

SELMOUNT POWER SYSTEMS PVT. LTD

(AN ISO 9001-2015 COMPANY)

SELMOUNT ARCADE No. 254/1-6, 3rd Phase,
Peenya Indl. Area, Bengaluru- 560 058.

(Formerly known as SAHYADRI ELECTRICALS PVT. LTD.)

TITLE : GA, PANEL SPECIFICATION & WIRING DRAWINGS

PRODUCT : WIRELESS BREAKER CONTROL, ANNUNCIATION
& INDICATION PANEL

DRAWING No. : SELM-010

CONTACT:
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M: +91 9448260562



RELEASE
DATE

10-8-2020

REV
No.

00

WHY ?

- ✓ **COMPATIBILITY AND BONDLESS FLEXIBILITY**
- ✓ **SECURE AND ENCRYPTED WIRELESS COMMUNICATION**
- ✓ **NO WIRING, NO CIVIL WORK JUST PLUG AND PLAY**
- ✓ **EASY EXPANDABILITY**
- ✓ **READY FOR RETROFITS**
- ✓ **COMPACT SIZE**
- ✓ **MULTI REDUNDANT**

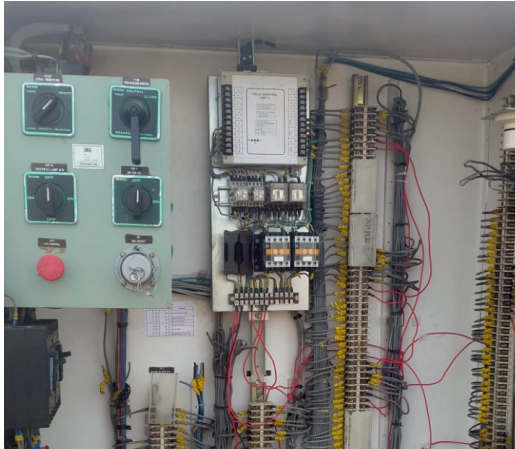
ABOUT WIRELESS TECHNOLOGY

- 1) 2.4 GHZ LICENSE FREE ISM BAND (INDUSTRIAL, SCIENTIFIC & MEDICAL)
- 2) DIRECT SEQUENCE SPREAD SPECTRUM TOPOLOGY.
- 3) USER FRIENDLY ADDRESS UPLOAD FACILITY.
- 4) EASY HMI INTERFACE.
- 5) DATA ENCRYPTION FOR ADDITIONAL SECURITY.
- 6) RUGGED CUSTOM MADE HARDWARE FOR HARSH ENVIRONMENT.
- 7) DIAGNOSTIC OPTIONS ON ALL UNITS.



FIELD INSTALLATIONS

TRIAL INSTALLATION AT KPTCL 400KV S/S NELAMANGALA



THE TRIAL INSTALLATION IS DONE ON ANCHEPALYA FEEDER AT 400KV S/S NELAMANGALA

THE SYSTEM IS PERFORMING SATISFACTORILY SINCE 4 LONG YEARS!!

