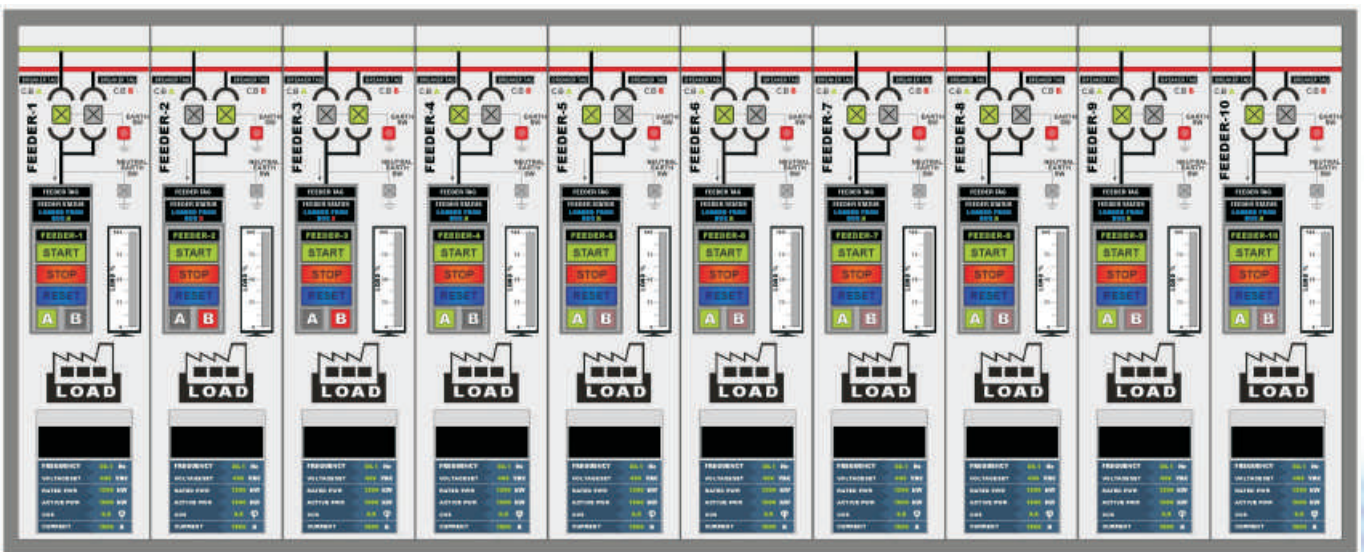


## REDUNDANT BUS POWER SYSTEM



**OPTIONAL FEEDER MONITORING & REMOTE CONTROL SYSTEM**



ComAp

Suite # 216, 2nd Floor, MASHREQUE CENTER, GULSHAN-E-IQBAL BLOCK 14  
KARACHI - PAKISTAN, TEL +92-21-34852125, 34852126, FAX . +92-21-34853363  
EMAIL. raelect@cyber.net.pk, WEB, www.raeng.com

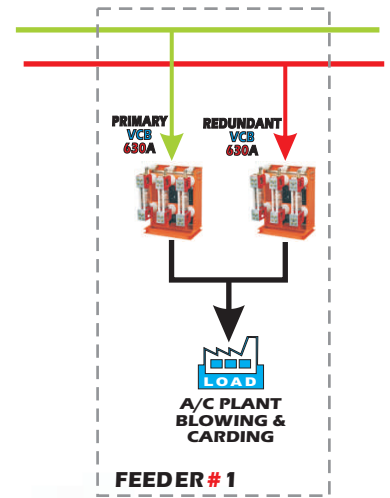
[www.raeng.com](http://www.raeng.com)

## ▶ **The need for redundancy**

Redundancy means the existence of one or more components, of one or more circuits, being able, in replacement of homologous parts of a system, to assume their functions totally or partially.

Generally speaking, distribution substations should be designed with redundancy allowing a portion of feeders to remain energized if any major component fails or is taken out of service for maintenance.

To help ensure a reliable system, planners and operators and engineers prefer having as much redundancy in these components as can be justified economically.



