System 9000TS
Sequence of Events Recorder

1ms Event Recorder and combined Annunciator

- Modular, rack mounting design expandable to over 4000 inputs
- 1ms time stamping of events across the whole system
- Up to 15,000 events stored per rack in distributed non-volatile memory
- Flexible auto-shelving facility to avoid nuisance alarms
- Fully programmable via the programming port on the Interface Card using Windows-based configuration software
- Fully integrated alarm annunciator functionality
- Wide range of optional displays

The System 9000TS Sequence of Events Recorder leads the way in the latest technically advanced event and alarm management systems.

Built on a rugged hardware platform suitable for the most severe of industrial environments this unit will provide true time-stamping of event occurrence to a resolution of 1ms. Using the synchronisation input this can also be related to real time.

Using the optional integrated alarm annunciator features it is possible to build a system that will capture, record, print and display events and alarms both for immediate action on the plant and for later analysis to find the prime cause of the failure.

The system is available with various different display and output options to suit individual applications.
Features & Benefits

- Provides independent annunciation and time stamping of critical plant alarms whilst communicating back to the host DCS, PLC, ESD, SCADA or computer system.
- Fully programmable, for all system features which can be stored and downloaded as required via the integral Interface Card.
- Suitable for systems from a sixteen-input package to a plant-wide alarm/recording system.
- Total flexibility in choice of system size, display style, operation and options.
- Field proven technology, with hundreds of thousands of alarm points already in operation worldwide.

With personnel safety, increased regulation and the high cost of plant shutdowns the need to continuously monitor, record and analyse system performance has become more important than ever before.

The traditional back-lit annunciator will provide the clearest method of alerting the operator this can now be combined with accurate time tagging of the events. In the automated control and protection used in today’s modern plant a typical failure can result in alarm bursts of over 100 alarms within the first few seconds. The key issue in these situations is not only to identify the alarms and inform the operator but also to identify the primary cause of failure within the process.

The System 9000TS has been developed with this in mind and will capture a change in state on digital events across the entire network to within a 1ms resolution.

Total Configurability

All the facilities are field programmable using RTK’s Windows-based setup software provided with the equipment.

All features are configurable for each individual input and output channel and can easily be set-up in minutes without the need to learn a special programming language.

All the alarm sequences specified in the ISA publication “Annunciator Sequences and Specifications” are available in addition to a wide range of additional features.

Total Flexibility

The modular construction and the advanced programming facilities mean that the System 9000TS combined SER and alarm system can be supplied to match any process alarm application.

Standard 19” Racks provide almost unlimited system expansion and the user can configure each channel from a range of pre-defined features and embedded sequences as required. Configuration changes can easily be generated off-line and downloaded.

High Density Packaging

Standard 3U 19” Euroracks with rear access terminals are used on the System 9000TS. The first rack houses the Interface Card and up to 13 off Sixteen Channel Input/Output Cards. Extension racks are suitable for 14 off Sixteen Channel Input/Output Cards.

Multiple racks are interconnected using factory supplied ribbon cables/connectors to form large systems up to 4000 channels.

Interfacing

The System 9000TS is ideally suited to interface to third party plant equipment. Systems are always supplied with a Modbus RS485 serial interface and options exist for Ethernet and protocol converters.

Eight system relays are provided as standard for use as watchdog, system faults, horn and group relays. Individual repeat relays for each channel can be provided as an option.

Using the powerful communications features it is possible to interface to existing PLCs, SCADA systems, Emergency Shutdown Systems and plant-wide distributed control systems. The Annunciator can monitor and display critical alarms and communicate the results into the normal monitoring systems, giving another level of safety and independence from the general monitoring or control system.

Event Storage

The system has a unique distributed method of storing events so that even following a cascade of alarms or a power failure up to 15,000 events per rack are stored within the solid-state, non-volatile memory.

Expandability

Each 19” rack is supplied fully equipped allowing simple expansion with the addition of Input, Output or Relay Cards. If a larger system is required additional racks can be interconnected to the existing unit using factory supplied ribbon cables and connectors to link system features.

Interface Card

Each system is supplied with an Interface Card. Customer connections for remote printing and programming are provided on the front of this card.

Configurable system relay outputs and the RS485 serial output are available on the rear of the associated chassis. Once configured, settings are stored on EEPROM on the individual cards.

In addition, the Interface Card filters and protects the incoming 24VDC supply and provides real time synchronisation to the system.

Nuisance Alarms

Each alarm can be set to automatically inhibit (shelve) if the alarm frequency exceeds configured parameters and are therefore considered invalid. Alarms are automatically re-instated once they return to normal patterns.
Features & Benefits

Isolation
All customer inputs to the system are provided with optical isolation. This enables the system to operate without deterioration or disturbance in environments of extreme electrical noise.

Inputs
Each optically-coupled input can be set to operate from a normally open or normally closed volt free contact powered via the annunciator at 24VDC. Alternative configurations are available for direct powered inputs from 24V, 48V, 110V and 250V AC/DC if required.

Servicing
All alarm ways are configured by plugging into the programming port on the Interface Card and downloading the settings from the Windows Setup Software supplied with the system. In the unlikely event of a card failure a new card installed into the system will be automatically configured to the original configuration.

Mounting
Industry standard 3U 19" racks with rear access, rising clamp terminals mounted on the rear of the chassis for customer wiring. As an option quick disconnect terminals with locking screws are available.

Power Supply
The supply voltage range for the system is wide enough for unregulated and battery backed supplies. The nominal 24V DC supply can be anywhere within the range 19-36V DC without affecting system performance.