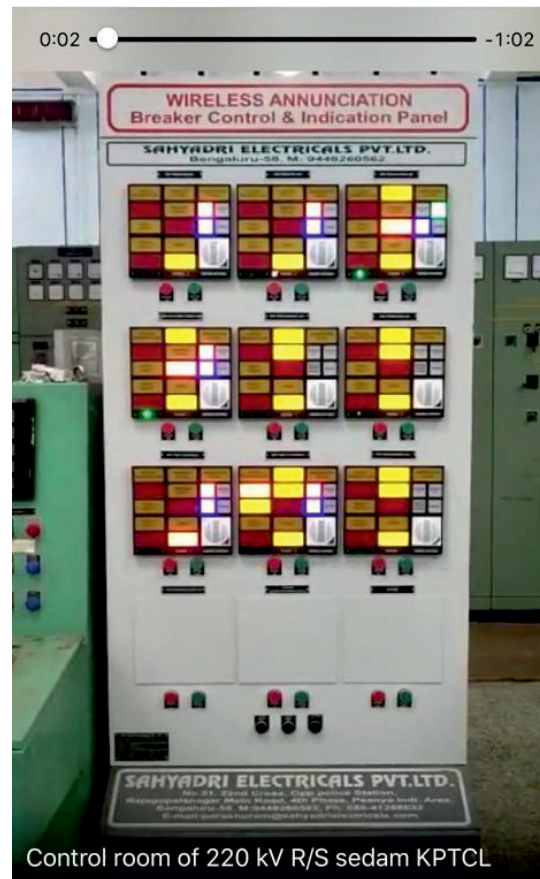


FIELD INSTALLATIONS

RETROFIT AT 220KV KPTCL S/S SEDAM

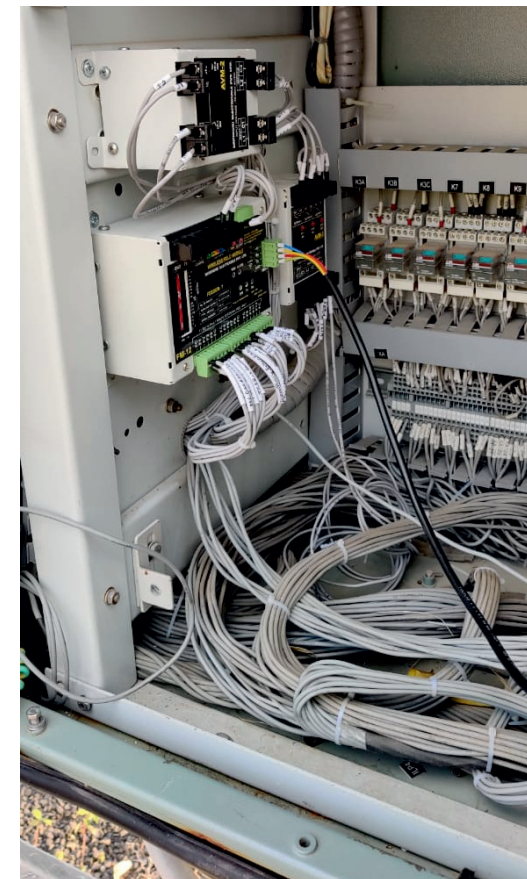


CONTROL ROOM

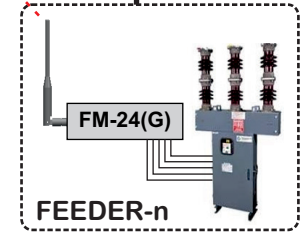
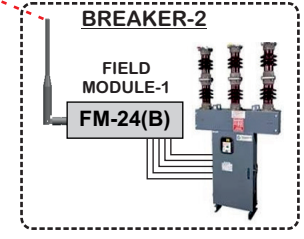
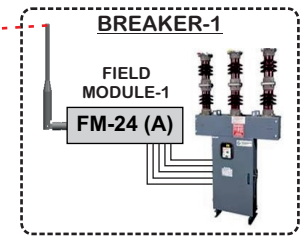
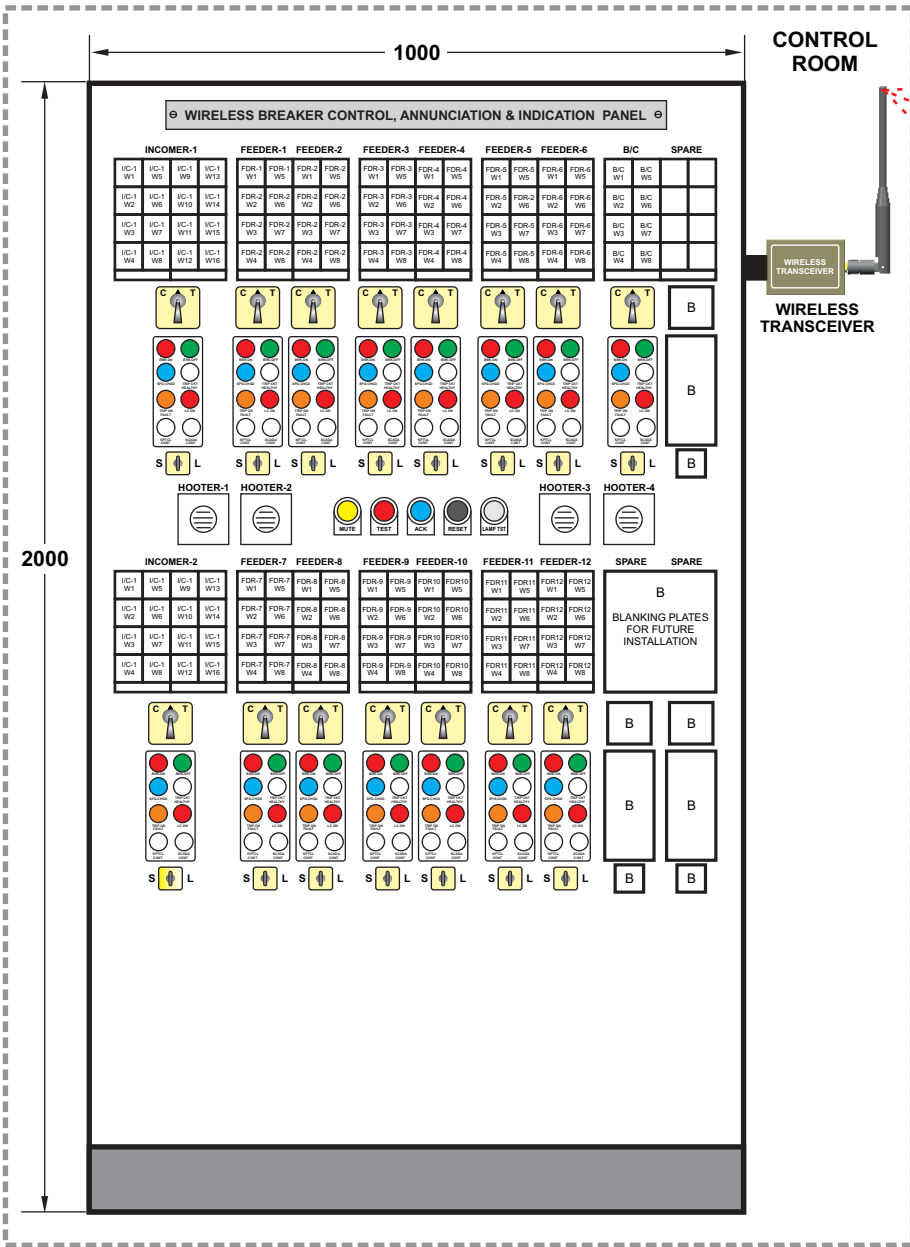


