



**Elemec *plus***  
**Digitally Controlled PA and Alarm System PA/GA**  
for Oil and Gas Markets



- Up to 19.2 kW of Audio Power per system (up to 64 Amps per system A/B)
- Fully duplicated or single system
- Multiple Hot Standby power amplifiers
- Plug and socket construction for easy maintenance
- Up to 16 fully monitored full featured microphone panels over 3-pair cable
- Message storage and replay up to 2 mins
- Auto (time-configurable) access panel lockout on panel failure
- Compliant to UKOOA, PFEER, IMO, SOLAS, DNV, NORSOK requirements / guidelines
- System status and fault log monitoring via Ethernet link
- Emergency Access fallback operation
- Intrinsically Safe (I.S.) ATEX microphone panels to Group IIB/C
- Auxiliary Audio Input e.g. music
- CE Marked
- Robust 300W Intelligent Power Amps
- PABX Telephone Access & Page/Party Access
- Engineers Test Panel provision
- Fibre Optic link to remote amplifiers
- Auto alarm override feature
- Duplicated Controllers
- Supports Alarm Zoning requirements
- Amplifier Sub-Zoning
- Two priority levels for routine speech
- Morse Code function from Access Panel Pushbuttons
- Beacon Cable Monitoring
- Ultrasonic Loudspeaker Network Monitoring

The Elemec *plus* is a Digitally Controlled Public Address and Alarm System (PA/GA). Designed principally for **life critical installations** in the **Oil and Gas** market, it is also suitable for many industrial communications requirements.

The equipment is specifically and fundamentally designed as failsafe, with extensive system and fault status monitoring for maximum availability at all times.

In addition to General Paging and Emergency Broadcasts, Alarms can be automatically initiated, e.g. from Fire and Gas Alarm and Emergency Shut Down Systems. Alarm tones or pre-recorded digital voice evacuation messages can be broadcast.

GAI-Tronics provides the essential control and monitoring system for the PAGA High Integrity Public Address & Alarm System commonly used on Oil & Gas Platforms, FPSO's, Power Stations & Oil Refineries, Chemical Plants & Industrial Complexes Worldwide where the safety of all personnel is of immense importance.



#### PA Controller



The centre of the Elemec plus PA/GA system is the Controller Unit. Designed for 19" Equipment cabinet mounting, this unit is microprocessor controlled and software configurable.

The Controller Unit provides continuous monitoring functions for up to 16 Microphone Access Panels and sends/receives data from the Elemec plus Power Amplifiers, to provide complete high integrity system monitoring, from microphone panel to loudspeaker. Integral Alarm Tone Generator circuits are also monitored.

A backlit LCD provides instant status information of system activity and faults; a major advantage to operator and maintenance personnel. To increase security, a watchdog circuit allows Emergency fallback to increase the integrity. This allows manual initiation of Emergency Speech and audible alarms in the event of processor failure.

For ease of installation and maintenance all cabinet internal connections are on a plug/socket basis. The software control is designed to be as flexible as possible, and can easily be downloaded via the RS232 communications port on the front of the Controller.

As a security measure, Alarm Tone types can only be changed by replacing an I.C. (EPROM) on the main PCB within the Controller.

Hot standby Amplifier Control is provided whereby a powered spare amplifier/s is automatically connected to the loudspeaker network of a failed amplifier/s. PABX access and page/party access is configured so that telephone/intercom inputs are digitally stored and replayed to completely eliminate the possibility of acoustic feedback between telephone/intercom & local loudspeaker.

Eight individually programmed beacon control outputs are available to operate beacon relays during emergency speech/alarm broadcasts. A numerical keypad enables certain test and setup functions to be implemented e.g. Amplifier Tick Tone, Alarm & PABX broadcast levels.

The controller can be supplied in duplicated format for additional redundancy.

#### Web Server Board



The unique IP address of each web server board enables remote monitoring of the system. The board may be LAN or WAN, or in turn connected to the Internet giving world-wide access to system monitoring without dedicated viewer software.

