⚡ VIGILANT

AVI Mk2
Audio Visual Indicator

AVI MK2 - 24V INSTALLATION AND OPERATING INSTRUCTIONS
(FP0853, FP0854, FP1037 and FP1038)

Description

The VIGILANT AVI Mk2 is a 2-stage, internally-illuminated warning sign with internal loudspeaker. It offers link-selectable options for illumination (top, bottom, both) and alerting tones (AS 2220 Alert, AS 2220 Evacuate, ISO 8201 Evacuate, "RH3" sounder, or silent). It is particularly suited for use in gaseous fire extinguishing applications, with automatically-released fire doors, and for areas of high ambient noise where sounders alone may be ineffective. The AVI Mk2 is designed to comply with the functional requirements of Australian Standard AS 1603 part 11 2010: Visual Warning Devices.

A variety of UV-resistant acrylic faceplates with standard warning messages / instructions are available separately. Typically, these have two or three lines of text, although four lines can be accommodated. An LED board is positioned behind each line of text for illumination. The colour is determined by the colour of the LEDs (red or yellow) and the faceplate (which has coloured text on a black background).

Illumination and tone options are field-selected by mini-jumpers on the Controller board. A "Quiet" option reduces the tone volume by approximately 15dB. A "Dim" option is also available for reducing the illumination (and the AVI supply current) to 1/3 of that of "full" brightness. This is suitable for areas with lower ambient light level, and is selected on the Controller board by snipping one resistor per LED board.

IP65 AVI versions (FP1037 and FP1038) comprise a standard (indoor) AVI mounted inside an IP65-rated UV-resistant plastic enclosure with a transparent lid. An externally-mounted, weatherproof, 8 Ohm, loudspeaker (ordered separately) is available to provide a higher sound level.

WARNING: Despite being UV-resistant, the AVI <u>must not</u> be mounted in direct sunlight as its internal temperature rating will be exceeded.

Ordering Information

Two standard (indoor) versions of AVI Mk2 are available:
FP0853   **AVI Mk2 2-Line Red 24V** – complete AVI less face plate. Includes mini-jumpers and instructions.
FP0854   **AVI Mk2 2-Line Yellow 24V** – complete AVI less face plate. Includes mini-jumpers and instructions.

Two IP65 versions of AVI Mk2 are available:
FP1037   **AVI Mk2 IP65 2-Line Red 24V** – AVI as above, mounted into IP65 enclosure. Includes grommets and cable gland.
FP1038   **AVI Mk2 IP65 3-Line Yellow 24V** – AVI as above, mounted into IP65 enclosure. Includes grommets and cable gland.
     These also include 2.3mm receptacles for connecting an external speaker, if required (not supplied).

An IP65 8 Ohm horn loudspeaker is also available for use with the IP65 AVI:
EA0020   **Loudspeaker 8 Ohm 10W horn IP65** – this includes a mounting bracket, and an un-terminated cable. The two crimp receptacles (included in IP65 AVIs) facilitate connection to the speaker tabs on the AVI Controller, but require use of a suitable crimp tool.

Two kits are available for use with the standard, 2-Line, Red AVI:
KT0292   **AVI Mk2 Expansion, Red LED Board plus Mounting Hardware**
     KT0292 adds a third LED PCB to convert a 2-Line Red sign to a 3-Line – Instructions are included in this document.
KT0293   **AVI Mk2 Red Double Sided Expansion Kit**
     KT0293 adds a 2nd cover and base with 2 LED boards fitted, to make a ceiling-mountable, double-sided, 2 Line red warning sign. Includes assembly instructions. (Not compatible with IP65 AVI.)

Standard faceplates are available as follows:

		AVI Format
FA2700	**AVI Mk2 Faceplate FIRE ALARM / EVACUATE AREA**	2-Line Red
FA2701	**AVI Mk2 Faceplate FIRE ALARM / DO NOT ENTER**	2-Line Red
FA2702	**AVI Mk2 Faceplate DO NOT ENTER / CO2 GAS / DISCHARGED**	3-Line Red
FA2703	**AVI Mk2 Faceplate DO NOT ENTER / FM-200 GAS / DISCHARGED**	3-Line Red
FA2704	**AVI Mk2 Faceplate DO NOT ENTER / INERGEN GAS / DISCHARGED**	3-Line Red
FA2710	**AVI Mk2 Faceplate WARNING / FIRE DOOR / CLOSING**	3-Line Red
FA2776	**AVI Mk2 Faceplate EXTINGUISHING / SYSTEM / INOPERATIVE**	3-Line Yellow
	(Other faceplate legends are available to special order)	

Operation, Connection and Supervision

The AVI Mk2 may be connected to the controlling device (usually a fire alarm panel) using a polarity-reversal two-wire circuit, or via a three-wire circuit with the common as either +24V or 0V. The AVI Mk2 automatically identifies which wiring method is used and interprets the signals accordingly.