Control room of 220 kV R/S sedam KPTCL

BREAKER SIDE



WIRELESS BREAKER CONTROL, ANNUNCIATION & INDICATION PANEL GENERAL ARRANGEMENT



*FM-24 (A to G) : WIRELESS FIELD SIDE MODULES



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All dimensions are in mm

TITLE	GENERAL ARRANGEMENT	DRAWN BY	TKS	SIG.	
PRODUCT	WIRELESS BREAKER CONTROL, ANNUNCIATION & INDICATION PANEL	APPROVED BY	SRI	SIG.	
DRG. No.	SELM-010	RELEASE DATE	10-8-2020	REV No.	00
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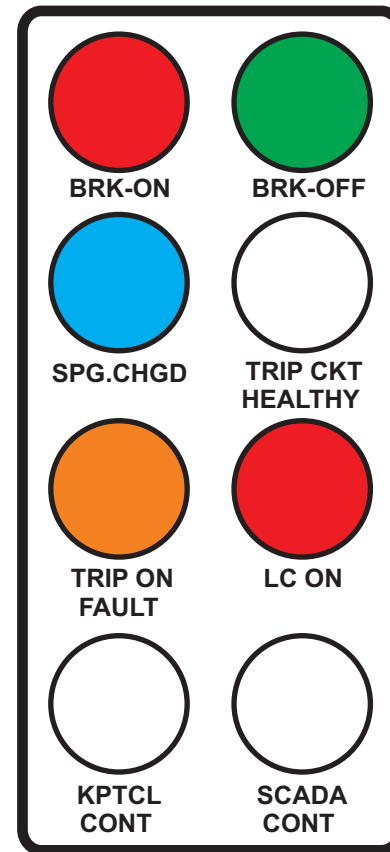


ANNUNCIATOR WINDOW ARRANGEMENT (INCOMER)

INCOMER

PROTECTION OPERATED	COMMAND FROM SCADA	SPARE	SPARE
DC FAIL	RELAY IN TEST MODE	SPARE	SPARE
BCU FAULTY	SPARE	SPARE	ANNUNCIATOR PANEL AC FAILURE
TRIP CIRCUIT HEALTHY	SPARE	SPARE	ANNUNCIATOR PANEL DC FAILURE

INDICATING LAMPS



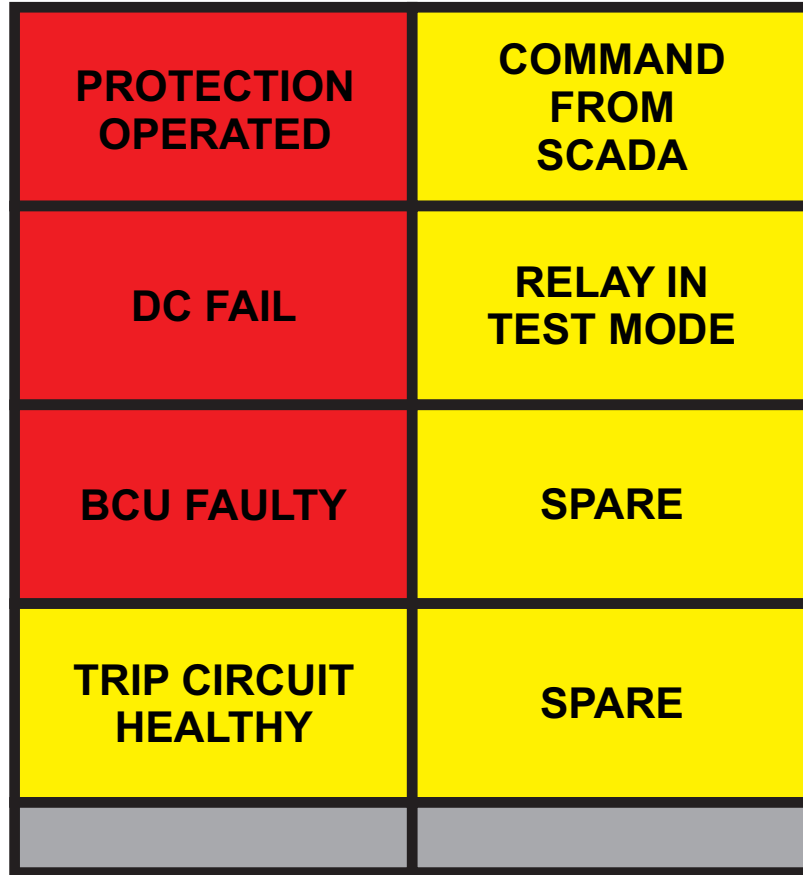
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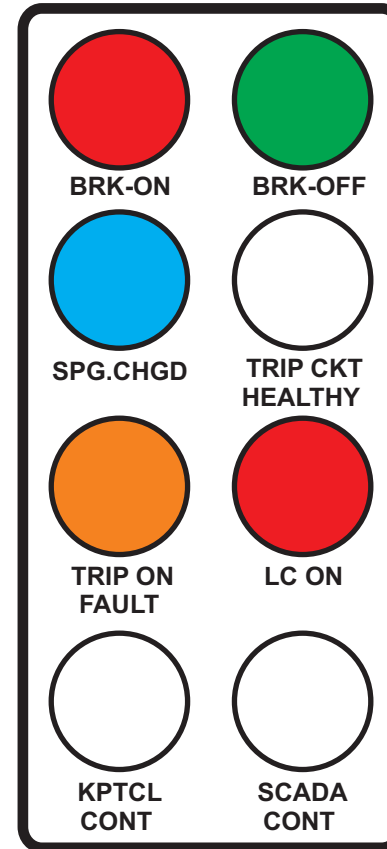


