MICROPROCESSOR BASED ALARM ANNUNCIATOR SYSTEM

1.00 Scope

The scope of this USER'S MANUAL is limited to the product named MBAS 1800 annunciation systems / modules manufactured, marketed and serviced by MINILEC. The scope is further limited to the extent of technical specifications enlisted in this USER'S MANUAL only.

Users should not refer this manual for using any other annunciator other than MBAS 1800 with unspecified technical specifications and features.

2.00 MBAS 1800 System Details

2.01 General

The MBAS 1800 series are microprocessor based annunciation systems.

MINILEC, a well known name in the field of electronic motor protection and microprocessor based annunciators, offer this unique alarm annunciation system based on latest single chip microcontroller or technology with a totally new face-lift and with considerable size reduction, having moulded enclosure, conforming to DIN panel cutouts.

These highly reliable and compact systems offer multipoint annunciation with operating sequence as per ISA standards and with optional features such as extra auxillary relay outputs, for remote annunciation, multicoloured front replaceable windows for easy differentiation of trip and non-trip or alarm and trip type of faults, manned/unmanned mode of operation etc.

Thus there is a readily available option for the specific needs of every installation. Minilec offers annunciators for all applications.

2.02 Standard Features

The Design Features
- Single chip microcontroller logic.
- Opto isolated inputs and outputs.
- Super Bright LED window illumination.
- High Noise immunity / isolation.
- Switch mode power supply.
- Self surveillance watchdog LED.

The Constructional Flexibility
- Conforming to DIN panel cutouts.
- Replaceable snap-on window capsules.
- Replaceable window inscriptions (Legends).
- Two different window sizes.
- Expandable modules.
- Moulded enclosures.

The Functional Features
- Fixed Sequence (S1/S2/S3/S4).(Any other Sequence on Request)
- Sequence as per ISA standard.
- Potential contact inputs.(with -ve common)
- NO/NC inputs grouping selectable configuration.
- Relay output for external Audible Hooter.
- 3rd Relay optional for either of below mentioned feature.
  a) Ring back hooter.
  b) Supervisory contact.
  c) Normal supply fail annunciation

2.03 Optional Features
- Site Selectable sequence (S1, S2, S3, S4). (Any other Sequence on Request)
- Preprogrammed Custom built operating sequence (without site selection facility).
- Trip & Non-Trip grouping facility for MBAS 1800 with Ring-Back Sequence only.
- Manned / Unmanned function .
- Fault Follower contact output per fault Input (NO) .
- 4 different colours for window illumination.
- Ringback sequence with optional 3rd relay output for Ringback hooter, with Trip & Non-Trip grouping facility.
- Supervisory control.
- Supply fail annunciation.
- External and / or built-in control push buttons.

2.04 Constructional Details

■ **The CPU Block**
The CPU block is integral mounted and accessible from side. This Central Processing Unit block scans and processes digital (wet contact) inputs and triggers the corresponding facia window and hooter relay and other optional auxillary relay output (if any), as per the operating sequence given in the order.

The CPU block's 'BRAIN' is the single chip microcontroller IC which is powered by +5 V DC regulated from Power Supply block.

■ **The Power Supply Block**
The Power Supply block is also integral and accessible from side. This switch mode power supply accepts specified AC or DC input supply 90-270 V AC / DC and converts it into 3 different filtered noise free DC outputs which are fed to the CPU block (+5 V & +12 V DC isolated) and to the Facia block (+12 V DC).
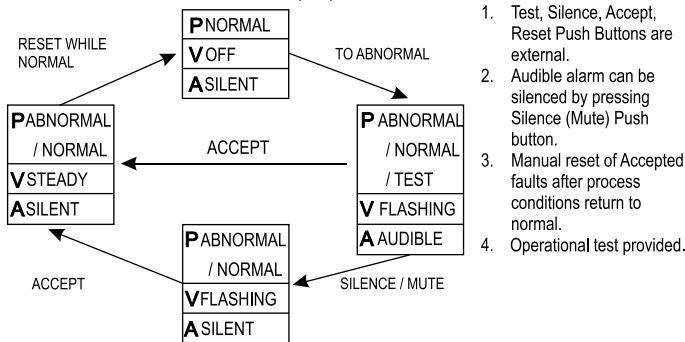
■ **The Facia Block**
The Facia Block is accessible from front & constitutes of front black window frame, small size 'S' window reflector capsule or big size 'B' window reflector capsule, Acrylic, Diffuser & Window legend. In case of small window facia there is separator in between two windows. Window legend (Inscription label) is sandwiched between acrylic lens and diffuser plate. Windows can be interchange individually. This facia block can be incorporated with push button capsule. It consist 4 nos. feather push buttons which is fitted in one 'B' size window location OR there is facility of tact keys, which is fitted in name plate frame, depending on no. of window configuration.
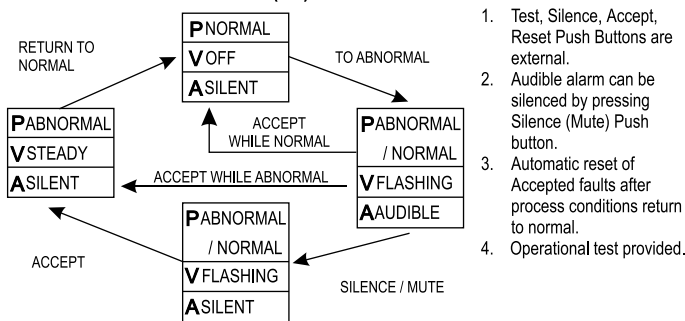
2.05 Standard Operating Sequence

The MBAS 1800 annunciation systems are programmed to operate as per following operating sequences confirming to ISA standards. Other sequences / non standard sequences are given as per customer's requirement.

Minilec Sequence Code	Operating Sequence Title	ISA Std. Code
S1	Manual Reset	M1
S2	Auto Reset	A1
S3	Ringback	R1-12
S4	First UP	F2M-1

SEQUENCE S1 : Manual Reset (M1)

1. Test, Silence, Accept, Reset Push Buttons are external.
2. Audible alarm can be silenced by pressing Silence (Mute) Push button.
3. Manual reset of Accepted faults after process conditions return to normal.
4. Operational test provided.

SEQUENCE S2 : Auto Reset (A1)

1. Test, Silence, Accept, Reset Push Buttons are external.
2. Audible alarm can be silenced by pressing Silence (Mute) Push button.
3. Automatic reset of Accepted faults after process conditions return to normal.
4. Operational test provided.

