{PLUS}/HFSR STANDARD MODEL – 3 – 3.5 IF_L

- Our standard offering is provided with a main switching contactor, soft starter with bypass contactor along with metering and protection for the motor with a customer requested make of MPR/Overload relay
- These panels can also be provided with an isolating device like MCCB /SFU/ ACB as required by the customer. We also use closed loop control using a PLC
- Our MV standard offerings can be connected both on the line and the neutral side of the motor
- We offer customized FCMA starting solutions with the combination of a PF Capacitor or Feeder/Starter panel as per customer requirements

Our line side soft starters are designed for fault level of the system. Line side soft starter are preferred for motors in hazardous area or when neutral terminal box is not available



FCMA Neutral side



FCMA Line Side

FCMA LINE SIDE V/S FCMA NEUTRAL SIDE

Parameter	FCMA Line Side	FCMA Neutral side
Starter Connections	SS is connected in between VCB and Motor	Connected on the neutral side of the motor
Fault Level	Has to be designed for the Motor feeder bus fault level	Starter will be designed for Motor DOL current
Panel Size	Panel includes – Surge Arrestors, Fuse if required and two terminations inside the panel	Panel size will be comparatively smaller, as there is no SA and there is only single termination.

Note : Functionality and performance of the starters are same for both models.

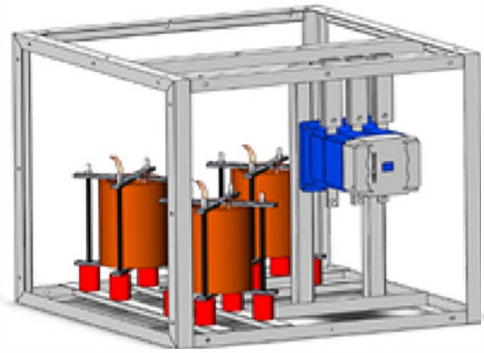
FCMA^{PLUS} /HFSR SPECIAL MODEL

- These types of soft starters can be offered for any applications like pump, compressor, fans, blowers, mills
- Motor starting solution to reduce the starting current to 1.5I_n can be offered with the help of sophisticated solutions connecting the line / neutral side soft starters.
- We offer customized FCMA starting solutions with the combination of a PF Capacitor or Feeder/Starter panel as per customer requirements

Lecon's special designs help in lowering the line (starting)current to as low as 1 to 1.5I_{FL} which helps start higher capacity motors, especially on Grid Captive Power Plants

LT FCMA^{PLUS}/HFSR OPEN EXECUTION MODEL

Our Open Execution models can be fit into customer MCC panels to provide specific and simple solutions to customers already having an existing control panel.



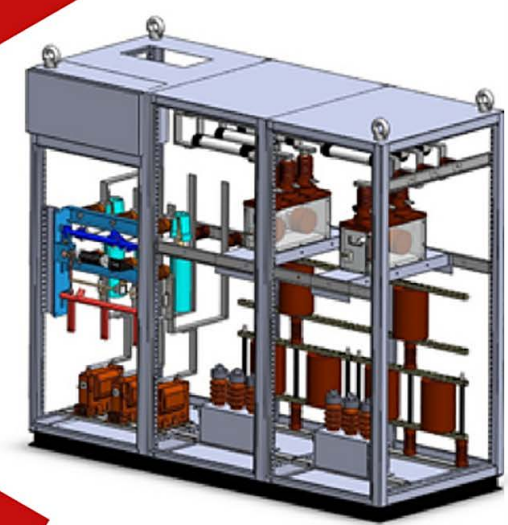
APFC, PF CORRECTION AND DETUNED FILTERS

MV APFC PANELS

Lecon's (Automatic) Power Factor Correction Capacitor Panels are used to improve the power factor on the customer's grid upto 11 kV.

These panels can be offered with customer desired make of APFC relay or can be offered individually for a particular load.

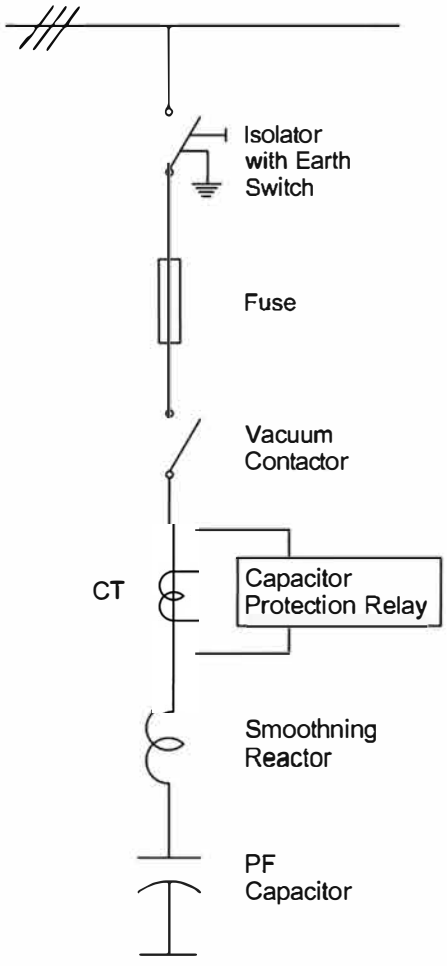
We offer automatic PF correction panels with inhouse manufactured smoothing / detuned reactors up to 14%.