ANNUNCIATOR WINDOW ARRANGEMENT (FEEDER/BUSCOUPLER)

FEEDER



INDICATING LAMPS

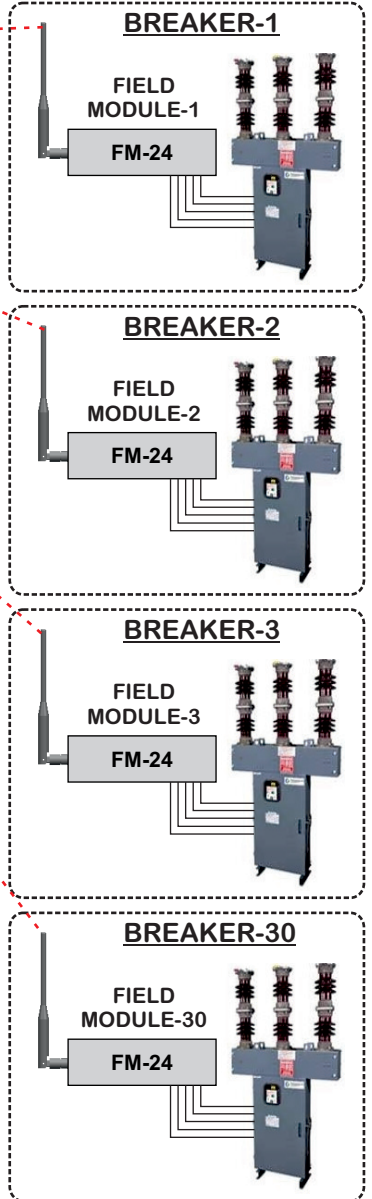
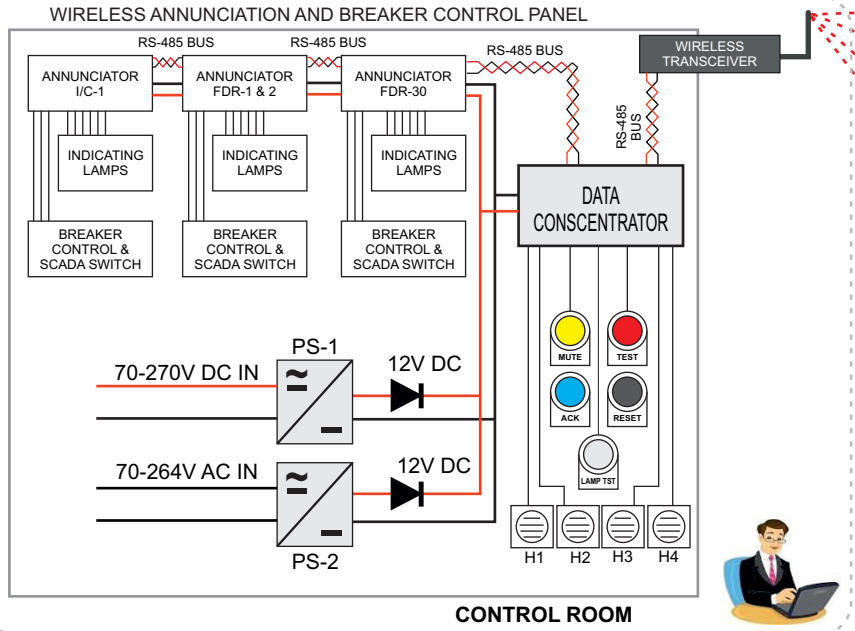


SELMOUNT POWER SYSTEMS PVT. LTD

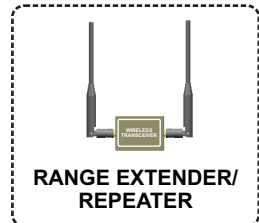
TITLE	WINDOW/LAMPS ARRANGEMENT	<small>DRAWN BY</small>	TKS	<small>SIG.</small>	
PRODUCT	WIRELESS BREAKER CONTROL, ANNUNCIATION & INDICATION PANEL	<small>APPROVED BY</small>	SRI	<small>SIG.</small>	
DRG. No.	SELM-010	<small>RELEASE DATE</small>	10-8-2020	<small>REV No.</small>	00
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WORKING PRINCIPLE



RANGE UP TO 1000Meters
LINE OF SIGHT



RANGE EXTENDER/ REPEATERS CAN BE ADDED FOR INCREASING THE RANGE OF OPERATION

PRINCIPLE OF OPERATION

FM-24 Field modules are placed in the each breaker & connected with the contacts of the breaker, protection relay annunciation contacts, trip/close coils & indicating lamps.

The Annunciator unit will be in the centralized panel & connected to the lamps, & breaker control switch etc. Individual annunciators are connected to the DATA concentrator via RS-485 multidrop system. The Data concentrator will communicate between field modules and the annunciators. It also controls the common functions like mute, test, ack, reset and hooters.

Range extender/ repeater module is used to extend the range of the system and also acts as a DATA concentrator.

Annunciator unit will communicate with FM-24 field units & gets the updates on status of breaker over the air without any cables. The same data will be received & reflected in the annunciator at the control room.

The operator will get real time updates of all the breakers & its equipments status in the control room. He can even control the trip/close function of any breaker remotely.