SEQUENCE S3 : Ringback (R1-12)

1. Test, Silence, Accept, Reset Push Buttons are external.
2. Alarm & ringback Audible devices.
3. Audible device or ringback alarm can be silenced by pressing Silence (Mute) Push button.
4. Ringback visual & audible alarm when process status returns to normal.
5. Operational test provided.
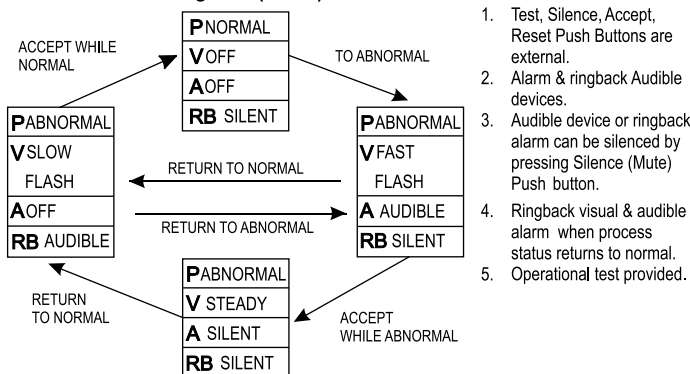
SEQUENCE S4 : First Out Manual Reset (F2M-1)

1. Test, Silence, Accept, Reset Push Buttons are external.
2. First-out flashing and subsequent steady.
3. Manual reset of Accepted faults when process status return to normal.
4. Operational test provided.
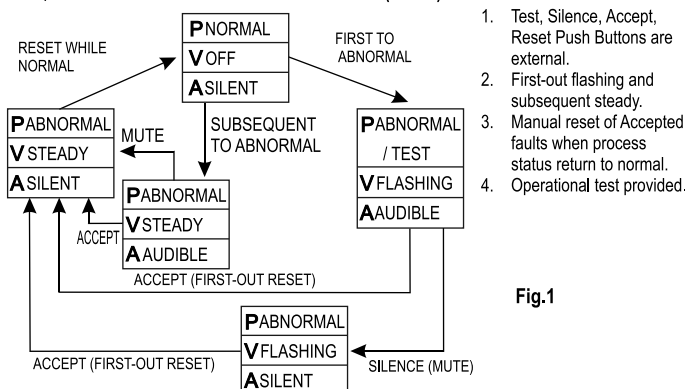
Fig.1

Note 1 :
P : Process Status, **V** : Visual Alarm Status,
A : Audible Alarm Status, **RB** : Ringback audible alarm status.

Note 2 :
Sequence DIP switch position selected as S3 shall act as S1 only when 3rd Relay is used for Normal supply fail annunciation / supervisory contact with either operational TEST / LAMP TEST.

CUSTOMIZED SEQUENCE: Manual-Reset Sequence (S1) with Lamp Test

Sr. No.	Conditions	Visual Window Display	Relay1 (for Group1 Faults) (Note 1)	Relay2 (for Group2 Faults) (Note 2)	NOTES:
1.	Normal Condition (No Fault)	OFF	OFF	OFF	**Note 1:** Corresponding to Relay1, Relay2 & Relay3 ON/OFF Condition, the I1–C1,I2–C2 & I3–C3 contacts are close/open respectively.
2.	Fault Abnormal (Group 1 Fault)	Fast Flashing	ON	OFF	**Note 2:** Relay3–Normal Supply Fail Relay (Relay3 will act according to Normal Supply Fail Fault F1 Only)
3.	Accept while Abnormal / Normal	Steady ON	OFF	OFF	
4.	Reset while Normal	OFF	OFF	OFF	
5.	Normal Condition (No Fault)	OFF	OFF	OFF	**Note 3:** Test Push Button Operation –For Lamp Test Only.
6.	Fault Abnormal (Group 2 Fault)	Fast Flashing	OFF	ON	**Note 4:** Mute Push Button Operation- Relay1, Relay2 & Relay3 gets OFF when Mute Key is pressed.
7.	Accept while Abnormal / Normal	Steady ON	OFF	OFF	
8.	Reset while Abnormal	Steady ON	OFF	OFF	
9.	Reset while Normal	OFF	OFF	OFF	
10.	Test Key Kept Pressed	Steady ON	OFF	OFF	
11.	Test Key Release	OFF	OFF	OFF	

2.06 System Enclosures

The MBAS 1800 annunciation systems is configured in multiples of three basic ABS moulded enclosures.

Size 2 D   Size 3 D   Size 4 D

Fig.2   **Basic Standard Enclosures**

The Facia section, the 'C' cover side plates and the chassis form the enclosure assembly.

1. The 2D size confirms to DIN standard bezel (144 x 144 mm) and panel cutout (138 x 138 mm).
2. The 3D size confirms to DIN standard bezel (216 x 144 mm) and panel cutout (210 x 138 mm).
3. The 4D size confirms to DIN standard bezel (288 x 144 mm) and panel cutout (282 x 138 mm).

Individual Facia modules (2D size for multipoint alarm systems also conform to DIN standard bezel (144 x 144 mm) and panel cutout (138 x138).
The terminal block and the DIP Micro Switches are located at the rear of **MBAS 1800.**

2.07 Scope of supply

Minilec offers to supply its micro controller based Annunciation system MBAS 1800 as an isolated system to be installed in a suitable control cubicle.

Minilec's scope of supply is limited to following:

1. MBAS 1800 Standard annunciator module.
2. Built in Power supply block as per Purchase Order specifications. (either AC or DC)
3. Push Button capsules as built-in or external.
4. As per 'B' or 'S' size window order, LED's are mounted on single common PCB in 2D or 3D or 4D Facia Units as per the ordered configuration. (The window size configuration is coded in the model code number.)

Following mandatory accessories are also supplied with MBAS 1800

1. 2 Nos. mounting clamps for every 2D & 3D Box. 4 Nos. mounting clamps for 4D box.
2. User's manual (may be supplied with consignment or will be sent to the user/buyer separately.)

2.08 Optional Accessories

Following optional accessories will be supplied only if these are ordered by buyer as additional facilities:
1. Industrial diaphragm type AC or DC Powered Hooter (Audible Device).
2. Electronic (Tone controlled) type AC or DC Powered Hooter (Audible Device).
3. External NO type Push Buttons (4 Nos. = 1 set).
4. Field Contact follower outputs or Ext. repeat relay cards with prefab connection cables. (Min. cable length = 1.5 Mtr.)
5. Ringback sequence with 3rd relay output for Ringback hooter.
6. Noise suppressing NETWORK (RRC N/W) supplied with the annunciators to be wired across the inductive load of the audible device. (If ordered)
7. Supply fail annunciation
8. Supervisory relay contact
9. RS485 with MODBUS communication
10. Manned / Unmanned feature

2.09 List of Spares (Recommended)
1. Pre-programmed Microcontroller chip.
2. CPU Card.
3. Power Supply Card.
4. LED Board (Single common PCB).
5. 'S' size window acrylic & diffuser.
6. 'B' size window acrylic & diffuser.
7. Push Buttons Capsule.
8. Repeat Relay Cards.
9. Repeat Relay Card interconnection prefabricated connection cable assembly.

