

## NEB FIRE ALARM SPECIFICATION

### SPECIFICATION



### CONSTRUCTION and GENERAL SPECIFICATION

The NE Series Fire Alarm Control Panels are manufactured to the requirements of BS5839 Pt.4 for use in systems installed to BS5839 Pt.1.

Panels are wall mounted, and are available in four sizes: One / Two Zone(s), One to Four Zones, and an Eleven to Twenty Two Zone.

Construction of the panel enclosure are powder coated on 18 swg mild steel box with right hand hinges \*. The doors are locked with chrome plated cam locks, with the exception of the One / Two Zone which is secured with a 2.5mm socket button screw (Allen Key).

Smoked perspex display window in the door allow the indication to be viewed. The One / Two Zone have the indication protruding through the front, and use milky white LED's that strike coloured. Access to the control switches mounted on the front panel can only be assessed via the "Activate Panel Control" (APC) key switch. These switches are "Reset", "Mute Tone", and "Stop - Resound Sounders". The One / Two Zone have the "Mute Tone" and "Stop - Resound Sounders" combined as one switch. All control panels have a "Total Evacuate" key switch. **NOTE** Both the APC and Evacuate key switches are the same profile.

The Central Panel Unit (CPU) PCB carries the complete modular electronic assemblies. The indication PCB is connected to the CPU via a 14 way ribbon cable harness.

The panes are surface mounted direct to the wall via three stand - off mounting holes, with a centre top fixing and two bottom fixings. Cable entry to the panels is through 20mm knockouts on the top of the panel and / or through a letter Box cut out in the back of the panel 50mm x 75mm \*. All the terminal blocks will accept up to one 2.5mm cable per way.

Input supply is 230 Volts A.C 50 / 60 Hz +/- 5%. See *System Design* No. 6 (any other input are available to special order). The panel is protected by a 20mm x 5mm tube fuse, located in a fuse carrier on the right of the mains input terminals, (finger release enclosed type), directly below the Transformer \*. Twin green LED's are constantly illuminated as long as the A.C. supply is maintained.

Power supply / battery charger is a nominal 24 Volt D.C at 1.5 Amps as standard, larger supplies are available to special order. The charger output is a series constant voltage regulator, adjusted to 27.8 Volts to float charge Sealed Lead Acid (S.L.A.) battery cells. This voltage is set by RV1 (anti - clockwise to increase) and measured at the battery output terminals with the batteries disconnected. This output is protected by a 20mm x 5mm glass fuse rated at 2 Amp \*, located directly above the battery output terminals. The supply is fully monitored for charger output failure, Fuse failure, mains failure and battery disconnection. Should any of these conditions occur, the amber "Supply Fault" single LED on the CPU and the twin amber "Common Fault" LED's on the indicator card, will illuminate and the

internal tone will sound. Ensure that the batteries are connected in the correct polarity (red to +ve and black to -ve) as the battery input is reversed polarity protected and will blow the battery fuse. See *Calculation* for correct battery capacity.

Detection circuitry for each fire zone is carried on an individual plug in module. (One / Two Zone Panel has the first zone populated directly on the CPU) and operates on an open / short circuit principle, utilising a 3K9 End of Line (E.O.L.) resistor, (must be fitted at the end of the detector fire zone) there must be no spurs but one continuous zone. When an open circuit does occur in the wiring, the "Common Fault" LED's and also the single amber LED on the Zone module (s/c) illuminates. When a short circuit occur in the wiring, the "Common Fault" LED's and also the single white (strikes amber) LED on the Zone module (s/c) illuminates. There is a single LED on each Fire Zone module to indicate which is at fault. Whenever this occurs the internal tone will also sound.