The complete system is based on wireless licence free band & communication will be on secured protocol. The system will work on its own local net work & does not depend on any third party network.

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TITLE	WORKING PRINCIPLE OF THE WIRELESS ANNUNCIATION SYSTEM	DRAWN BY	TKS	SIG.	
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DRG. No.	SELM-010	RELEASE DATE	28-8-2018	REV No.	00
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WIRELESS ANNUNCIATOR DATA SECURITY & RUGGEDNESS OF THE SYSTEM

DATA RECEPTION

128 Bit AES Encryption
(Equivalent to an online credit card Transaction)

Personal Area Network ID, Channel ID, Device ID

Reliable Packet Delivery Checks, Redundant Channels

Cyclic Redundancy Checks

IP-65 HOUSING

PLUG & PLAY CABLES

IEC-61000-XX-XX EMI EMC COMPLIANCE

125°C EXTENDED INDUSTRIAL GRADE COMPONENTS

DATA TRANSMISSION



SELMOUNT POWER SYSTEMS PVT. LTD

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TYPICAL ANNUNCIATION, INDICATION & CONTROL ARRANGEMENTS FOR INCOMER & FEEDER

WIRELESS ANNUNCIATOR GENERAL SPECIFICATIONS

SYSTEM:

- 1) The system will operate wirelessly on zigbee 2.4GHz. licence free band and communicates to the field unit in the breaker. The system can be installed in new substations or can be easily retrofitted in existing ones. The product is split in to 2 basic parts. A) Annunciator unit (which is mounted in the control room and gives the status and alarm to the operator)
- B) Field unit. (which captures the DATA from breaker and transmits to the annunciator in the control room) Manual trip/closing of the breaker is also possible through binary inputs from the annunciator.

The complete system is capable of working in the harsh/high voltage environment of an EHV substation without any DATA loss and interruptions between the annunciator and field unit. The provision of range extension is also possible by adding the range extender at any stage of installation. Using the wireless system will not effect the existing operations of the substation at any circumstances.

No. OF ANNUNCIATOR WINDOW, STATUS INDICATOR AND BREAKER CONTROLS:

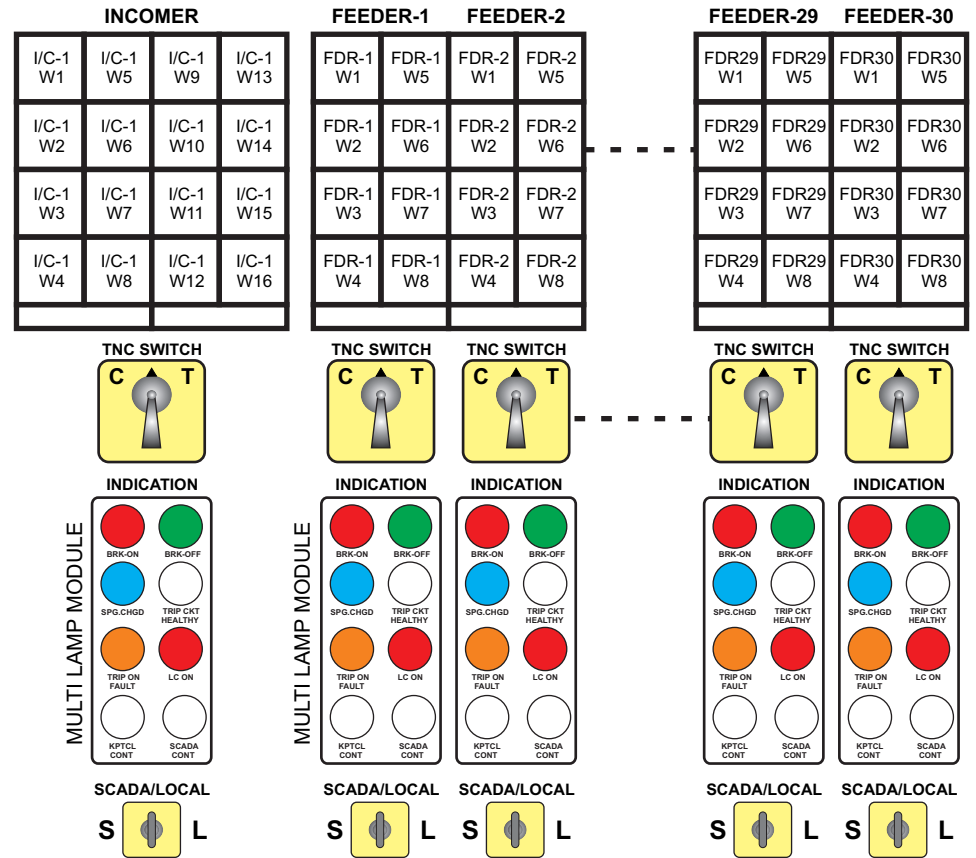
The system shall have the basic minium count of window, status Indications and breaker control as below

- 1) No. of window per In comer/ capacitor bank : 16
- 2) No. of window per feeder : 08
- 3) No. of status Indication per In comer/ capacitor bank : 08
- 4) No. of status Indication per feeder : 08
- 5) Breaker control : Trip/close control per In comer/ feeder/ capacitor bank
- 6) Interlock : SCADA/ Local selection for breaker trip/close control
- 7) Repeat relay: Any number of repeat relay modules per In comer/feeder can be added via RS-485

ANNUNCIATOR:

Annunciator shall be of low current LED facia window flush mount type with low current LED, suitably designed to identify In comer & feeder row wise arranged (as indicated in the GA) The annunciator shall confirm the below basic specifications.