2.10 Technical Specifications

1.	Supply Voltage	90-270 V AC/DC
2.	Supply Frequency(for AC)	50 Hz/60 Hz +/- 3%
3.	Windows 2D	16 Small (Max)
	3D	24 Small (Max) or 12 Big (Max)
	4D	32 Small (Max) or 16 Big (Max)
4.	Display (Window)	Window Acrylic replaceable Legends replaceable
5.	Window Dimensions	
	Small 'S'	31.5 x 30.2mm
	Big 'B'	66.2 x 30.2mm

6. Unit Dimensions

	Overall	Cutout
2D	144 x 144 x 215 mm	138 x 138 mm +1/-0mm
3D	144 x 216 x 215 mm	138 x 210 mm +1/-0mm
4D	144 x 288 x 215 mm	138 x 282 mm +1/-0mm

7.	Weight	
	2D	1000gm
	3D	1400gm
	4D	1600gm
8.	Power Consumption	0.5Watt / window
9.	Flash Rate	50-60 Flash / Min. in fast flash 20-30 Flash / Min. in slow flash
10.	Legends	Legend plate with inscriptions
11.	Operating Sequence	S1, S2, S3, S4 (Fixed or Site Selectable
12	Optional Features	Any other operating squence Supply fail annunciation Repeat Relay Cards Supervisory relay contact Manned/Unmaned Rs485 withMODBUS communication
13.	Input Signal (For Faults)	110 VDC/220 VDC/48 VDC/24 VDC +/-20% contact NO type or NC type as per selection/factory set
14.	Input Interrogation Voltage (For keys)	+ 12 V DC
15.	LED Colour in windows	Red, Green, Yellow (Amber), White or combination
16.	Output	Two opto isolated Electro-magnetic relay for hooter are provided. Third Relay contact (Optional): 3rd Optional relay can be used as (a) Ringback relay when RLY1 & RLY2 used for grouping (b) Supervisory Relay (c) Supply fail annunciation.
17.	Output Contact rating	5A, 240 V AC (Resistive)
18.	Operating Temperature	0^0C to 60^0C
19.	Storage Temperature	-10^0C to 70^0C
20.	Humidity	Upto 95% Rh
21.	Push Buttons Capsule	4 Nos. membrane type (Optional) 4 Nos. Tact key type (Optional)
22.	Enclosure	ABS type moulded enclosure

3.00 Installation Instructions

3.01 Check list of supply

Check whether following essential items are delivered with your MBAS 1800 annunciator packing box and unit of MBAS 1800 for any physical damage.
MBAS 1800 annunciator module (2D, 3D or 4D enclosure) as per order and dispatch documents.

■ 2 Mounting clamps for 3D
■ 2 mounting clamps for each 2D size unit/4 Mounting clamps 4D .
■ Noise suppressing Network (RRC N/W) if ordered·
■ Window inscription photo, (If required) film.
■ Other optional accessories if ordered . (The Hooter, external push-buttons, cover plate etc.)
■ Verify ordered specifications like number of windows, number of 'B' & 'S' size windows as coded in the model code are incorporated, Input Supply Voltage etc.

3.02 Pre-Installation Checks
i)   List the ordered features like —
■ Normal supply voltage.
■ Window size combinations.
■ Number of windows .
■ Number of coloured windows .
■ Operating Sequence Fixed or site selectable.
■ Number of repeat relays.
■ NO/NC fault selection & Grouping site selectable .
■ Legends
■ Fault input voltage

ii)   Connect specified normal power supply voltage to your MBAS 1800 and wait. The 'Self-Surveillance' watch-dog LED will switch 'ON' and start flashing. This indicates your MBAS 1800 logic circuit is operating perfectly as designed.

iii) Below listed test sequence is with a presumption of 'MANUAL RESET(S1)' operating sequence with operational TEST and NO type fault contacts as inputs, with MBAS1800 in MANNED mode operation.
If 'Push buttons Capsule' is provided as builtin then
a)   Press' TEST 'push-button. All windows will flash.
b)   Check the output hooter relay RLY1 & RLY 2 are energized and contact (I1),(C1) & (I2),(C2) are closed.
c)   Press 'MUTE' Push Button Output hooter relay will be de-energize and contacts (I1) & (C1) & (I2) (C2)   will open.
d)   Press 'ACCEPT' Push button. All windows should stop flashing and glow steady.
e)   Press 'RESET' Push button to clear all windows. For testing other operating sequence refer sequence chart. Note: (if push button capsule is not provided built-in, then connect external 'NO' type push buttons to test the functioning of your MBAS 1800 module, as detailed above.)
iv) Below listed test sequence is with a presumption of ' Manual-Reset Sequence (S1) with Lamp Test' operating sequence and NO type fault contacts as inputs, with MBAS 1800 in MANNEND mode operation.
a) Press & hold 'TEST' button, then all window LEDs will steady ON. After releasing the 'TEST' button all window LEDs will gets OFF.
b) Connect all Fault Potential Inputs and relay outputs as per Fig .9 External Terminal Connection Diagram for Annunciator.
c) Now check the unit with "Manual Reset (S1) with Lamp Test" operating sequence & NO Type Fault Contacts as inputs by giving Potential Input (with -Ve common) to faults. If 'Push Buttons Capsule' is provided as inbuilt then if Test Key is pressed, all windows are ON & when Test Key is released previous status will be shown on windows.
d) Repeat Relays- Check whether the Repeat Relay output contacts at terminals are actuating on initiating respective Fault Inputs by connecting through provided FRC Cable.
e) Check Relay 1 & Relay 2 actions according to Grouping Selection. i.e. Relay 1 will energize for GROUP 1 Faults & Relay 2 will energize for GROUP 2 Faults. Also Relay 3 will act according to Normal Supply Fail Fault F1 Only
f) 'MUTE' push button can be operated directly to silence the audible alarm.
g) 'ACCEPT' push button can be operated directly to acknowledge the fault & silence the audible alarm.
h) All the above test will ensure that your MBAS 1800 annunciators are delivered perfectly as per ordered specifications.

NOTE : If push button capsule is not inbuilt, then give Test, Mute, Accept, Reset signals by external 'NO' type switches / push buttons.

v) By giving potential input (with -ve common) to actuate individual fault input and operate, MUTE, ACCEPT & RESET push-buttons sequentially.
a)   If repeat Relays are provided, check whether the repeat relay output contacts at terminals FR & FRC actuate on initiating respective fault inputs.
b)   If ringback sequence is used then on fault actuation hooter contacts of RLY 1 or RLY 2 will energize and (I1 & C1 or I2 & C2 will close). On fault normalization before or after ACCEPT command the Ringback Hooter Relay RLY 3 will energize with slow flashing window. (Refer fig. 15)
c)   If grouping facility is provided (Refer fig. 5)
       RLY 1 will energize for GROUP 1 faults.
       RLY 2 will energize for GROUP 2 faults.
d)   For 'MANNED' or 'UNMANNED' mode of operation connect externally Double   Pole   Single Throw   Switch as shown in fig.11 of this user's manual. Remove the shortlinks provided at these terminals of MBAS 1800.
e)   Supply Fail Annunciation. (Refer fig. 12)

NOTE : Ring Back Sequence facility and grouping facility provided simultaneously in the same MBAS 1800 module.
vi) Check all the individual MBAS 1800 modules as instructed above. Check for configuration of multiple modules of MBAS 1800 as follows:
a)   Connect Hooter contacts (I1) & (C1) of all the MBAS 1800 in parallel for driving one common audible hooter for a given combination of basic MBAS 1800   modules. Connect the RRC network across Hooter Coils. This RRC Network is supplied assuming that supply voltage of Annunciator   and Hooter is same. If Hooter is of different supply voltage then do not connect RRC Network and please ask for RRC Network suitable for hooter coil voltage supply. (Refer fig. 14)
b)   Similarly connect Push Button terminals TPB, MPB, APB, RPB & (C) of all MBAS 1800 modules in parallel to connect one common set of NO Push Buttons. (Refer fig. 13)

'ACCEPT' push button can be operated directly to acknowledge the faults and silence the audible alarm.