Each Fire zone will support a quiescent detector load of up to 1.5mA, which represents approximately (50 in theory) twenty (practical size) detectors. Ionisation, optical and electronic heat type detectors may be mixed. There is no limit to the number of control closure devices, such as manual call points, bi - metal and heat detectors (NON ELECTRONIC), that can be used, as these devices draw no current in the normal condition. All Short circuit devices must have a minimum of 470 ohm and a maximum of 820 ohm resistor in series with one terminal. Manual and automatic devices may NOT be mixed in any order on a Fire Zone (see BS5839 Pt.1 (6.6.2)). See *System Design* No.2,3 & 4. The cable length of each zone is only restricted by the fact that its resistance must not exceed 25 ohms per zone.

Should an alarm condition be initiated by any smoke, heat and / or manual call point, the zone module will illuminate by latching on, (even if the device is a resettable type) and will illuminate the twin red "Fire" LED's and trigger the two alarm sounder outputs. The Fire Zone can only be "Reset" when the initiating condition has been rectified or removed. Remember that the "Reset" is only accessible when the APC key is operated.

Twin common sounder output circuits are provided, each circuit being protected by a 20mm x 5mm glass fuse rated at 1 Amp each (2 Amp on 16 - 22 zone panels), located one on each side of the sounder output terminals. Each output is monitored for open and / or short circuit in the cabling, utilising a 12K ohm E.O.L. resistor, (must be fitted at the end of the sounder zone) these sounder outputs should be kept separate and there must not be any spurs. See *System Design* No.5.

Any Fire Zone going into alarm, energises these circuit and the sounders may be silenced by operating the "Stop - Resound Sounder". The sounder will stop, but the internal tone will then sound, (the "mute Tone" will have no effect). However by operating the S.R.S button again when in Alarm, the sounders will re - energise.

One set of voltage free, change over contacts, rated at 3 Amp, 24 Volt D.C. are provided which operate, when any Fire Zone is in Alarm. This relay follows the sounder output. (When sounders are on, the relay in operated.)

Terminals are provided for connection to repeater panels, and connection to Extension Units. These output / input allow for Zone Fire, Common Fire, Common Fault, Class Change, Evacuate etc. (contact supplier for more detail).

### SYSTEM WIRING

Detection circuits must be wired in continuous line, without spurs or branches which would cause the monitoring to be ineffective. Smoke and / or heat detectors and / or manual call points are wired in parallel, observing polarity in polarity conscious devices. The detectors can NOT be in any combination or order across the Fire Zone (see BS5839 Pt.1 6.6.2). NB. All Short circuit devices must have a minimum of 470 ohm and a maximum of 820 ohm resistor in series with one terminal. When the Zone is complete the E.O.L. (provided in the fire alarm panel zone terminals) must be connected across the last device in the zone. See *System Design* NO.2, 3, 4, & 7 for type of cable.

The two general sounder circuits must be wired as per the detection zone but kept separate. The two sounder circuits when wired, must be fitted with it's own E.O.L. in the last sounder (provided in the fire alarm panel in the sounder output terminals). If non - polarised sounders / bells are used then a diode must be fitted in series with one terminal in each sounder / bell. Cable size depends on current load and length of run, but should not be less than 1.5mm. See *System Design* No. 5 & 7.

For the mains A.C Supply. See *System Design* No.6.

### PANEL INSTALLATION INSTRUCTION

3 Open the front by unlocking the door using the key provided, (Allen key on One / Two Zone) remove the ribbon cable from the CPU. When the door is at 90 degrees to the back box, the door can be removed by lifting upwards off the pin hinges.

The CPU may be removed if required but is not necessary. Remove required number of knockouts or use the letter box cut out for back entry. Mount box direct to the wall, after marking out and preparing fixing points. Replace door and re - connect ribbon cable observing polarity of plug to socket.

Insert and connect all cables to appropriate terminals in the panel, ensuring correct polarity at all times.

Test the panel prior to connecting any external wiring to ensure that the equipment behaves as expected, and therefore when a fault does occur when external wiring is connected there is a clue to where to look for fault identification.

### COMMISSIONING and TESTING

For testing it is assumed the APC key is active.