- 1) Provision for replacing the inscriptions at field shall be possible.
- 2) External or inbuilt audible alarm function.
- 3) Annunciation AC and DC fail indications.
- 4) Wide operating auxiliary DC/AC input supply.
- 5) Wireless 2.4 Ghz. Zigbee communication option.
- 6) Additional feeder annunciation is possible through add-on modules.



UP TO 30 NOs OF FEEDER & 4 Nos OF INCOMER/ CAPACITOR BANKS CAN BE EASILY CONNECTED IN THIS SYSTEM BY WIRING UP FEW WIRES



TITLE	TYPICAL ANNUNCIATION, INDICATION & CONTROL ARRANGEMENTS FOR INCOMER & FEEDER	DRAWN BY	TKS	SIG.	
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WIRELESS ANNUNCIATOR TECHNICAL SPECIFICATIONS

ANNUNCIATOR SPECIFICATIONS:

INPUT SUPPLY VOLTAGE	20-60V DC OR 70-264V AC/DC
STAND BY SUPPLY VOLTAGE	230V AC
POWER CONSUMPTION	< 0.5 Watt/ WINDOW
UNIT HEALTHY INDICATION	FLASHING GREEN WATCH DOG LED
No. OF WINDOW CHANNELS	16 WINDOWS PER IN-COMER, 8 WINDOWS PER FEEDER
No. OF STATUS INDICATORS	8 INDICATORS FOR EACH IN-COMER & FEEDER
WINDOW COLOR	RED, YELLOW FOR ANNUNCIATION & RED, YELLOW, AMBER, WHITE, GREEN & BLUE FOR STATUS INDICATORS
ILLUMINATION	ULTRA HIGH BRIGHT LOW POWER LED
INPUT SIGNAL FOR BREAKER TRIP/CLOSE OPERATION	OPTICALLY ISOLATED POTENTIAL FREE
INTERLOCK	SCADA/ LOCAL SELECTION FOR BREAKER TRIP/CLOSE CONTROL
RESPONSE TIME	< 50 mSec.
MOUNTING	FLUSH PANEL MOUNT
TERMINALS	FINGER SAFE BARRIER TERMINALS & PLUG-IN TERMINALS (ACCEPTS 2 FORK LUGS WITH 2.5Sq/1.5Sq WIRES)
AUDIBLE ALARM OUTPUT	N/O CONTACTS FOR OPERATING EXTERNAL HOOTERS
FACIA WINDOW TYPE	INDIVIDUAL WINDOW WITH AN OPTION FOR REPLACEABLE LEGENDS
EXTERNAL PUSHBUTTON CONTROLS	PROVISION FOR REMOTE ACCESS MUTE, TEST, ACCEPT, RESET & LAMP TEST THROUGH REAR TERMINALS
COMMUNICATION PORT	RS-485 / WIRELESS (LICENCE FREE BAND)
PROGRAMMABILITY	DIP SWITCHES
OPERATING TEMPERATURE	-5° TO +55° C
STORAGE TEMPERATURE	-10° TO +60° C
HUMIDITY	95% RH
DEGREE OF PROTECTION	IP 40 FRONT PANEL, IP 20 REAR PANEL

EMI / EMC COMPLIANCE:

ESD	IEC 61000-4-2
EFT	IEC 61000-4-4, POWER SUPPLY AND INPUT SIGNAL.
SURGE	IEC 61000-4-5, POWER SUPPLY.
CONDUCTED EMISSION	CISPR 11
VOLTAGE DIPS	IEC 61000-4-11.

SAFETY COMPLIANCE :

HIGH VOLTAGE TEST BETWEEN ALL TERMINALS SHORTED AND EARTH	IEC 60255-5, 2KV RMS 50Hz FOR 1 MINUTE.
INSULATION RESISTANCE	UL508>50 KOHMS.