All above test will ensure that your MBAS 1800 annunciators are delivered perfectly as per ordered specifications.

3.03 Installation
Install the MBAS 1800 Annunciator modules in designed panel cutout, inserting from front of panel. Before installation please ensure that in the vicinity of MBAS 1800 there are no equipments / systems generating heat, vibration, noise, RF signals etc.

3.04 Mounting
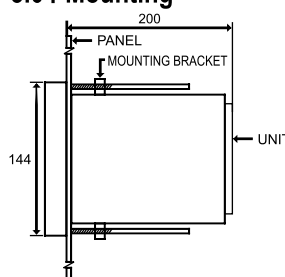
For fixing, use the mounting brackets supplied with the Annunciator, Tighten suitably so that it does not move or get loose.

Fig 3 Front Panel Mounting

3.05 External Electrical Cable Connections
(Refer Ch.6 of this user's manual)
Connect various fault contact cable (2.5 sq.mm max.) with pin lugs to the fault inputs at terminals with respective labels. Please ensure that these are Potential input(110VDC/220VDC/48VDC/24VDC) contacts which carry voltage from source end. (CAUTION: The fault potential input is High DC voltage so take care during connection, and testing the unit connect Hooter(s) along with RRC Network.

Wherever external repeat relay cards are supplied use prefabricated cables for interconnection between the main annunciator unit & the relay card. Secure male-female connectors tightly. Each repeat card have maximum 16 relays.

3.06 Window Legends
For inserting legends or window inscriptions please refer ch.4 of this user manual. Insert the inscribed label at the back of the opaque diffusing plate fitted to the window acrylic lens. The inscription label is sandwiched between the acrylic lens and diffusing plate.

3.07 Trip & Non-Trip Group Selection
DIP micro switches (1 to 32 max.) are located at the rear side of MBAS 1800. Select the grouping of window by setting the respective microswitch to ON or OFF position. This facility is provided as site selectable if NO or NC fault configuration is pre-programmed (factory set) or vice versa. (Refer fig. 5)

3.08 Sequence Selection
DIP micro switches (No. 1 to 4) are provided at the rear side of MBAS 1800 module. Please select any one sequence at a time by changing the switch position. This facility is given if ordered otherwise fixed sequence is given as per requirement. (Refer fig. 5)

3.09 NO/NC Configuration Selection
DIP micro switches (No.1 to 32 max) are located at the rear side of MBAS 1800. Select the switch position to OFF or ON for every individual fault signal as required for NO or NC type fault contact respectively. This facility is provided as site selectable with grouping of faults as pre-programmed (factory set) whenever required. (Refer fig. 5)

3.10 Post Installation Checks
Before connecting power supply, please check all wiring terminals for correctness. Please ensure power supply voltage is same as that of mentioned on MBAS 1800 unit. The fault potential input is High DC Voltage. So be cautious.

3.11 Testing & Commissioning
Connect power supply and test for operation of MBAS 1800 as per Testing Flow Chart given in clause 5.02 of ch.5

3.12 Precautions
Please ensure that power supply to MBAS 1800 is stable and free from spikes and surges. Please ensure that fault contact cabling does not pick up RF signals. Please ensure that there is no heat generating and vibration near to the MBAS 1800 installation.

4.00 Maintenance Instructions

Instructions for removing and fitting of the front Acrylic for changing the Legends of MBAS 1800.
In case of changing the Legends, release top black locking knob of front black window frame by pulling up top black cover with the help of screwdriver. Hold the front black window frame at bottom and pull out gently.
Hold the black window frame keeping Acrylic plate side at bottom and window reflector capsule side on the top. Pull up the window reflector capsule. In case of small window facia, pull out window reflector capsule without touching separator between two windows. Keep both the thumbs at center of the diffuser plate from back side and press downward. Then front Acrylic plate also will come out with Legend.
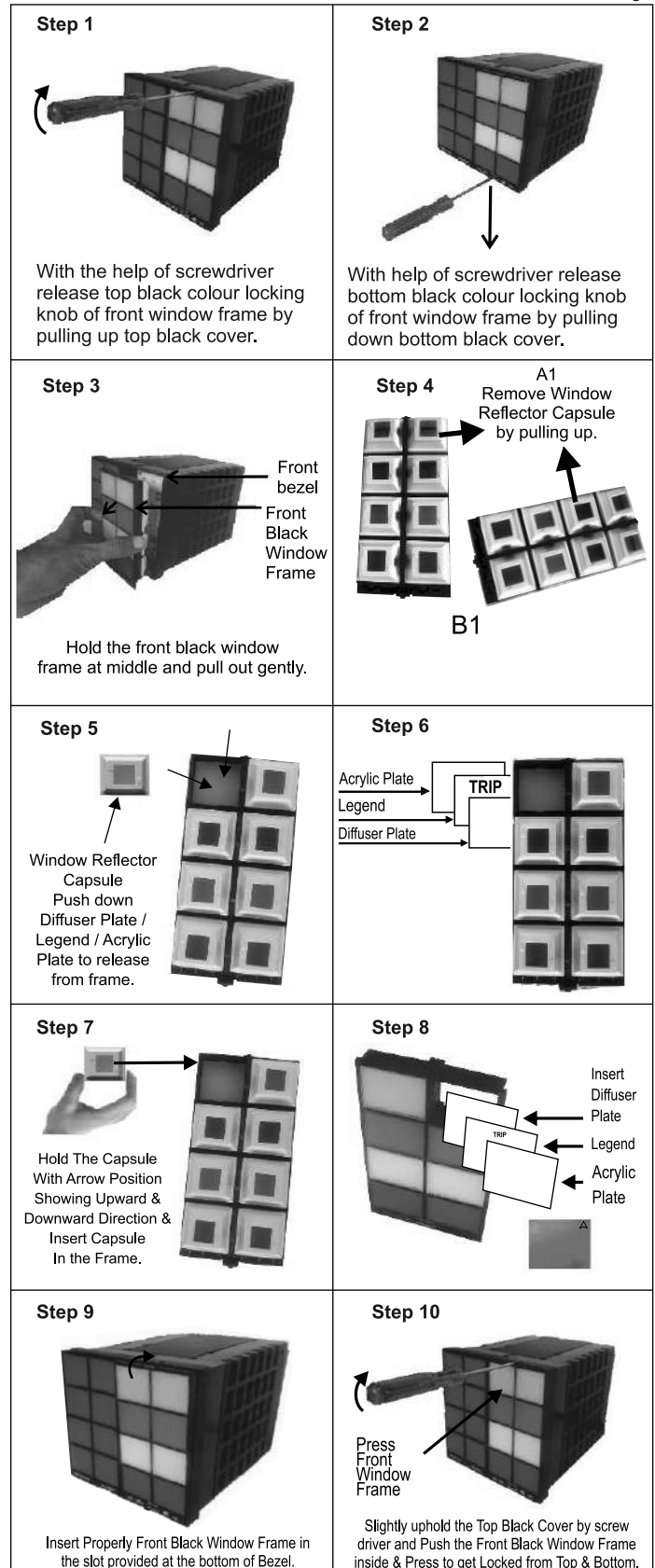
For refitting
1. Insert the window reflector capsule in the respective slot from top and press it.
2. Locate the cutout slot provided on the front side of the front window frame for holding diffuser plate. Insert the diffuser plate in a slot, keeping plain surface on the front and surface provided with cutout edges on the back side.
3. Put the Legend on top plain surface of the diffuser plate.
4. Insert front Acrylic plate keeping textured finished side on the front and plain surface on back side having cutout edges with small additional locking edges on each side of the plate. Match the cutout edges and press it from all side. The plate gets refitted with locking sound.