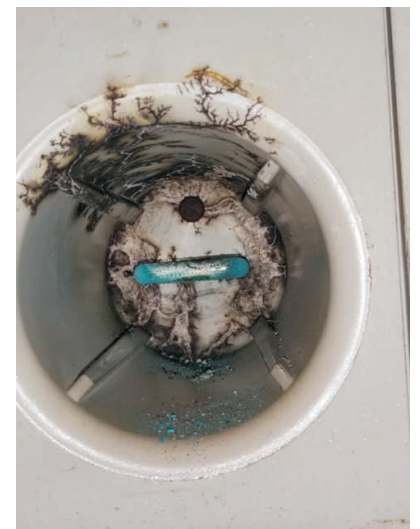
## ▶ **Power Distribution with out redundancy**

In critical process industries where abnormal shutdown resulting material loss and definitely production loss.

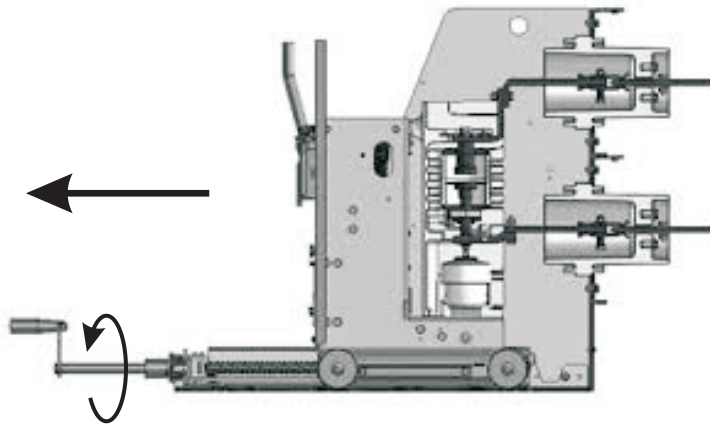
The Power Distribution Systems , where there is no Redundancy , doesn't allow the possibility of maintenance of the distribution system serviceable components , resulting sudden failure.

Medium and High voltage power distribution required periodic monitoring and maintenance. Here are some photos where VCBs burnt due to Oxidizations which leads in low insulation between phase to phase and rest of the VCB enclosure. resulting the burning of VCB.

The right side photo shows highly oxidized mating terminal of VCB which resulted the burning of VCB.



## Vacuum Circuit Breaker Preventive Maintenance



System reliability directly relates with its serviceable components and their preventive maintenance.

In power distribution network , ACBs & VCBs are the GATEWAYS devices and must be reliable and fully operational.

On previous page , few photos showing the burnt and damaged VCB due to the ignorance of preventive maintenance cycle.

Every ACB or VCB manufacturer provided the details of the maintenance and the cycles of the maintenance which based on average number of operation. Ignoring these instruction means , any time any mishap may be happen.

**BUT !!** some times this is not the matter of ignorance ,, It is the matter of **AVAILABLE OPTIONS** and the system limitations to carry out maintenance work.

R.A Engineering is offering REDUNDANT BUS BAR SYSTEM .  
This is a system which is splitted in 2 segments which are

### **Primary Bus & Distribution System & Redundant Bus & Distribution System**

This allows Preventive Maintenance of power distribution system without any downtime of that segment and its production.

No Doubt , adopting this system is the matter of Key Planning for a new project and its feasibility , but nevertheless , **The Redundant Bus & Distribution System** can be adopt by case study , proper planning , re-designing , structuring and the installation of the system.

R.A Engineering offers their vast experience & technical expertise as **1 Window Solution**. This includes the Consultancy , Feasibility , CAD designing and Modeling of our proposed solution.

We also offer the Smart , state of Art Centralized **SCADA** Control System , which provides the periodic reports including the No. of Operations of all distribution breakers , their temperature , the bus bar temperature and other related parameters.