System monitoring is divided into web pages, with the web server opening a general introductory page.

Control unit input and output functions are monitored by selecting the Control Unit and Signals.

From this page the real time state of the systems alarm and beacon outputs, together with the control inputs can be monitored.

This enables the user to monitor all inputs from other devices such as the fire & gas system, therefore

extending the monitoring capacity of the web server connection.

Additionally, it allows the user to have a remote mimic display of all current messages seen on the control unit LCD within the main Elemec plus equipment cabinet/s.

The access panel monitoring page mimics the layout and operation of access panels connected to the Elemec plus control unit being viewed.

As key functions are operated the monitoring panel mimics the LEDs indicating the selection of functions and/or alarms.

A drop-down menu located at the top of the page permits the selection of one or all access panels.



## Elemec *plus* Digitally Controlled PA and Alarm System PA/GA for Oil and Gas Markets

### Intelligent Power Amplifier



Central to the Elemec *plus* Public Address Systems is the 300 Series Intelligent Power Amplifier. The modular design allows for racked amplification of systems up to 19.2 kilowatts per system.

The field proven amplifier is designed for ruggedness and performance to enable usage in a range of applications, from continuous 300W RMS rated output for General Alarm Systems to high quality music reproduction.

To reduce the risk of single point failure, on AC systems the Amplifier has its own internal power supply.

The loudspeaker monitoring circuits (DC Earth leakage and ultrasonic load sensing) are contained within the Amplifier. Load sensing is easily set up by the single

press of the CAL button on the front of the each amplifier.

This load sensing facility allows an element of loudspeaker monitoring as it will detect changes in the load of the connected loudspeakers.

System expansion is easily achieved by simply adding more Amplifiers, without the need to change controller hardware.

The high power units may be racked above each other without recourse to fan trays or cabinet vent panels. To reduce the risk of "Hot Spots" each amplifier is fitted with a cross-flow forced cooling system. A thermostatically controlled fan provides forced air cooling to the output power devices only during high temperature operation.

In situations where low standby power consumption is important, i.e. battery backup systems, the amplifier has a bias shutdown facility, to minimise the UPS requirements.

### Local/Remote Access Panel



Several types of access panel are available for use with the Elemec *plus* PA/GA system.

The panels are available in four basic formats - 19" console mounted, desktop mounting and indoor/outdoor IP66 bulkhead mounting. All are available for use in 'safe areas' weatherproof enclosures or I.S. panels can be supplied for hazardous areas to Zone 1 as ATEX certified EEx ib IIB/C T4. To standardise equipment supply each variant uses the same panel insert.

Either a single set of data control and audio outputs are provided connected to the Central Equipment via only a 3 pair cable, or fully duplicated circuits (from dual segregated switch contacts to dual panel outputs) are also available for use with dual A/B systems.

The access panel insert assembly comprises a mild steel plate pierced to accommodate up to 30 pushbuttons, with a textured polycarbonate overlay with 'secret until lit' status LED's.

All pushbuttons can be individually programmed by software to perform any of the microphone panel functions.

Up to 8 zone select pushbuttons and 8 alarm pushbuttons can be fitted. Emergency Speech and

Alarm pushbuttons are fitted behind a Perspex cover to prevent accidental operation. 'All call' and Sleeping Quarter zone pushbuttons can similarly be fitted behind the cover if required.

Gooseneck or fist microphone options are available with LED "VU" indication. LED's adjacent to the pushbuttons illuminate only when the switch press has been accepted by the Central Equipment to provide added confidence to the operator. Pushbutton legends are easily interchangeable.

Up to 16 fully fitted microphone panels can be connected to the Elemec *plus* PA/GA system. During Emergency Speech broadcasts the audible Alarms can be programmed to attenuate (typically 12dB) or completely mute.

Both routine and Emergency Speech access are standard with two routine speech priority levels. This is used to allow routine speech to be heard over some alarms but not other alarms. This is in addition to the priority between individual panels.