5. Always ensure proper insertion and refitting of Acrylic plate.
After fitting of diffuser plate, Legends, Acrylic plate and window reflector capsule, insert the front black window frame in the slot provided in the annunciator front bezel, match the locking knob and push button position at bottom of the front black window frame. Then slightly uphold the top black cover by screwdriver and push the front black window frame inside, so that front black window frame gets locked from top and bottom.

Also, for easiness the steps are shown in sketches below.

Fig.4

Step 1
With the help of screwdriver release top black colour locking knob of front window frame by pulling up top black cover.

Step 2
With help of screwdriver release bottom black colour locking knob of front window frame by pulling down bottom black cover.

Step 3
Front bezel
Front Black Window Frame
Hold the front black window frame at middle and pull out gently.

Step 4
A1
Remove Window Reflector Capsule by pulling up.
B1

Step 5
Window Reflector Capsule Push down Diffuser Plate / Legend / Acrylic Plate to release from frame.

Step 6
Acrylic Plate
Legend
Diffuser Plate
TRIP

Step 7
Hold The Capsule With Arrow Position Showing Upward & Downward Direction & Insert Capsule In the Frame.

Step 8
Insert Diffuser Plate
Legend
Acrylic Plate
TRIP

Step 9
Insert Properly Front Black Window Frame in the slot provided at the bottom of Bezel.

Step 10
Press Front Window Frame
Slightly uphold the Top Black Cover by screw driver and Push the Front Black Window Frame inside & Press to get Locked from Top & Bottom.

5.00 Drawings / illustrations

5.01 DIP Switch Settings
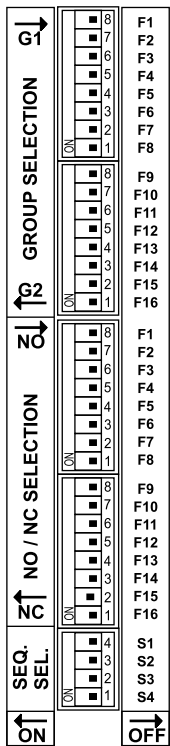
SEQUENCE SELECTION :-
To select any one sequence from S1,S2,S3,S4 keep corresponding switch in 'ON' position.

S1 ON	Manual Reset
S2 ON	Auto Reset
S3 ON	Ring Back
S4 ON	First Up

NO-NC SELECTION :-
To select type of fault contacts for particular Fault Input. Put corresponding fault switch in 'NO-NC Selection' switch at NO or NC position.

GROUP SELECTION :-To select group 1 & group 2 for particular Fault Input. Put corresponding Fault switch (F1 through F16) in 'G1' or 'G2' position.

Note: Diagram shows max. 16 Faults. For 24 Faults there will be addition of DIP switches

Fig.5 : DIP Switch Settings
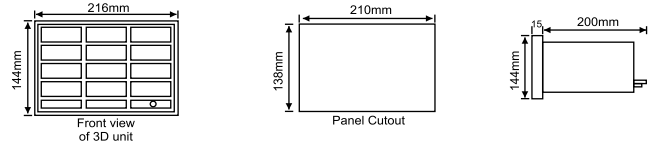
5.02 Testing flow chart
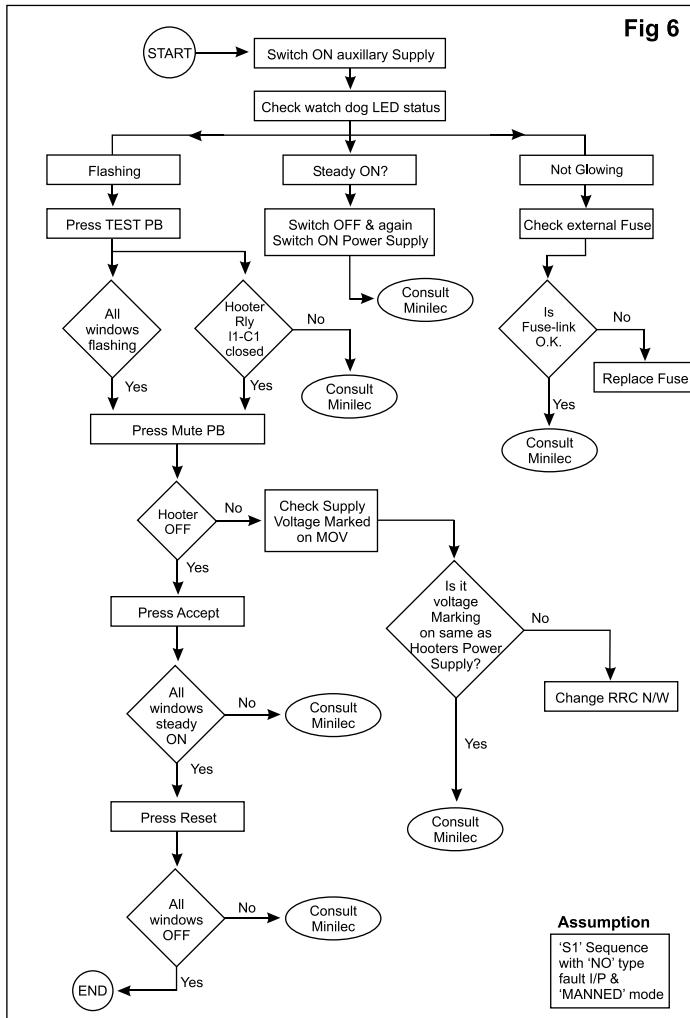
Fig 6