4 Place the batteries in the Fire Alarm Panel and connect leads observing polarity, red lead to +ve and black lead to -ve. On connection of the batteries ensure that the "Common Fault" LED's and the "Supply Fault" LED are illuminated, the internal tone will sound intermittently.

Switch on the mains A.C. supply, and ensure that all fault LED's all extinguish (Common and Supply Fault). Check that the green "Supply Healthy" LED's are illuminated, and the internal tone has stopped.

If any of the fault LED's are illuminated (Supply, Bell, O/C or S/C) or any of the Fire Zones LED's) first check the wiring, the E.O.L resistors, the polarity of detectors, sounders etc. before proceeding any further with the commissioning. Check all cables have been laid correctly and are not exposed to mechanical damage. If a break does occur on a detection or sounder circuit, a fault will be indicated on the Fire Alarm CPU, and the tone will sound continually.

Check the operation of each smoke detector, manual call points and heat detectors, on each Fire Zone in turn, ensuring that the correct Fire Zone LED's illuminate and that the sounders operate each time the Fire Zone LED's illuminate. A smoke detector can be triggered by cigarette smoke but a high concentration is necessary as the detectors are set to avoid false alarms.

Check each Fire Zone fault condition by unplugging a smoke detector (See detector removed data sheet) or disconnecting the E.O.L Resistor for O/C, and short the E.O.L. resistor for S/C. The zone fault LED on the zone module will illuminate and the tone will sound, also check that mechanical devices (manual call points and some type of heat detectors) must trigger the fire panel into "FIRE" and not a "FAULT"

Using a convenient manual call point to activate the fire alarm, check the operation of each sounder in turn ensuring the sound output penetrates to every point in the building to meet the require building sound specification. See *System Design* No. 5. After 24 hours to allow the batteries to fully charge, isolate the main's to the fire alarm and repeat the sounder test.

To check the sounder monitoring, ensure there are no fire or fault LED's illuminated. Check one sounder output at a time by disconnecting the sounder cable from the panel, this will cause the sounder O/C LED, to illuminate and the tone to sound, replace the cable and the panel will return to the stand - by state. To check for a short circuit condition, apply a short across the sounder output, the S/C LED will illuminate and the tone will sound, remove the short and the panel will return to the stand - by state. Repeat the above at the E.O.L ensuring the same conditions apply, then repeat all the above for the second sounder output, also check that the "Common Fault" Amber LED's illuminate when ever a CPU fault occur.

Check the battery monitoring by disconnecting the batteries. The supply fault LED and the "Common Fault" LED's are illuminated and the tone sounds. Reconnect batteries. Fail the mains supply and the same indications as for the battery fault will occur, with the exception that the "Supply Healthy" green LED's will extinguish. Restore the mains supply.

Activate the fire alarm panel into a fire state and check all sounders and auxiliary equipment connected to the fire alarm operate correctly, such as door release units and emergency lighting. Activate "Total Evacuate" key switch and check that the sounders, auxiliary equipment etc. operate. **NOTE.** Some auxiliary equipment will only

operate in a Fire condition and not in an Evacuate condition. This information must be noted in the LOG BOOK for reference.

When the Fire Alarm Panel has been tested and commissioned to the building specification, close the door to the panel and secure, turn the APC key and remove. The Fire Alarm Panel should now only have the twin "Supply Healthy" LED's illuminated, and no tone sounding. Fill in the LOG BOOK with all relevant details.

See *System Design* No. 8 & Log Book for Routine testing of System.

#### **SUMMARY OF TECHNICAL SPECIFICATION (Standard)**

##### **5 General :**

The Central Panel Unit (CPU) contains all the electronics to carry out all vital circuit monitoring. The supply is derived from the mains 230 Volts via a transformer, rectifier and series regulator, adjusted to 27.80 volts D.C which is used for the general electronics and power switching. This supply is then further adjusted to 15 volts to power the CMOS logic switching. The CPU contains all the fuses, electronics, connection for the front panel card, connections for the zone cards and termination for all the out going cables : Mains, Batteries, Sounders, Aux. Contacts, Remote Fire Signalling and Detector Fire Zones.