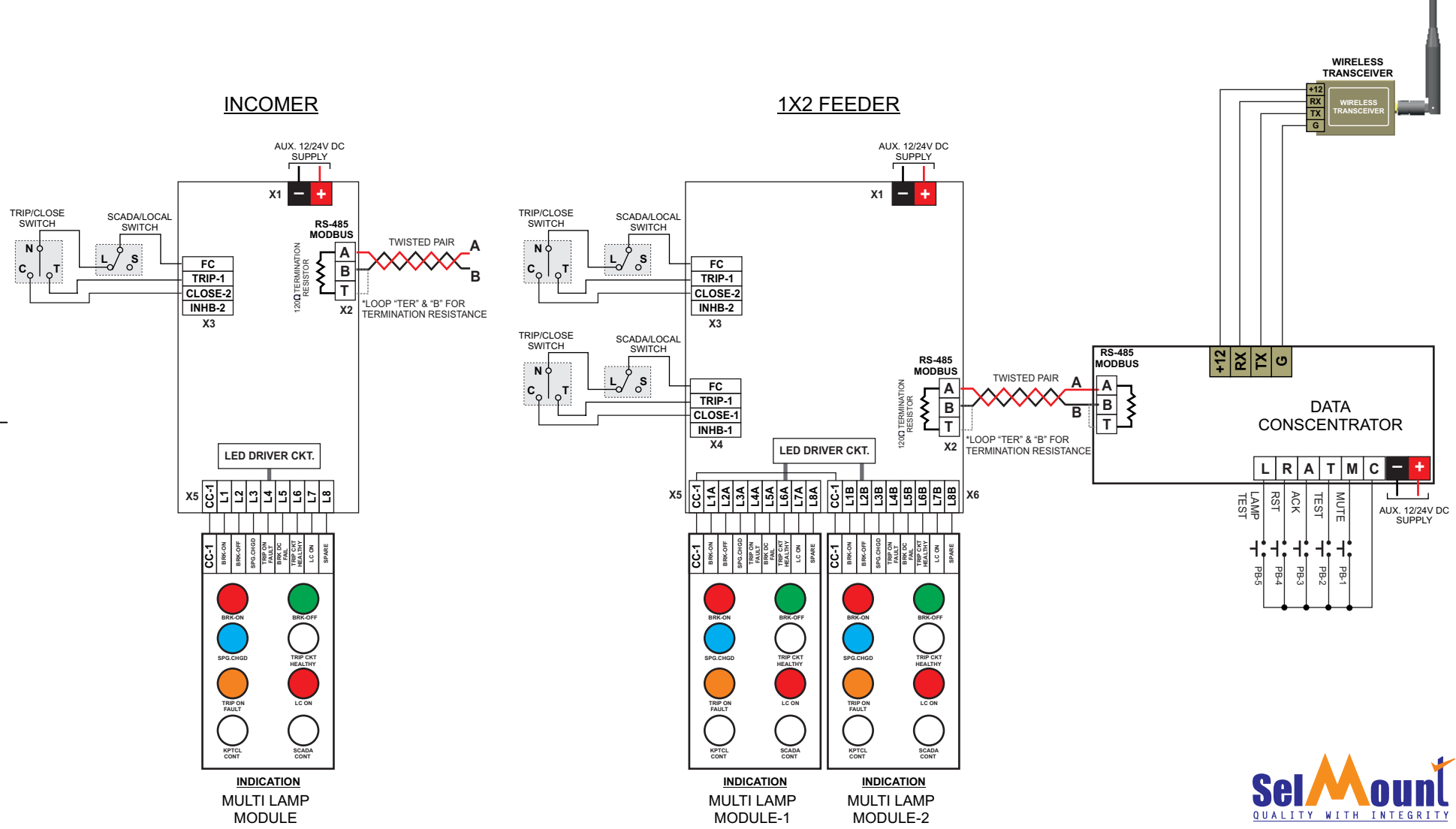
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WIRELESS ANNUNCIATOR WIRING DRAWING (CONTROL PANEL SIDE)



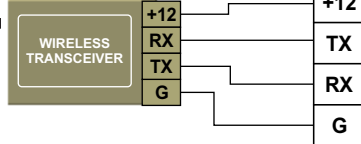
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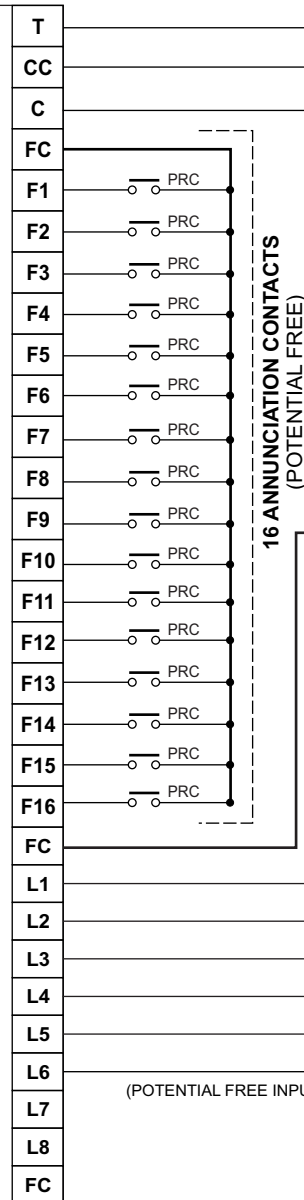
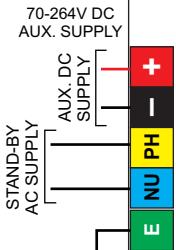
FM-24 FIELD MODULE BREAKER SIDE WIRING DRAWING