5.03 Functional Block Diagram
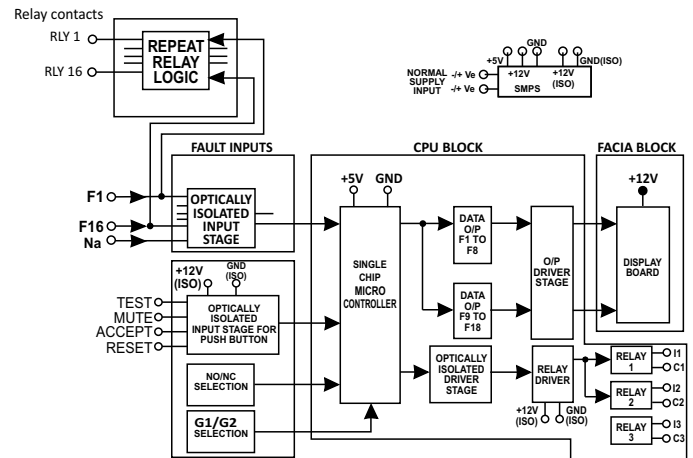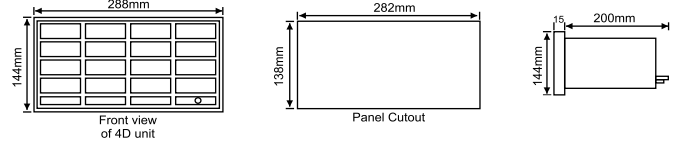

Fig 7

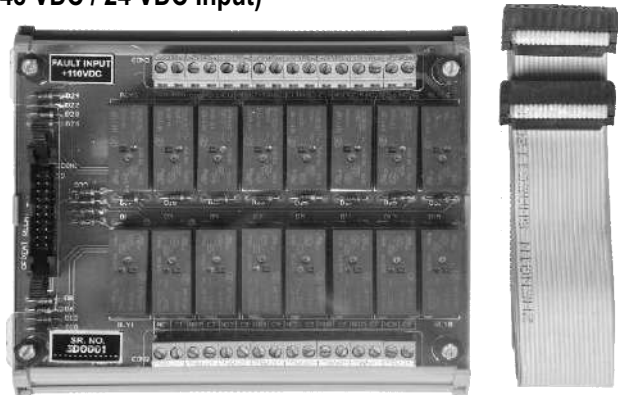### 5.04 Dimensional & Panel Cutout Details

Drawing of 2D Model

Front view of 2D unit — 144mm / 144mm
Panel Cutout — 138mm / 138mm
200mm / 144mm / 15

Drawing of 3D Model

Front view of 3D unit — 216mm / 144mm
Panel Cutout — 210mm / 138mm
200mm / 144mm / 15

Drawing of 4D Model

Front view of 4D unit — 288mm / 144mm
Panel Cutout — 282mm / 138mm
200mm / 144mm / 15
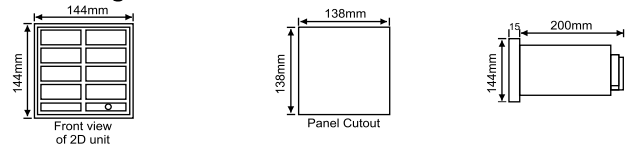
Repeat Relay Unit (For Fault Potential 110 VDC / 220 VDC / 48 VDC / 24 VDC Input)

Technical Specifications

1. Output Contacts	1NO type (16 No. Max)
2. Output Contact Rating	5Amp, 240 VAC (Resistive).
3. Connection between Main Unit & Repeat Relay Unit	Through FRC Cable having Input signal 110 VDC/220 VDC/ 48 VDC/24 VDC (Length = 1.5 Meter)
4. Mounting	35 mm DIN Rail
5. Overall Dimensions	144 x 125 x 65 mm (L x W x H)
6. Weight (Approx.)	525gms.

5.05 3D View of various models with different window sizes with/without push buttons block

22B10SP0

20B16SMP0
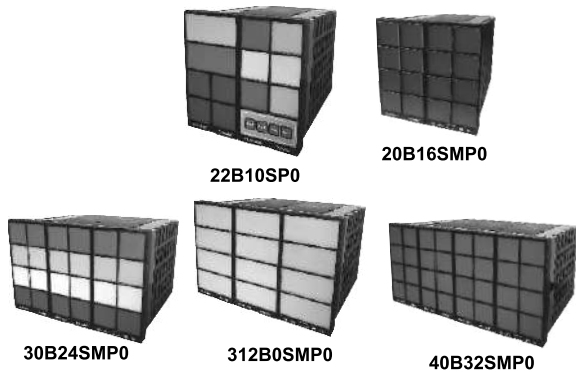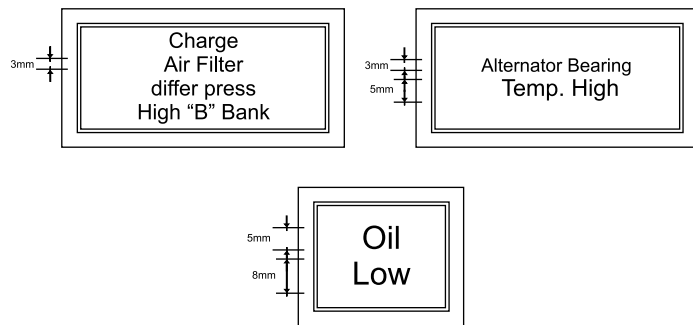
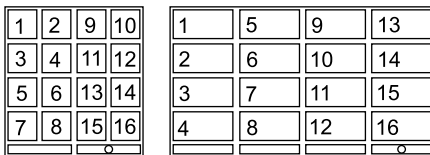30B24SMP0   312B0SMP0   40B32SMP0

Fig 8

5.06 Legends Letter Sizes

MBAS 1800 facia incorporates legend plates which are individually accessible from the front of the unit. General guidelines for selection of letter sizes & number of lines per window are -

LETTER SIZE IN mm	NO. OF LINE PER WINDOW	NO. OF LETTERS PER LINE	
		Small windows	Big windows
3	4	9	19
5	3	5	11
8	2	3	5
10	2	3	7

3mm

```
Charge
Air Filter
differ press
High "B" Bank
```

3mm
5mm

```
Alternator Bearing
Temp. High
```

5mm
8mm

```
Oil
Low
```

5.07 Window Numbering System

1	2	9	10
3	4	11	12
5	6	13	14
7	8	15	16

1	5	9	13
2	6	10	14
3	7	11	15
4	8	12	16

A) 16pt. Small Window configuration

B) 16pt. Big Window configuration

The numbering system is shown for 16pt. models (small & big) for reference. All other models can be referred from this fig.

6.00 Connection Diagram

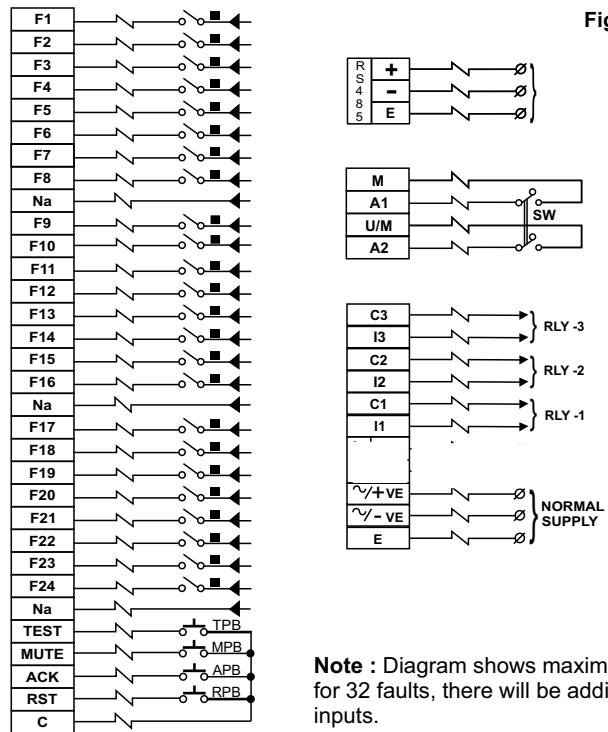### 6.01 Fault Inputs connection Diagram

Fig. 9

Note : Diagram shows maximum 24 faults, for 32 faults, there will be addition of fault inputs.

