

## IIMP18

# Operating Instructions

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**BALDWIN BOXALL**  
C O M M U N I C A T I O N S

## **IMP18 and BEL1 AMPLIFIER AND LOUDSPEAKER Line Surveillance System**

### **SINEWAVE SURVEILLANCE TONE GENERATOR IMP18**

This unit maybe selected to either 30Hz or 20KHz when installed using the dual in line switches. 30Hz is suitable for systems employing horn loudspeakers or ceiling loudspeakers which have a poor low frequency response. Should speakers of good low frequency response be employed the 30Hz tone could be audible.

#### **Advantages of 30Hz**

1. Less power absorbed by cable as compared to 20KHz.
2. More positive fault detection as breaks in the cable are easier to detect due to lower stray capacitive coupling compared to 20KHz.
3. Most digital meters selected to the AC range will accurately indicate a 30Hz signal.

#### **Disadvantages of using 30Hz**

1. Speakers with a good low frequency response will produce the 30Hz tone.
2. Any harmonic distortion produced by the amplifier may be audible, even when produced using horn loudspeakers.
3. Interrupting the 30Hz surveillance tone will cause a click thus envelope shaping must be employed.

#### **Advantages of 20KHz**

1. Generally inaudible, however some speakers may produce a sub-harmonic i.e. 10KHz.

#### **Disadvantages of 20KHz**

1. High capacitive cable such as PYRO, FP200 etc absorb a lot of power at this frequency.
2. Breaks in cable may be difficult to indicate due to the capacitive coupling between adjacent conductors.
3. Possibility of lines resonating at this frequency and therefore consuming unnecessary power resulting in amplifiers overheating with reduced battery standby time.
4. Some digital multi-meters will not accurately read 20KHz AC.

### **SYSTEM OPERATION**

The surveillance tone is fed to the mixer unit and via the power amplifiers it is transmitted to line. At the end of each line, or at the end of each spur on that line a BEL1 detects this signal and super imposes a DC current with reference to ground. Where there are no spurs on the line the single BEL1 is set to produce 1mA. When there are spurs, the BEL1 units are set to produce a total current of 1mA. Eg If there are two spurs each unit is set for 0.5mA. This current is detected by the IMP18. The constant current source is designed so that if one side of the line becomes disconnected no current flows.

A voltage doubling circuit is incorporated which improves the overall system sensitivity, and care must be taken as high voltages may exist. The recommended surveillance tone level is 10 Volts but detection is not affected when higher speech or music signals are present. The DC line current produced by the BEL1 is extracted by the centre tap of the amplifier's output transformer, which is fed to the input of the IMP18. This input is terminated with a 6.8K resistor and assuming a line current of 1mA produces 6.8 Volts across it. This DC signal is buffered and fed into a window detector via a sample and hold gate. The lower voltage threshold is 5 Volts and the upper is 10 Volts and providing the input signal is within this range the IMP18 will indicate a normal condition. The input circuit also includes an AC detector providing a fault condition should the loudspeaker line be unbalanced due to a fault condition.

A fault is indicated by a flashing LED indicator together with the buzzer sounding 1 second on, 1 second off. By pressing the buzzer mute switch the LED will illuminate continuous and the buzzer will mute. Should a second fault occur on the other input its associated LED will flash and the buzzer will sound until the buzzer mute switch is again depressed. Operation of the buzzer mute does not affect the fault output produced by the relay contacts. When the line or amplifier is restored to its normal condition the associated fault LED indicator will extinguish. The two fault indicators and internal buzzer may be tested by pressing the buzzer mute.

Setting the IMP18 to use

Decide which module is required to produce the surveillance signal and select either 4 or 5 on the dual in line switch depending on the audio BUS you require. Ensure all other modules not required to produce the surveillance tone have both these switches selected 'off'.

Select the required frequency 30Hz or 20KHz. This is achieved by selecting either Switch 1, 2 or 6 on the master module only. See figure 2.

If using a Vigil BVMX Frame the access terminals of all IMP18's should be paralleled together which provides synchronisation when used in the intermittent mode. This is Pin number 5 on a DIN input connector if an Adept Main Frame is used. Connect this access point to 0 Volts selecting the continuous surveillance mode. Adjust VR1 of the master module to produce approximately 10 Volts from the amplifiers outputs. The fault conditions of all lines should be removed and the O.K. indicator should now illuminate on all IMP18 modules. If only one input is used it is possible to disable Input B by selecting switch 3 of the dual in line switch ON. If the internal buzzer is not required selecting switch number 7 to the 'off' position will disable it. If you require the surveillance to freeze during an input busy condition i.e. during paging or pre-recorded alarm condition select switch number 8 to the 'on' position and this will hold its previous state whether a fault or normal condition.