## Elemec plus Digitally Controlled PA and Alarm System PA/GA for Oil and Gas Markets

### TECHNICAL SPECIFICATIONS

#### Controller Unit

Three keyswitches are provided - functionality is as follows:

**Keyswitch 1** - Used for duplicated A/B systems. Either system A or B can be set on master to source audible alarms or voice recorded messages.

**Keyswitch 2** - Used to select either local or remote Power Amplifiers to be driven by the controller.

**Keyswitch 3** - Used to inhibit Auto Alarm inputs e.g. to prevent false alarms during F & G system commissioning.

#### Mechanical

**Dimensions:** 483W x 177H x 390D (mm)

**Material:** Mild Steel

#### Electrical

- Power 24V DC +/-10% <100mA (unit itself)
- 100mA fused outputs provided for Access Panels, Beacon Relays etc.
- Microphone Panel Audio Input 2.2V p.p. 600Ω
- Microphone Panel Data, RS485 semi-duplex
- Page/Party interface Input Level 1.5V rms
- Control Inputs e.g. Auto Alarms Up to 16 Dry contact or 24V DC
- Amplifier Audio Output 2.2V p.p.
- Amplifier Data Link RS485 semi-duplex
- A/B System interlink 6 pair connection Audio 2.2V p.p. Data RS485 Fully-duplex
- Auxiliary Input e.g. background music 2.2V p.p. 600Ω

#### Amplifier

LCD Indicator Panel on the front of the amplifier displays the following information:

- High Temperature Operation (above 70°C)
- Output Overload Condition
- Amplifier Shutdown Protection Active
- Power Healthy
- Amplifier Enabled / Disabled
- Fuse Failure
- Zone Allocation
- Bargraph at output level

#### Electrical

- **Line output voltage:** 70V - 100V rms (or client specified)
- **Input sensitivity:** 0dBm (0.775V rms) for rated output
- **Frequency response:** 100 - 18kHz (-3dB points)
- **Output distortion:** <1% at 1kHz, full load

- **Signal to Noise ratio:** 60dB (A)
- **Operating Voltage Options:** 24V (250W) DC, 48V DC, Mains 115V or 230V AC
- **Operating Temperature:** -20°C to +50°C

#### Mechanical

- **Dimensions:** 390D x 483W x 88H, DIN standard 2U
- **Mounting:** 19" Standard Rack (Shelf or Slider)
- **Material:** Welded Steel Tray with Vented Lid
- **Finish:** Black Textured Enamel, stoved
- **Output Audio Connectors:** Phoenix STF/STGF
- **AC Power:** IEE Standard, 3 pin
- **DC Power:** 2 pin connector ST16/2BS
- **Audio / Data Comms (PS485):** IDC
- **Weight:** 16Kg max

#### Access Panel

- Up to 30 pushbuttons
- System Status LEDs
- 300mm gooseneck or fist noise cancelling microphone
- 3 pair connection cable

#### Electrical

- Power 24V DC nominal (15-30V DC) <65mA
- Audio Pair, uni-directional, 2.2V pp
- Data pair, RS485 semi-duplex
- Audio Conditioning 2:1 compression
- VU Meter LEDs in 6dB steps
- S/N Ratio >60dB
- Environmental -20°C to +50°C RH95%

#### Mechanical

	19" Console Panel	Indoor Bulkhead Panel	Desktop Panel	Outdoor Bulkhead Panel
<b>Dimensions</b>	483W x 177H x 135D (mm)	450W x 324H x 173D (mm)	269W x 90H x 230D (mm)	400W x 300H x 210D (mm)
<b>Mounting</b>	19" Console	Wall Mount	Desktop	Wall Mount
<b>Material</b>	Mild Steel	Mild Steel	Mild Steel	Stainless Steel
<b>Connections</b>	2.5mm <sup>2</sup> screw terminal	2.5mm <sup>2</sup> screw terminal	15 way 'D' connector	2.5mm <sup>2</sup> screw terminal
<b>Resistance</b>				IP66