There are 3 inputs: IN-T, IN-B, COM, and one input/output: SYNC. Each has duplicated screw terminals to allow in/out wiring between multiple units.

     IN-T controls the top LED Board(s) and associated tone.
     IN-B controls the bottom LED Board(s) and associated tone.

If both inputs are active, the tone selected for IN-B overrides the tone selected for IN-T.

The AVI Mk2 draws negligible current (is high impedance) when supplied with 6V or less. Fire panels which employ either positive or negative low voltage (less than 6V) output supervision may supervise a circuit of multiple AVI Mk2s without the need for additional blocking diodes. For this, the AVIs must be connected for common 0V, or 2-wire polarity-reversal inputs. Examples are shown overleaf.

Synchronisation

Multiple AVI Mk2s on the same circuit may have their tones and flashing synchronised by interconnecting their SYNC terminals. There is no master. Without interconnection of the SYNC terminals, the units will operate correctly, and may appear synchronised initially, but will typically drift out of synchronisation over time. Note that synchronisation was not implemented for the RH3 tone in software V1.01 or earlier.

Configuration

Mini-jumpers are supplied with each unit. Fit them to the Controller board as required to select various options.

WARNING: Use anti-static precautions when fitting jumpers.

Tables 1 and 2 show LED, Volume, and Tone jumper settings for current units (fitted with software SF0326 V1.20 or later).

Table 1 – LED and Volume jumper settings for current AVI Mk2 (fitted with SF0326 V1.2X)

Input IN-T		Input IN-B		Volume	
LK1		**LK4**		**LK7**	
OUT	TOP LEDS	OUT	BOTH TOP & BOTTOM LEDS	OUT	LOUD
IN	BOTH TOP & BOTTOM LEDS	IN	BOTTOM LEDS	IN	QUIET

Table 2 – Tone signal jumper settings for current AVI Mk2 (fitted with SF0326 V1.2X)

Input IN-T			Input IN-B		
LK2	**LK3**	**Tone Signal**	**LK5**	**LK6**	**Tone Signal**
OUT	OUT	ALERT	OUT	OUT	EVAC
OUT	IN	EVAC	OUT	IN	RH3
IN	OUT	ISO 8201	IN	OUT	ISO 8201
IN	IN	DISABLE	IN	IN	DISABLE

Table 3 shows jumper settings for <u>older units</u> (without ISO 8201 tone) fitted with software SF0255 (up to and including V1.11).

**Table 3 – Jumper settings for older AVI Mk2 (fitted with SF0255 up to and including V1.11)**

Input	IN-T			IN-B			Volume
	LEDs	**Tone Signal**		**LEDs**	**Tone Signal**		
OFF	Top	Enable	Alert	Both	Enable	Evac	Loud
ON	Both	Disable	Evac	Bottom	Disable	RH3	Quiet
Jumper	LK1	LK2	LK3	LK4	LK5	LK6	LK7

For darker areas you can reduce the illumination brightness by snipping resistors: R43 (for connector J4A), R44 (for J4B), R45 (for J5A) and R46 (for J5B). Snip only one end and lift the resistor up so it can be re-soldered later, if required. **DO NOT snip while power is applied**.