**REDUNDANT BUS POWER SYSTEM** 



**DOUBLE BUS BAR (K.Electric) Panel**



**PROJECT DONE BY.. R.A ENGINEERING**



# REDUNDANT BUS POWER SYSTEM



# REDUNDANT BUS POWER SYSTEM



## AUTOMATIC POWER DISTRIBUTION SYSTEM

WITH AUTOMATIC LOAD SHEDDING & ADDING SYSTEM FOR OPTIMUM IPP PERFORMANCE

**PROJECT:** SAPPHIRE TEXTILE MILLS NO.1 SITE KOTRI - SINDH

**48 Stages Auto Load Shedding / Adding & 48 Stages of P.F.I System**

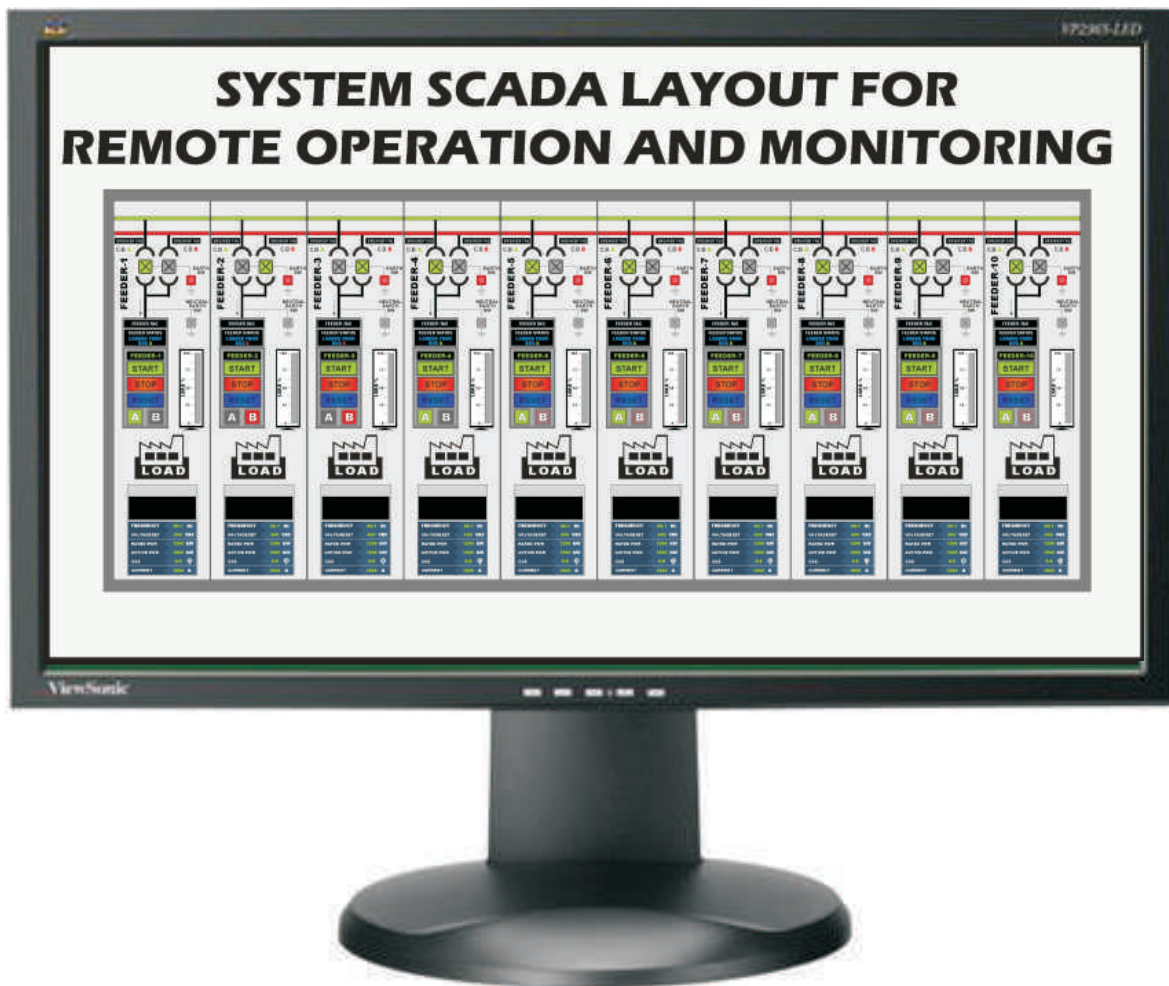