NOTES -

1   ■ - EXTERNAL POTENTIAL FAULT CONTACTS.
2   F- FAULT INPUT CONTACT
3   Na - COMMON POINT FOR FAULTS INPUT CONTACTS(-Ve)
4   C- COMMON POINT FOR PUSH BUTTON CONTACT.
5   TPB - TEST PUSH BUTTON
6   MPB - MUTE PUSH BUTTON
7   APB - ACKNOWLEDGE PUSH BUTTON
8   RPB - RESET PUSH BUTTON
9   RLY-1 - NORMAL HOOTER CONTACT/ - GROUP -1 HOOTER CONTACT.
10   RLY-2 - NORMAL HOOTER CONTACT/GROUP - 2 HOOTER CONTACT.
11   RLY -3 - Optional Relay
        A) Ringback hooter Relay with grouping facility or
        B) Supervisory Relay or
        C) Normal supply fail Relay or
        D) Any other function (optional).
12   Connect RRC network across hooter coil if ordered.
13   This is diagram for maximum fault inputs Fn, n=24.

External Terminal connection diagram for max. 24 Point MBAS 1800

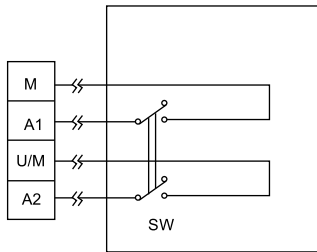### 6.02 Stand by Power Source Connection

Fig.10
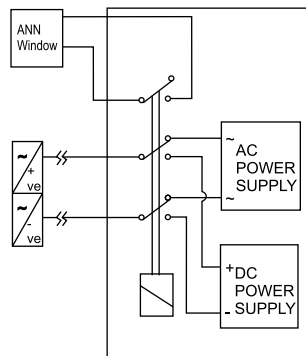
Changeover relay assembly effecting switch over to standby Power Source is external to the annunciator.

| Normal supply Voltage	Standby Supply Voltage
90-270 V AC/DC	220 V DC/110V DC 230 V AC/110 V AC, 50 Hz.

6.03 Manned 0r Unmanned Mode

Fig.11

Connect external (shown in the Box) double pole single throw switch (DPST) to enable you to select the MBAS 1800 annunciator in either MANNED mode or UNMANNED mode of operation.

SW SWITCH POSITION	CLOSED	OPEN
	○—⊣⊢—○	○—⊣ ⊢—○
MODE OF POSITION	MANNED MODE	UNMANNED MODE

6.04 External connection diagram for supply fail annunciation function

Fig.12

[Applicable for:- a) Any type of same normal voltage & standby voltage OR b) Different normal voltage & standby voltage within the range of 90V to 270V AC/DC]
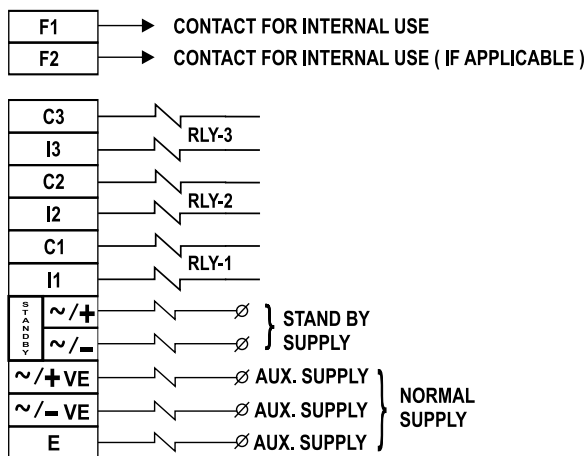
NOTES -
1) F1 contact is for internal use only. Do not connect anything to it.
   i.e. It is for normal supply fail annunciation.
2) F2 - stand by supply fail annunciation, it is for internal use only (if applicable).
3) Connect external connections as per terminal provided on unit.
4) Rly-1 and Rly-2 are provided.
5) Rly-3 will operate only when normal supply is absent.
6) Connect supplied network across hooter coil if it is ordered. Hooter supply is same as aux. Supply of annunciator.
7) RRC N/W - RRC network.
8) Keep DIP switch F1 of NO / NC selection at NC position.
9) Keep DIP switch F2 of NO / NC selection at NC position (if applicable).
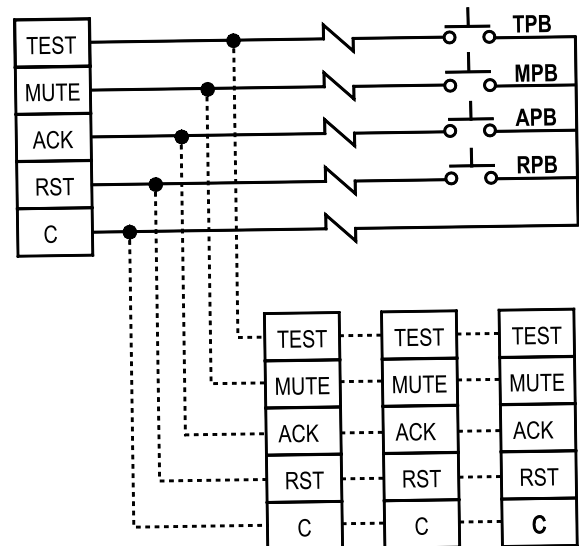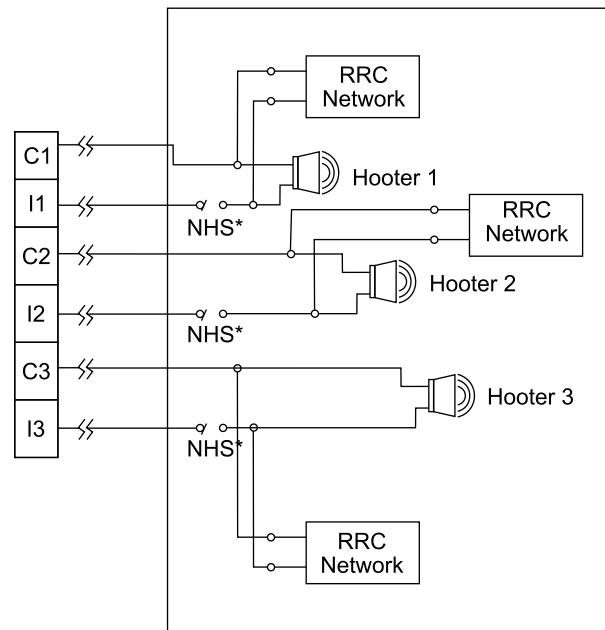
6.05 Push Buttons

Fig. 13 Common External Push Button Connection diagram

NOTE:
External Potential NO type Push Buttons. Wherever multiple units (modules) are used together for multipoint windows, the same set of push button should be connected in parallel as shown above.

## 6.06 Hooter Relay Contact Connections, with RRC Network.

✱ NHS = Normal Hooter Supply

Fig. 14
Common Hooter Relay connection diagram

- Hooter 1, Hooter 2 & Hooter 3 shown inside the box are external to the annunciator module.
- RLY1 & RLY2 are universally provided with every MBAS 1800 annunciator module. RLY3 is optionally provided on request during the following requirements:
  a) When Ring Back alarm sequence is asked for.
  b) When Trip and Non trip grouping of inputs faults is asked for.
  c) When normal supply fail annunciation is asked for
  d) When supervisory contact is asked for.
- RRC Network will be supplied only if these are ordered by party. It is designed for normal power supply voltage of Hooter coil (load).