Connection Diagrams

In the following diagrams, supervised relays are shown as S, unsupervised as U. Supervision is generally required to comply with fire alarm standards. Supervision typically involves fitting a link on a Relay board and programming the fire alarm panel. The End-Of-Line (EOL) value must match the panel requirements (2k7 resistor is suitable for F3200, MX4428 ARR and IOR). For gaseous fire extinguishing applications there are typically two stages of warning: Stage 1 indicates a Fire Alarm, but does not mean that the gas discharge initiation process has begun; Stage 2 indicates that the process has begun and gas discharge is imminent.   A fuse-protected battery-backed source should be used for the +24V supply.
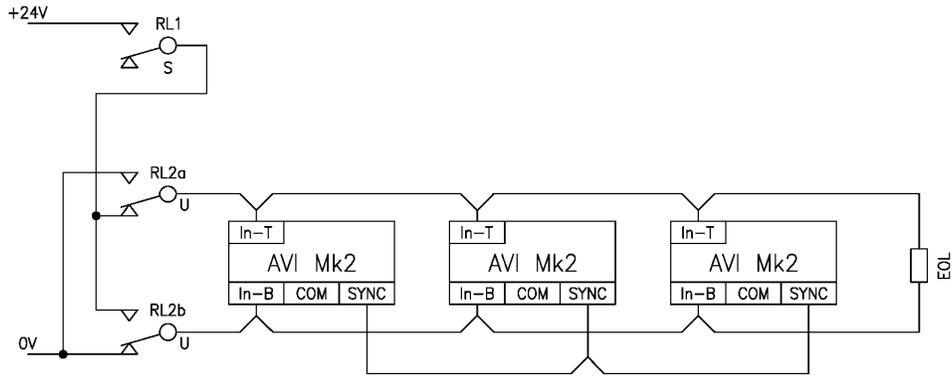
3-Wire, 2 Stage, Unsupervised
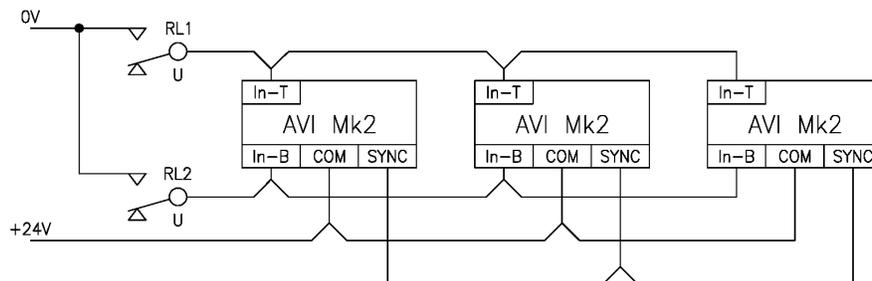
For FIRE ALARM / DO NOT ENTER or FIRE ALARM / EVACUATE AREA
RL1 = Stage 1   LK1-LK6 not fitted
RL2 = Stage 2   U = Unsupervised

Note: RL2 can be Stage 2 AND NOT Stage 1.

For DO NOT ENTER / xxx GAS DISCHARGED with the bottom lines having RH3 tone and operating off Gas Discharged.
RL1 = Stage 2.   LK3, LK6 FITTED
RL2 = Gas Discharged   U = Unsupervised

2-Wire, 2-Stage, Supervised

```
+24V ──────●──────▽  RL1
                  △ ○
                    S
           ┌──────▽  RL2a
           │      △ ○ U
           ●───────▽
           │       △ ○ U   RL2b
  0V ──────●──────▽
                  △ ○
                    U
```

In-T AVI Mk2 In-B | COM | SYNC   In-T AVI Mk2 In-B | COM | SYNC   In-T AVI Mk2 In-B | COM | SYNC   EOL

For FIRE ALARM / DO NOT ENTER or FIRE ALARM / EVACUATE AREA
RL1 = Stage 1 OR Stage 2   S = Supervised   U = Unsupervised
RL2a = RL2b = Stage 2   RL2a, RL2b can be two separate relays driven together.
LK1-LK6 not fitted.

For DO NOT ENTER / xxx GAS DISCHARGED with the bottom lines having RH3 tone and operating off Gas Discharged.
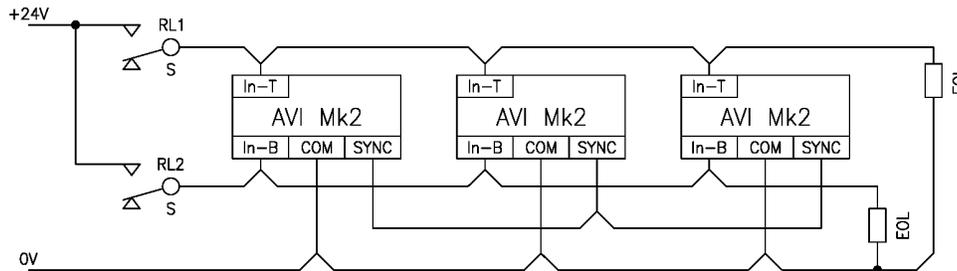RL1 = Stage 2 OR Gas Discharged. S = Supervised   U = Unsupervised
RL2a = RL2b = Gas Discharged   RL2a, RL2b can be two separate relays driven together.
LK3, LK6 fitted.