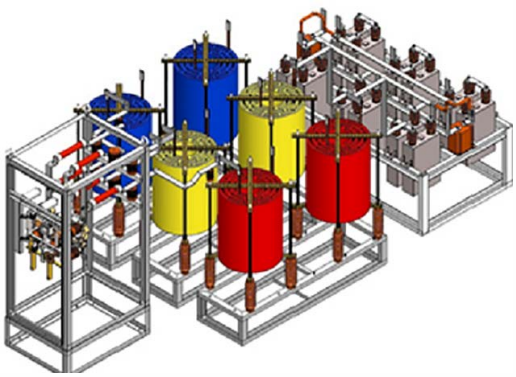


Free standing cubicle with PF corrector capacitor and inhouse manufactured smoothing / detuned reactors protection fuses and isolator is offered as one of our standard products

PF CORRECTION PANELS

- Our PF Correction panels help in improving the power factor of the system thereby increasing reactive loads and resulting in reduced demand charges and increased load carrying capabilities
- Free standing cubicle with PF corrector capacitor and inhouse manufactured smoothing / detuned reactors protection fuses and isolator is offered as one of our standard products
- Our PF Correction panel solutions can be routinely combined with our FCMA Soft Starters to provide a combined motor starting solution while improving the power factor of the system.





DETUNED FILTER

- Series reactors are used with capacitor banks for detuned filter.
- It safeguards the capacitor from harmonics present in the system. The 6% reactor filters harmonics up to the 5th and protects capacitors.

SWITCHGEAR VCB AND VC PANELS

- Lecon's metal enclosed indoor type switchgear use primarily a Vacuum Circuit Breaker and/or Vacuum Contactor as a switching device. We customize each of our panels based on customer requirements, to allow for specific applications such as HVAC, Oil & Gas, Steel to name a few.

- Our panels are engineered robustly with precise consideration of protection relay settings for close protection of motors.

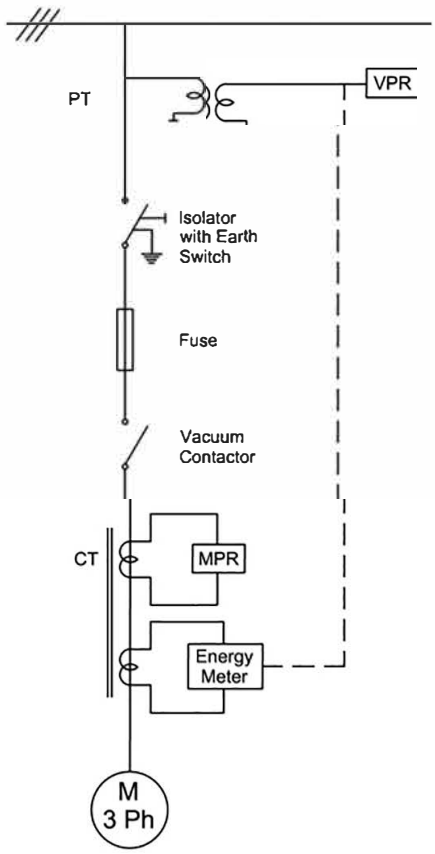
VCB – PANELS

We offer panels with VCB, protection relay, voltage, and current metering up to 11KV. Range includes up to 1,250 A, 40 kA, 11kV rated.

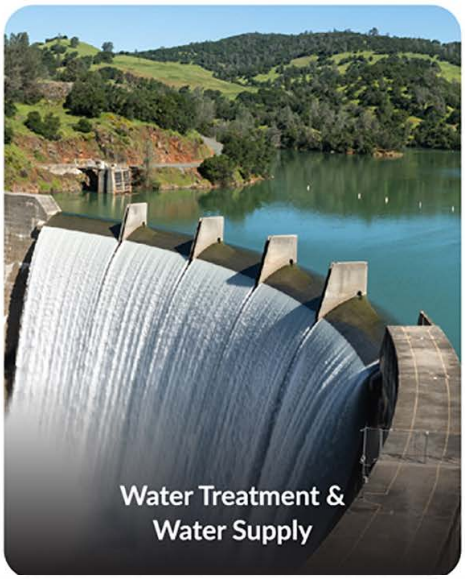
Construction :- VCB panel line up with incomers, bus couplers, and motor feeder, transformer / capacitor feeder panels can be offered as per the customer requirements. IP4X – Mechanical protection IEC 62271-1