- RRC Network used for noise suppression.
- Presumption
- Normal supply voltage of MBAS 1800 and Hooter coil supply voltage are same.
- When more annunciator modules are used togather, for multiple window configuration, consult Minilec while ordering or before delivery to enable correct supply of the network RRC or one common audible device (Hooter).
- Connect RRC Network across the hooter coil, if it is ordered.

6.07 Parallel Connections for more than one Annunciation Units.
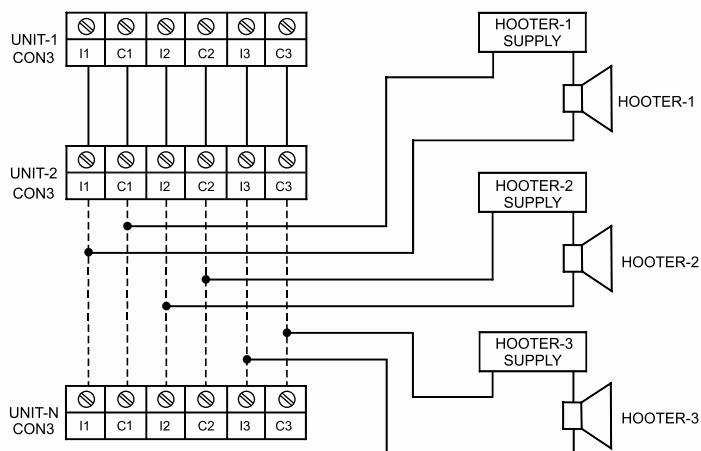
NOTE : UNIT -1, UNIT -2 UPTO UNIT - N ARE CONNECTOR STRIP
FOR ANY MBAS 1800.

Fig. 15

- Please use shielded twisted pair cable with characteristic impedance 120 Ω to RS485 side.
- The distance up to 1 km.
- Please connect RS485 (+,- & E) of Master device to corresponding RS485 (+,- & E) of annunciator via shielded twisted pair cable
- Party can test this Unit's communication by testing with Third Party Testing Software Tool (if required)

7.01 HARD WIRE FAULTS

SPECIFICATIONS OF SERIAL COMMUNICATION PROTOCOL

ANNUNCIATOR IS ALWAYS A SLAVE DEVICE.

MODE   : MODBUS RTU
DEVICE ID   : Site Selectable as per Device ID Selection Chart.
No. OF POINTS : Up to 32 Points.

Serial Communication Parameters (Fixed) :

1. Baud Rate   : 9600
2. Data Bits   : 8
3. Parity   : None
4. Stop Bit   : 1
5. Error Check Method : CRC.

- **Query Format** (Send by Master Device to Slave Device) :

Field Name	No. of Characters
Device ID	01
Function Code	01
Starting Address	02
No. of Points	02
CRC	02

- **Response Format** (Send by Slave Device to Master Device) :

Field Name	No. of Characters
Device ID	01
Function Code	01
Byte Count	01
Data *	YY
CRC	02

* - No. of characters of data for 8 Points / 16 Points / 24 Points / 32 Points is 01 / 02 / 03 / 04 respectively

- **Exception Response Format** (Send by Slave Device to Master Device) :

Field Name	No. of Characters
Device ID	01
Function Code	01
Error Number	01
CRC	02

Example : 1. To read fault status from Annunciator, having Device ID = 10 (Device ID should be sent in HEX form. i.e. 0Ah in this case. Device ID can be decided from Device ID selection chart which is given onwards.), Master has to send the following query :

Field Name	Hex Code
Device ID	0A
Function Code	02
Starting Address Hi	00
Starting Address Lo	00
No. of Point Hi	00
No. of Point Lo *	18
	CRC

* **-** Hex code for 8 Points = 08h, 16 Points = 10h, 24 Points = 18h & 32 Points = 20h.

2. In response of above query, Annunciator will send following response code :

Field Name	Hex Code
Device ID	0A
Function Code	02
Byte Count **	03
Data Byte 1 (Fault Status of Fault 8 to 1) **	XX
Data Byte 2 (Fault Status of Fault 16 to 9) **	XX
Data Byte 3 (Fault Status of Fault 24 to 17) **	XX
Data Byte 4 (Fault Status of Fault 32 to 25) **	XX
CRC Lo	
CRC Hi	

** **-** As per the " No. of Point Lo " : 08h / 10h / 18h / 20h in query, the Byte Count is 01h / 02h / 03h / 04h & Data Byte can be Data Byte 1 / Data Byte 1,2 / Data Byte 1,2 & 3 / Data Byte 1, 2, 3 & 4 respectively.

The significance of the bit in the data bits of the Data Byte 1 for above example is shown below :

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Status of Fault 8	Status of Fault 7	Status of Fault 6	Status of Fault 5	Status of Fault 4	Status of Fault 3	Status of Fault 2	Status of Fault 1

If Bit 0 of Data Byte 1 = 0, It means Fault 1 is absent.
If Bit 0 of Data Byte 1 = 1, It means Fault 1 is present.

3. In case of error in query, Slave Device will send following exception response code :

■ **Exception Response Format :**

Parameter	Hex Code
Device ID	0A
Function Code	82
Error Number	ZZ
CRC Lo	
CRC Hi	

Note : Function Code = 82h ,only in case of Error Number 02 & Error Number 03.
ZZ = Error Number
Error Number 01 : Invalid Function Code.
Error Number 02 : Invalid Data Address.
Error Number 03 : Invalid selection of Point Code.

7.02 DEVICE ID Selection Chart :

Sr. No.	P8	P7	P6	P5	P4	DEVICE ID (Decimal)
1.	0	0	0	0	0	1
2.	0	0	0	0	1	1
3.	0	0	0	1	0	2
4.	0	0	0	1	1	3
5.	0	0	1	0	0	4
6.	0	0	1	0	1	5
7.	0	0	1	1	0	6
8.	0	0	1	1	1	7
9.	0	1	0	0	0	8
10.	0	1	0	0	1	9
11.	0	1	0	1	0	10
12.	0	1	0	1	1	11
13.	0	1	1	0	0	12
14.	0	1	1	0	1	13
15.	0	1	1	1	0	14
16.	0	1	1	1	1	15
17.	1	0	0	0	0	16
18.	1	0	0	0	1	17
19.	1	0	0	1	0	18
20.	1	0	0	1	1	19
21.	1	0	1	0	0	20
22.	1	0	1	0	1	21
23.	1	0	1	1	0	22
24.	1	0	1	1	1	23
25.	1	1	0	0	0	24
26.	1	1	0	0	1	25
27.	1	1	0	1	0	26
28.	1	1	0	1	1	27
29.	1	1	1	0	0	28
30.	1	1	1	0	1	29
31.	1	1	1	1	0	30
32.	1	1	1	1	1	31

1 = " DEVICE ID SELECTION " DIP Switch at ON Position.
0 = " DEVICE ID SELECTION " DIP Switch at OFF Position.
In " DEVICE ID SELECTION "DIP Switch : P1 to P3 are don't care.