3-Wire, 2-Stage, Supervised

```
+24V ──●────▽  RL1
           △ ○
             S
       ┌────▽  RL2
       △ ○
         S
  0V ──────
```

In-T AVI Mk2 In-B | COM | SYNC   In-T AVI Mk2 In-B | COM | SYNC   In-T AVI Mk2 In-B | COM | SYNC   EOL   EOL

For FIRE ALARM / DO NOT ENTER or FIRE ALARM / EVACUATE AREA
RL1 = Stage 1   LK1–LK6 not fitted.
RL2 = Stage 2   S = Supervised

For DO NOT ENTER / xxx GAS DISCHARGED with the bottom lines having RH3 tone and operating off Gas Discharged
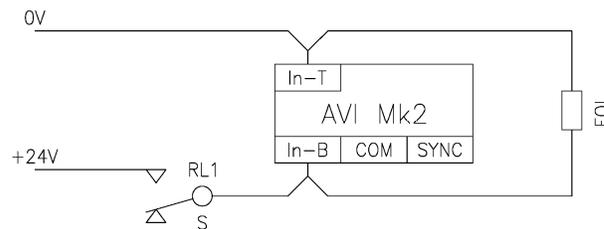RL1 = Stage 2   LK3, LK6 fitted.
RL2 = Gas Discharged   S = Supervised

2-Wire, 1 Stage, Supervised

```
  0V ────────────────
                        In-T  AVI Mk2  In-B | COM | SYNC    EOL
 +24V ──▽  RL1
        △ ○
          S
```

For EXTINGUISHING SYSTEM INOPERATIVE
RL1 = System Inoperative   S = Supervised
LK5 and LK6 fitted (tone disabled).
Alternatively 0V could be connected to COM.
Only one unit is typically required, but more could be added as per the diagrams above.

Standard AVI Fitting and Mounting

The faceplate is fitted to the metal cover from the inside, bottom first. Slide the faceplate over the two metal studs, push it right in, and insert the two plastic stand-offs (supplied) in the top from the outside. Ensure that the film taped to the back of the faceplate is flat.

The base plate has raised, 6.5mm diameter holes for screw mounting to the wall or ceiling. The AVI must be firmly secured for ease of cover removal. Five 20mm knock-outs and one 13mm hole are provided for cable entry. For two-stage AVIs it is recommended that field cabling enters via the bottom knockouts so that it does not have to pass behind the internal partition.

The metal cover fits over the tension arms of the base plate and "snaps" onto the dimple locators. Two slots in the outside centre of the base allow the cover to be 'levered' off with a screwdriver when necessary (e.g. when the base plate is not yet firmly mounted). The light-blocking internal partition sits in the bottom of the cover, so that it fits between the "top" and "bottom" LED boards. A partition is not supplied with 3-Line Yellow AVIs, as these are almost always used in single stage mode.

IP65 AVI Fitting and Mounting

WARNING: To avoid overheating of the AVI, do not install it where it is exposed to direct sunlight.

The IP65 AVI has four M5 holes, located in the back face of the plastic enclosure, for fitting four, stainless steel, wall-mounting brackets. (These are supplied with the AVI, in a bag with four M5 zinc-plated screws. Four M5, stainless steel screws are also provided as an alternative, if required.)

It is recommended that cables enter the plastic IP65 enclosure through the bottom face, or through the sides in the bottom 50mm. Two 16mm cable glands are supplied with the AVI for cable entry - the plastic enclosure must be drilled in installation-appropriate places to fit these glands. IP rating must be maintained when fitting cables, with RTV (or equivalent) used to seal any gaps.

When fitting the plastic enclosure cover, **avoid over tightening the plastic, cover mounting screws** as that may result in damage to the screw heads when tightening, or when next removing the cover.

An external 8 ohm loudspeaker, where used, should be mounted adjacent to the AVI, with its cables entering the AVI enclosure and connecting to the AVI Controller board SPKR tabs J2 and J3 (two 2.3mm crimp receptacles are supplied with the AVI for this purpose). Alternatively cut the internal loudspeaker wires and connect them to the external speaker cables (via a terminal block with wire protection clamps). Make sure any loose wire ends cannot touch any electronics.