**FULLY AUTOMATIC WITH MANUAL OVER RIDING SYSTEM**



**21 PANELS IN TOTAL**

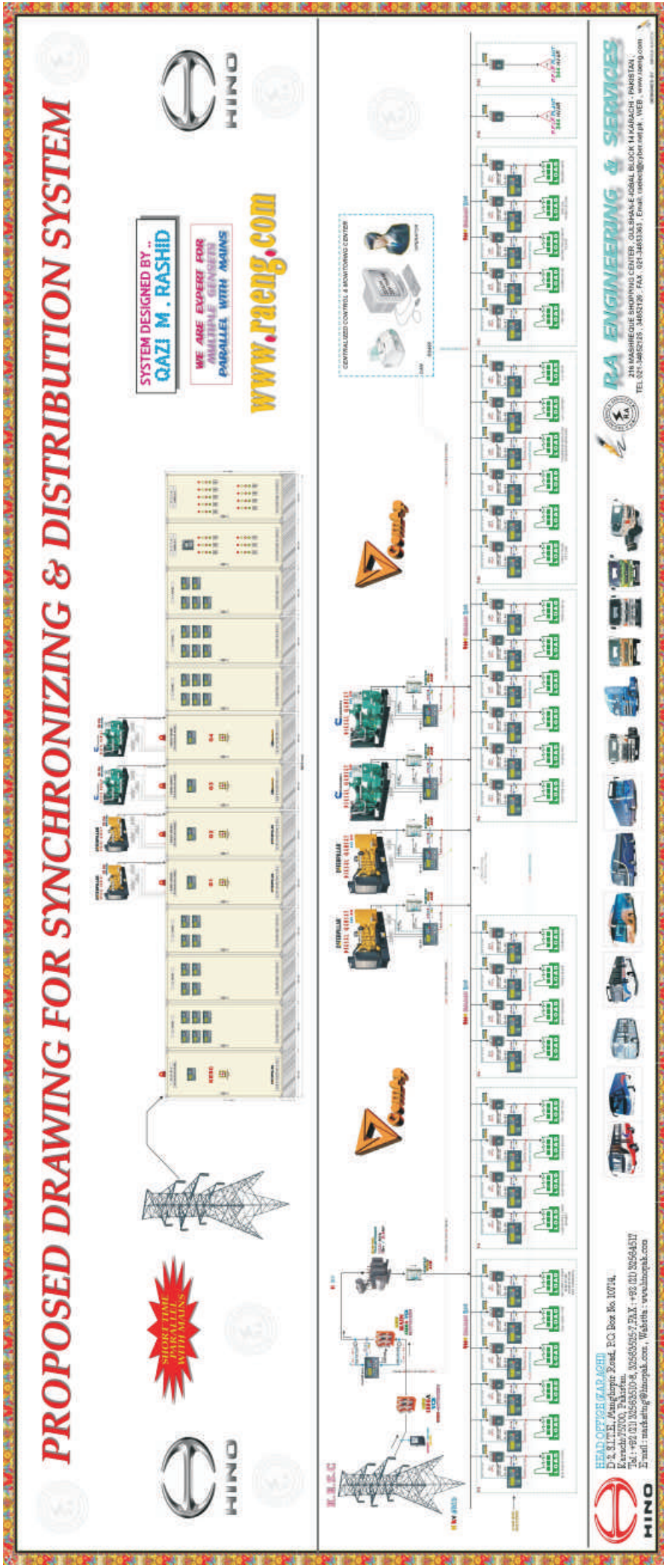


**SCADA SYSTEM**



**COLOR TFT  
OPERATOR PANEL**

# COLOR SLD 32 FEEDER MONITORING & CONTROL



PROJECT: HINO Pak - Karachi





*ComAp Products Compliance with  
IEEE and American Standard C37.2-1970.  
( Protective Devices Classification )*