The system would normally operate in the intermittent mode which saves battery life by leaving the access connections joined together but free from earth. It is possible to freeze the state of the detectors by remotely connecting this access input to +24V.

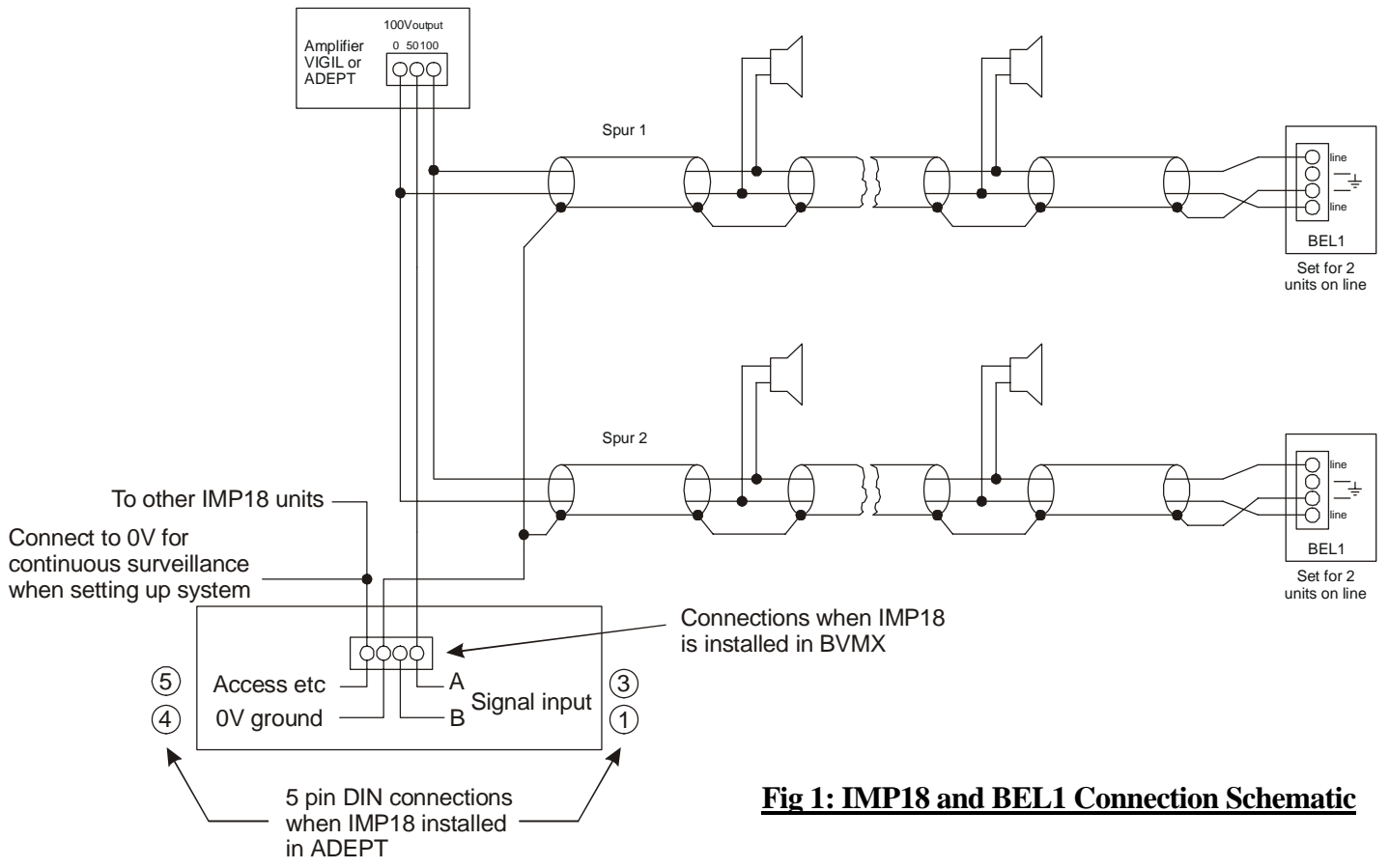
Summary of the Dual In Line Switches

20KHz	Switch 1	On	Switch 2 & 6	Off
30Hz	Switch 2 & 6	On	Switch 1	Off
SW3	On	Disable Input B		
	Off	Enable Input B		
SW4	On	Select Surveillance tone to MS Bus		
SW5	On	Select Surveillance tone to PA Bus		
SW7	On	Enable internal buzzer		
	Off	Disable internal buzzer		
SW8	On	Freeze when override is active		