**Power / Charger Supply :** 1.5 Amp stabilised supply with voltage and current limiting, current feedback with thermal shutdown.

**Two Sounder Zones :** Fused at 1 Amp\*, each, reversed voltage monitor at 0.5 mA per zone, and E.O.L. resistor at 12K ohms.

**Aux. Relay :** Volt free, change over contacts rated at 5 Amp. D.C.

**Zone Card :** Zone Current at 6 mA, plug in, stabilised detector output, detector monitoring at 4.5 mA., detector zone current trip at 9 mA (min) - 27 mA (max.)for Fire, 32 mA (max.) short Circuit Current, E.O.L. resistor at 3K9 ohms.

##### **Mechanical :**

**Case :** 18 swg sheet steel, finished in semi - gloss white powder coat with black screened notation, smoked perspex display window, except the One / Two zone that has the indication through the front panel.

**Cable Entry :** 20 mm knockouts on top, 50mm x 75mm letter box cut out for back entry\*.

**Access :** Lockable front door with right hand hinge. Allen key on the One / Two zone. Twin doors opening from the centre (wardrobe style) on 11 - 22 zone.

**Mounting :** Surface wall mounting with three point fixing\* through stand off feet.

##### **Overall Dimensions:**

- 1 - 4 Zones 310mm high, 344mm wide, 110mm deep.
- 5 - 10 Zones 470mm high, 344mm wide, 110mm deep.
- 11 - 22 Zones 470mm high, 685mm wide, 110mm deep.

##### **Electrical :**

**Mains Supply :** 230 Volt A.C. +/- 5%.

**Batteries :** 24 Volt Sealed Lead Acid (S.L.A.).

**Charger Output :** 1.0 Amp at 27.80 V One / Two Zone.  
1.5 Amp at 27.80 Volt 1 - 15 Zone.  
3.0 Amp at 27.80 Volt 16 - 22 Zones.

**Max. Alarm Load :**  
500 mA inductive total sounder output One / Two Zone.  
500 mA inductive per sounder output 1 - 15 Zone.  
1.20 Amp inductive per sounder output 16 - 22 Zone.

##### **Electronics :**

**Front Control :** Reset, Mute Tone, Stop - Resound Sounders \*\* all accessed via the Activate Panel Control key switch, Total Evacuate key switch. (\*\* combined on One / Two Zone.)

**Display Indication :** Supply Healthy - Twin Green LED's, Common Fault - Twin Amber LED's, Fire Zones - Twin Red LED's  
**Internal Indication :** Supply Fault, Bell Fault (open and short circuit), Detector Line Fault (open and short circuit), Each of the faults are a single 5mm LED.

**Fuses :** Mains 1 Amp,\* finger release, covered carrier type. Batteries 2 Amp.\* open carrier type. Two sounder O/P at 1Amp.\* open carrier type. (2 Amp fitted on 16 - 22 zone panels\*\*)

**Monitoring :** Mains failure, Regulator failure, Battery disconnection, Sounder circuits (open & short circuit), CMOS logic supply failure, Detector zone circuits (open & short circuit), Fuse failure.

##### **Calculation :**

**Stand - by Power Consumption :** Mains failed - Twin Common Fault amber LED's illuminated - Supply fault amber LED illuminated - Fault tone on + 0.075 Amps for the Control Panel. Fire Zone Card at 0.006 Amps per zone plugged in. All at 24 Volts D.C..

**Battery Capacity :** (( Equipment Load X Stand - By Duration) plus Bell Ringing Duration) plus 25% = AMPS per Hour.  
Equipment Load in AMPS = 0.075 + (0.006 x number of Fire Zones).

Stand - by Duration in HOURS.  
Bell Ringing Duration (sounder load) in AMPS/AMPS X Hours)

\* = Other arrangements apply to larger control panels and / or special requirements specified.

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