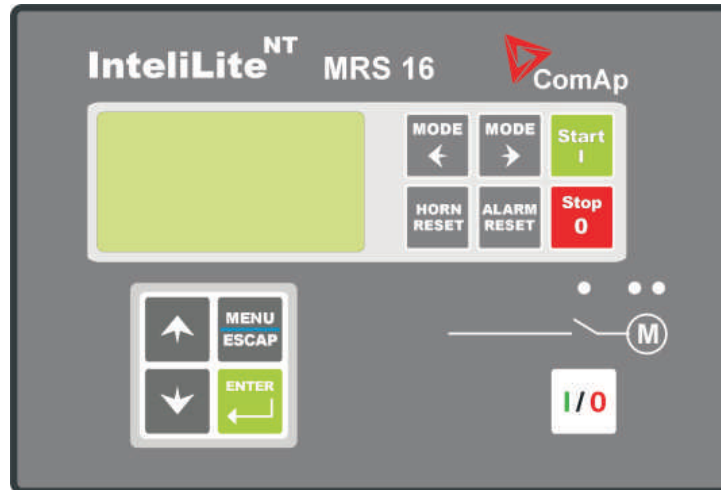
*Submitted By..  
( R.A Engineering & Services Pvt. Ltd. Pakistan )*



*ComAp Products Certifications & Approval Standards ..*



## *Modules Features Compliance with IEEE and American Standard C37.2-1970.*



### *Built-in Features & Protections With Standard ANSI Codes*

<i>ANSI Code</i>	<i>Built-in Features &amp; Protections</i>
47	Phase Sequence Sensing Protection
86	Wrong Phase Sequence Lockout Protection
48	Phase Incomplete Sequence / Missing Phase Protection
50	Feeder Overload Limit ( 0 to 200 %)
51	Feeder overload delay ( 0 to 60 Sec)
57	Short Circuit Current protection limit ( 100 to 500 %)
60	Current unbalance ( 1 to 100 %)
62	Current Unbalance Delay ( 0 to 60 Sec)
59	Feeder Over Voltage ( 70 to 200 %)
27	Feeder Under Voltage ( 0 to 110 %)
62	Voltage time delay ( 0 to 60 Sec)
60	Voltage Unbalance ( 1 to 100 %)
62	Voltage Unbalance Time Delay ( 0 to 60 Sec)
81	Feeder Over Frequency ( 85 to 200 %)
81	Feeder Under Frequency ( 0 to 110 %)
62	Frequency Time Delay ( 0 to 60 secretary)
96	Auto Loading/Unloading in Controller's AUTO MODE
74	Alarm & Horn Separate Digital Outputs



Features	Brands	SIEMENS PAC3200	CIRCUITOR CVM-C4	ENTES MPR 53-96	COMAP MRS-16
VOLTAGE		✓	✓	✓	✓
CURRENT		✓	✓	✓	✓
APPARENT POWER		✓	✓	✓	✓
ACTIVE POWER		✓	✓	✓	✓
REACTIVE POWER		✓	✓	✓	✓
POWER FACTOR		✓	✓	✓	✓
FREQUENCY		✓	✓	✓	✓
MODBUS		✓	✓	✓	✓
OVER CURRENT		✗	✗	✗	✓
UNDER VOLTAGE		✗	✗	✗	✓
OVER VOLTAGE		✗	✗	✗	✓
UNDER FREQUENCY		✗	✗	✗	✓
OVER FREQUENCY		✗	✗	✗	✓
EARTH FAULT		✗	✗	✗	✓
BREAKER CONTROL		✗	✗	✗	✓
BREAKER COUNTER		✗	✗	✗	✓
VOLTAGE UNBALANCE		✗	✗	✗	✓
CURRENT UNBALANCE		✗	✗	✗	✓
PHASE ROTATION		✗	✗	✗	✓
BUSBAR TEMP.		✗	✗	✗	✓
<b>ALARMS HISTORY</b>		✗	✗	✗	✓

# OUR PRINCIPLES



A Rolls-Royce  
solution



**BROAD**



For more details please click the link below

[www.raeng.com](http://www.raeng.com)



Thanks for your time

(R.A. Engineering)

Copyrights © 2020 , R.A. Engineering Pvt. Ltd. All rights reserved.

**R.A. ENGINEERING** Pvt. Ltd.