Converting a 2-Line Red AVI to a 3-Line Red AVI

There are 7 mounting positions (sets of 4 holes) for LED boards. KT0292 includes one red LED board and two sets of stand-offs. When adding a 3rd LED board to a 2-Line Red sign (typically to make it suitable for a DO NOT ENTER / xxx GAS DISCHARGED faceplate) the existing bottom LED board is raised one position, and a new bottom LED board is fitted one position below where the previous one was. The procedure is as follows:

- remove the bottom LED board;
- fit 10mm (shorter) stand-offs, from the rear of the base plate, to the inner holes directly above and below the existing ones;
- fit 13mm (longer) stand-offs to the outer holes directly above and below the existing ones;
- fit one LED board to the top set of stand-offs, and the other to the bottom set;
- check that the LED boards are sloping down, but not bowed (if not, press the outside edges back and straighten them);
- connect both LED boards to the Controller board "BOTTOM LEDs" connectors, with the wires running underneath the LED boards.
- For two-stage operation, ensure that the partition in the cover sits correctly between the LED board(s) connected to "Top", and the LED board(s) connected to "Bottom".

AVI Mk2 Specifications

Standard AVI Dimensions:	316mm W x 206mm H x 85mm D
Standard AVI Mtg Pattern:	Wall 280mm W x 160mm H (4 x 6mm). Ceiling 140mm W (2 x 6mm).
IP65 AVI Dimensions:	380mm W x 280mm H x 132mm D
IP65 AVI Mounting Pattern:	Wall 383mm W x 283mm H (brackets supplied).
Housing Material:	1.2mm mild steel (standard AVI). ABS/Polycarbonate UV-resistant (IP65 AVI)
Housing Finish:	Baked Epoxy Powdercoat, Cream Wrinkle (standard AVI). Light grey housing, clear cover (IP65 AVI).
Shipping Weight:	Standard model – 2.0kg, IP65 model – 5.2kg, Faceplate – 0.25kg
Temperature:	Operating 0°C - 50°C. Storage 0°C - 70°C
Humidity:	0% - 95% RH (non-condensing)
Operating Voltage:	19.2Vdc – 28.8Vdc
Average Operating Current:	0.12A maximum. Refer to the table below.
Peak Operating Current:	Slightly less than 2 x nominal average current.
Supervision Current:	2uA max at 25°C (5uA max at 50°C) at < 6Vdc
Luminance:	300 cd/m^2 nominal "full", 100 cd/m^2 nominal "dim"
Flash Rate:	1Hz nominal, synchronised to tone cadence
Standard AVI Sound Level:	Typically 90dBA nominal "loud" @ 1m on-axis, 73dBA "quiet" @ 1m on-axis
IP65 AVI Sound Level:	(internal loudspeaker) Typically 75dBA "loud" @ 1m on-axis
EA0020 Sound Level:	(external loudspeaker) Typically 105dBA nominal "loud" @ 1m on-axis, 85dBA "quiet" @ 1m on-axis

CURRENT CONSUMPTION (nominal average current at 24V dc)				
Number of LED Boards	**1**	**2**	**3**	**4**
LED brightness (default)	18mA	35mA	53mA	70mA
LED brightness "dim"	6mA	12mA	18mA	24mA
Tone Current	**Disabled**	**Alert**	**Evac**	**RH3**
Volume "loud"	4mA	21mA	25mA	27mA
Volume "quiet"	4mA	6mA	7mA	7mA

Add the LED Board and Tone currents together for the jumper-selected combination.
Note that the current increases with decreasing voltage, when tones are enabled.

Examples:

A 3-line sign with tones disabled (e.g., EXTINGUISHING SYSTEM INOPERATIVE) draws a nominal average of 57mA at 24V for "full" brightness or 22mA at 24V for "dim" brightness.

A 2-line sign with both lines on (e.g., FIRE ALARM / DO NOT ENTER) draws a nominal average of 60mA at 24V for "full" brightness and "loud" Evacuate signal volume, or 19mA for "dim" brightness and "quiet" Evacuate signal volume.

Manufactured By: Tyco Fire Protection Products,
17 Mary Muller Drive,
PO Box 19-545,
Christchurch, New Zealand
Tel: +64-3-389 5096   Fax: +64-3-389 5938