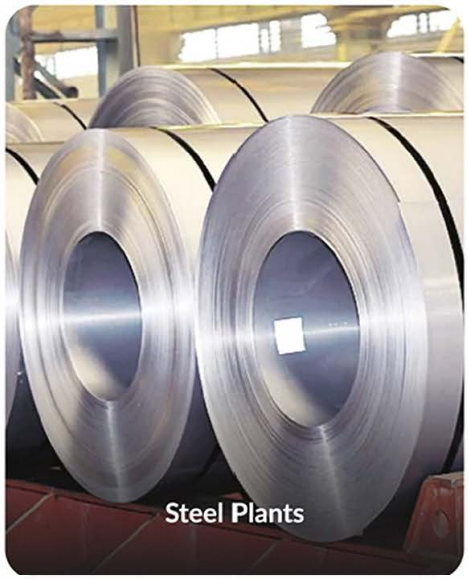
VACUUM CONTACTOR PANELS

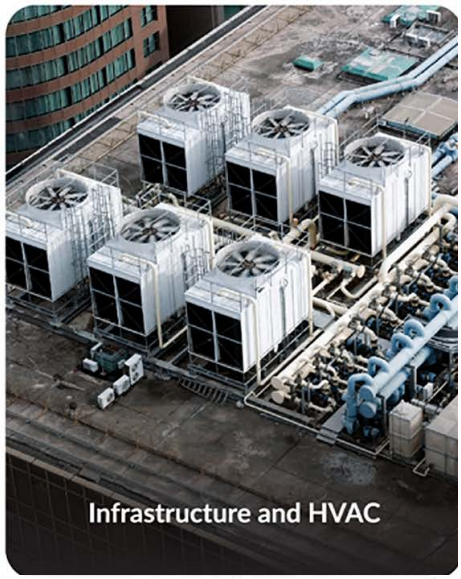
Motor feeder panels with Isolator, fuse and vacuum contactor with metering and protection can be offers as per customer requirements. These panels are type tested in CPRI.

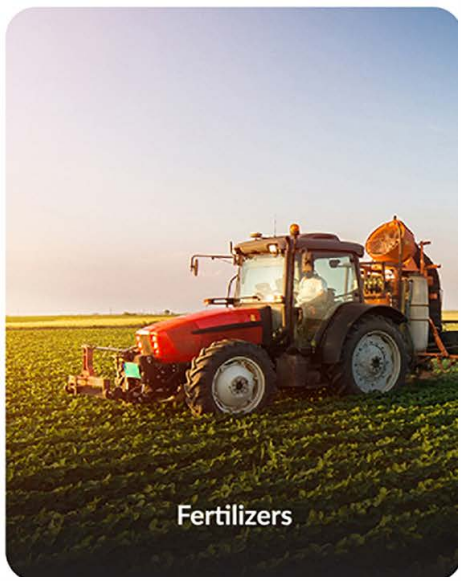


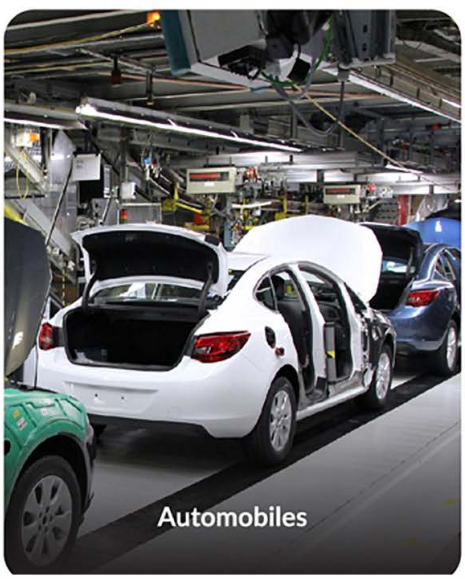
INDUSTRIES SERVED

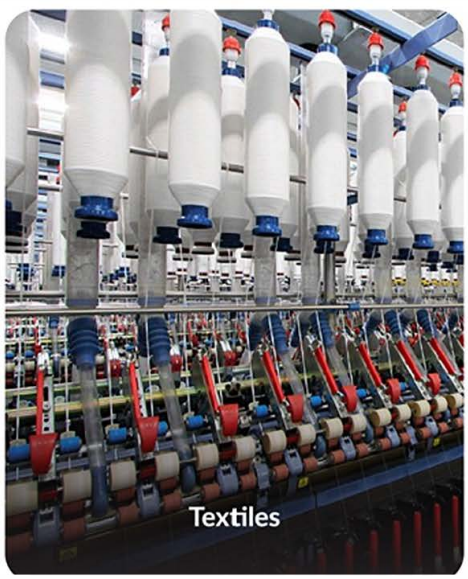












Lecon Energetics

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