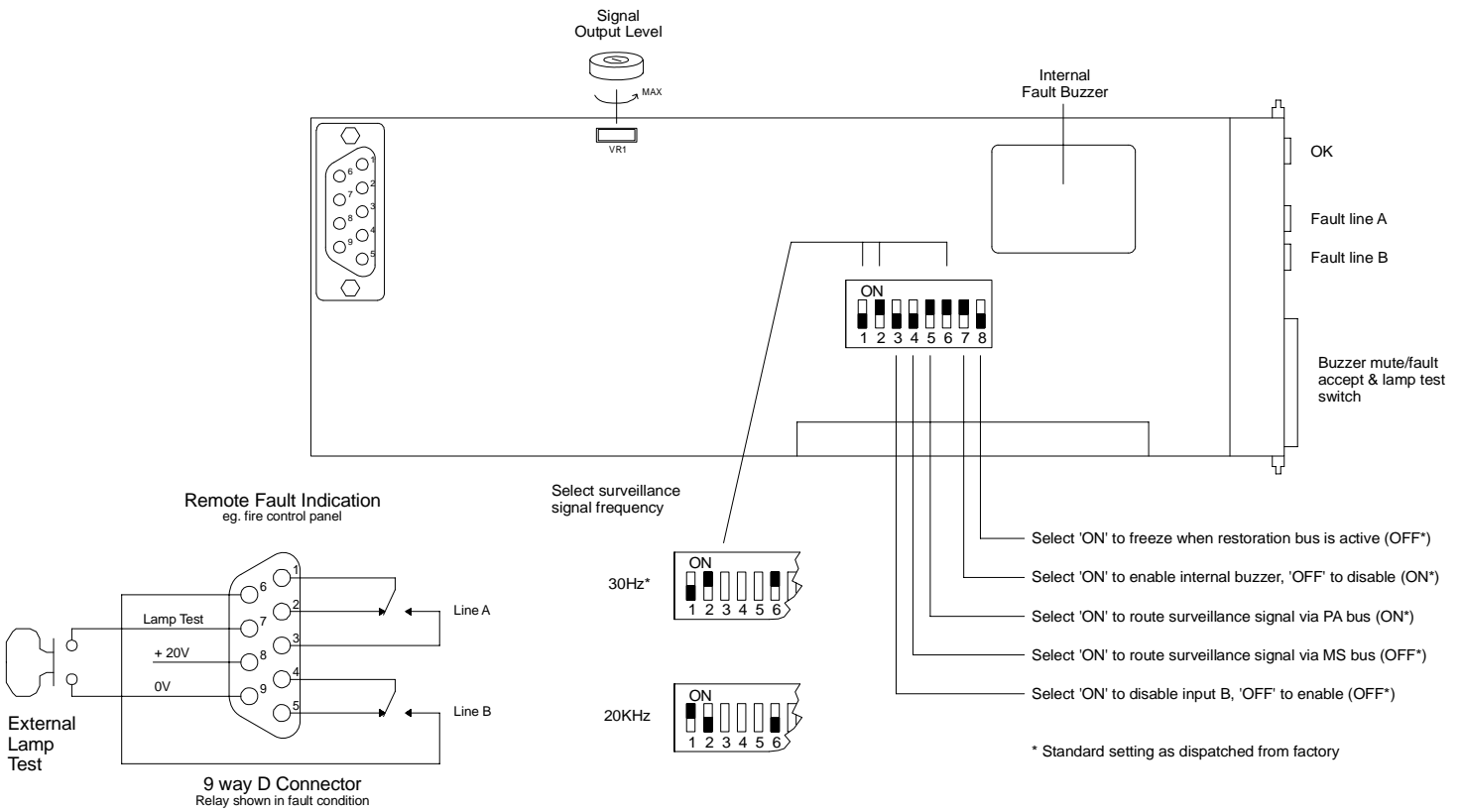
Setting the BEL1 for use

The switches on the unit are set depending on the number of spurs and hence BEL1s on the line, as follows:

No. of units	SW1	SW2	SW3	SW4
1	ON	ON	ON	ON
2	Off	ON	Off	ON
3	ON	Off	ON	Off
4	Off	Off	Off	Off



**Fig 1: IMP18 and BEL1 Connection Schematic**



**Figure 2. IMP18 Connector & Selector Locations**