WIRELESS TRANSCEIVER



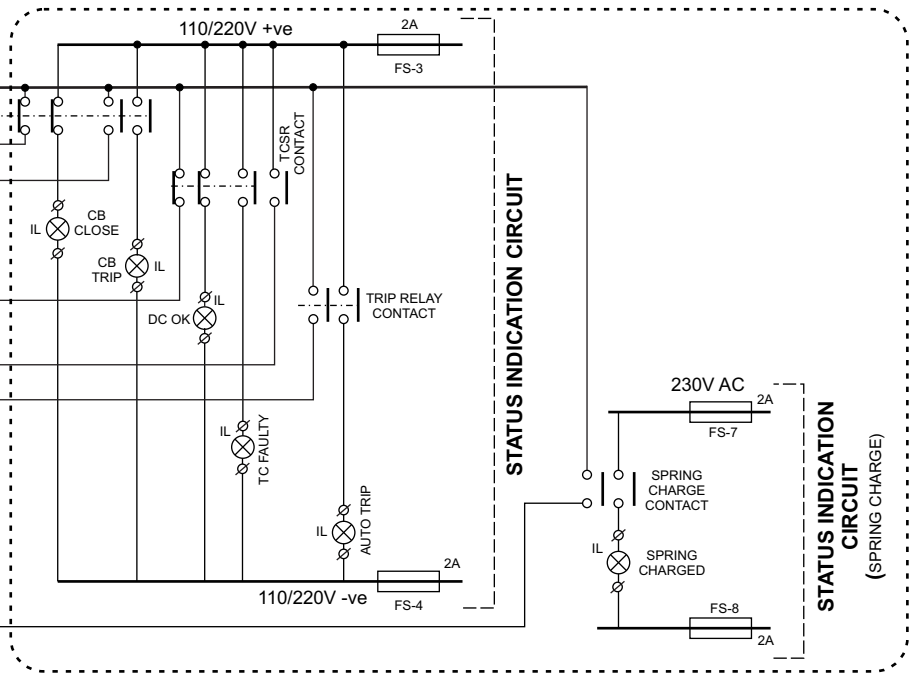
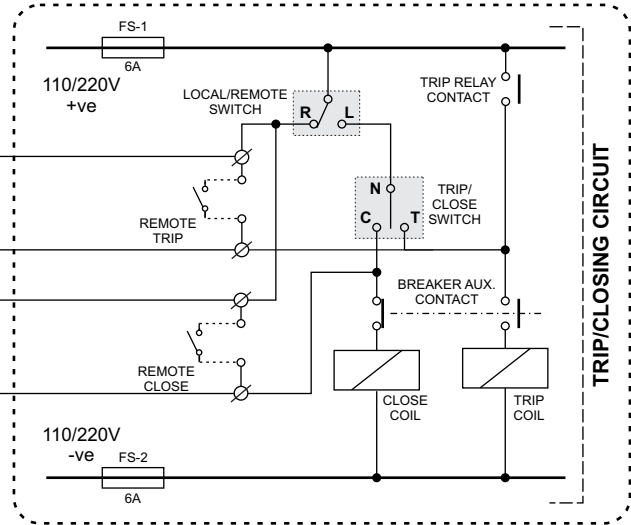
- RLT** : HEAVY DUTY RELAY FOR BREAKER TRIP
- RLC** : HEAVY DUTY RELAY FOR BREAKER CLOSE
- IL** : INDICATING LAMP
- PRC** : PROTECTIVE RELAY CONTACT
- ACM-3 (1&2)**: 3 CH. UNIVERSAL VOLTAGE INPUT TO POTENTIAL FREE OUTPUT MODULE

FM-24 FIELD MODULE



16 ANNUNCIATION CONTACTS (POTENTIAL FREE)

(POTENTIAL FREE INPUTS ONLY)



TITLE	FM-24 FIELD MODULE BREAKER SIDE WIRING DRAWING	DRAWN BY	TKS	SIG.	
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FM-24, AVM-3 & REPEATER MODULE TECHNICAL SPECIFICATIONS

FM-24 FIELD I/O MODULE:

INPUT SUPPLY VOLTAGE	20-60V DC OR 70-264V AC/DC
STAND BY SUPPLY	230V AC
UNIT HEALTHY INDICATION	FLASHING GREEN WATCH DOG LED
COMMUNICATION PORT	WIRELESS ZIGBEE 2.4GHZ. LICENCE FREE BAND & MODBUS-485
PROGRAMMABILITY	DIP SWITCHES
No. OF INPUTS	24 POTENTIAL FREE INPUTS
No. OF OUTPUTS	2 Nos. FOR BREAKER TRIP & CLOSE, CONTACT RATING 6A @ 230V AC/30V DC
MOUNTING	CHANNEL/ PANEL MOUNT

HEAVY DUTY RELAYS (FOR BREAKER TRIP/CLOSE OPERATION):

CONTACT ARRANGEMENT	SPNO
CONTACT CURRENT RATING	10A DC CONTINUOUS CARRY & BREAK
CONTACT VOLTAGE RATING	250V DC
TERMINALS	QUICK CONNECT OPTION

AVM-3 VOLTAGE CONVERSION MODULE:

INPUTS	3 CHANNEL
INPUT VOLTAGE RATING	70-264V AC/DC FOR EACH CHANNEL
AUX. SUPPLY	SELF POWERED
OUTPUT	3 CHANNEL SPNO DRY CONTACTS

REPEATER MODULE:

INPUT SUPPLY VOLTAGE	20-60V DC OR 70-264V AC/DC
UNIT HEALTHY INDICATION	FLASHING GREEN WATCH DOG LED
COMMUNICATION PORT	WIRELESS ZIGBEE 2.4GHZ. LICENCE FREE BAND
MOUNTING	CHANNEL/ WALL/ PANEL MOUNT
HOUSING	IP 65

EMI / EMC COMPLIANCE:

ESD	IEC 61000-4-2
EFT	IEC 61000-4-4, POWER SUPPLY AND INPUT SIGNAL.
SURGE	IEC 61000-4-5, POWER SUPPLY.
CONDUCTED EMISSION	CISPR 11
VOLTAGE DIPS	IEC 61000-4-11.

SAFETY COMPLIANCE :

HIGH VOLTAGE TEST BETWEEN ALL TERMINALS SHORTED AND EARTH	IEC 60255-5, 2KV RMS 50Hz FOR 1 MINUTE.
INSULATION RESISTANCE	UL508>50 KOHMS.

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