Reprogramming
The cost of replacement ICs and on-site visits to change cards is completely eliminated with the System 9000TS. All functions can be easily and permanently changed using the setup software provided with the system. No special programming skills are required, features are simply enabled or disabled in software.

Pushbutton Inputs
The standard requirement for the majority of alarm annunciators is 3 pushbuttons for Lamp Test, Accept and Reset. The System 9000TS provides these functions as standard and 5 additional control inputs are available for more complex applications if required. The additional control inputs can be enabled or disabled using the RTK supplied software utility. The additional functions are Silence, System Test, First-up Reset, Sleep and Horn Inhibit.

Combined Alarm System
The System 9000TS can be supplied as a standalone Sequence of Events Recorder or with Output Cards which will provide a fully integrated alarm and event management system. Various card combinations are available to build up systems to suit the exact application.

Advanced Communications
All systems are supplied with the RS485 communications feature in addition to outputs for printers, programming and synchronisation. These outputs are available to link to the wider plant equipment to log and store events and alarms as they occur for later analysis if required. Additional communications will also be available to provide ethernet, profibus, dual redundant communications etc.

Fully Programmable
Each input channel can be set to suit individual applications, for example: input time delay, alarm sequence, priority, grouping, and channel description. All these features can be enabled or disabled and stored using the RTK supplied configuration software. System parameters can be easily stored for retrieval at a later date if required.

Flexible System designs
RTK can supply the 9000TS system components as loose items for integration by others or fully integrated within industry standard wall mounting or floor standing panels configured to individual specifications.

Card Types
Interface Card (P925TS-X)
Provides a link between the system I/O and the outside world with the following outputs

- RS485 serial port
- Power input
- Synchronisation
- Programming port

Input Card (P925TS-I)
Connects to the alarm and pushbutton inputs, time-stamps to 1ms and buffers the events

Output Card (P925TS-O)
Provide the drive to external display facia to show alarm information to standard ISA sequences

Relay Card (P925TS-R)
This card is driven from the Input Card and gives an individual repeat relay per alarm input.

Relay Outputs
The standard system has outputs for all the commonly used functions, such as horn, watchdog, group and system fault relays. The watchdog relay is always provided, this will trip if any general fault occurs with the electronics. In addition to this there are eight further configurable relays which can be set as required up to a maximum of 8 group relays, 4 horn relays or various system fault relays. Each alarm relay can also be supplied with individual repeat relay outputs, user configurable to follow the alarm contact or follow the alarm logic.

Displays
The System 9000TS is designed to work with almost any type of remote display ie. conventional backlit lamp or LED displays individual panel lamps or mimic diagrams RTK Instruments offer a range of display products to complement the 9000TS, these are detailed in the Display Facias datasheet.
Software and Printing Facilities

The majority of the features listed are supplied as standard as part of the normal software. This allows the system to be configured to match individual applications, RTK also offer full software integration enabling us to provide complete systems, undertake programming and commissioning. Please consult our Sales Office for further information on Alarm Management Software solutions.

**Event Storage**
The S9000TS uses an advanced, powerful inbuilt processor system complete with non-volatile memory to store both system settings and event and alarm data. The data storage system is designed without using any components with moving parts such as Hard Disk drives to provide the greatest system reliability possible. The software is programmed for all the system settings via the front mounted programming port using a standard RS232 output from a standard PC.

**System Setup**
The RTK supplied configuration software allows the user to enable/disable features and assign alarm text ie.

- 60 character of text for alarm messages
- Event prefix for both alarm and return to normal states
- Normally open or closed inputs
- Input time delays
- Alarm priorities
- Printer setting
- Auto-shelfe parameters
- Assigning group and common relays

**Printers**
All systems can be supplied with a local printer to provide and immediate record of alarm and return to normal states. As an option systems can be supplied suitable for connection via modem or Ethernet to remote printers. Configuration settings, summary and status reports can be printed on demand.

**Software Options**
With its advanced communications facility the System 9000TS is an ideal front-end to a screen based alarm management/recording system. RTK can provide Alarm Management Software and complete systems using industrialised computers and screens. These are developed in conjunction with the users to provide the clearest possible means of showing alarms, the priority of these alarms and exactly what to do in each alarm situation. These systems can also provide a means of displaying/storing all alarm and event history for analysis at a later date.

**Timers**
Delay timers can be incorporated into the System 9000TS on both the inputs and the outputs. This facility can avoid the possibility of nuisance alarms by setting an input time delay from 1ms to 65,000ms. Using this setting the alarm contact must be in alarm for a pre-determined minimum time before triggering the input circuitry whilst still maintaining an exact record of the time of the original event. For example, if an alarm occurs but it is dealt with and accepted, the remote telemetry system will not need to be notified.

**Complete Systems**
RTK can provide the System 9000TS mounted in a wall mounted or floor standing cabinet and provide all the necessary wiring to the displays, PSU’s and terminals ready for final installation on site. These panels are quoted against each specific customer requirement; please contact the Sales Office for further details.

The Best of Both Worlds
Ideally, critical plant alarms should be hard wired to a dedicated Alarm and Event Recording System like the System 9000TS and data passed onto the DCS as a secondary function. This offers the best of both worlds in that the System 9000TS, which has been specially developed to offer high speed event capture and True First Out Discrimination, also provides the clearest possible indication of critical plant conditions.

The System 9000TS provides an independent, highly reliable, modular alarm system employing multiple redundant design features which should be used to complement centralised DCS platforms that have been primarily developed for control and monitoring.
Displays

To complement the System 9000TS Alarm Annunciator, RTK Instruments offers a wide range of displays from simple lamp arrays to full mosaic mimic diagrams. Most of the displays are modular in design to enable RTK to match your exact needs, rather than compromising on the nearest available shape and size. The main display types are illustrated and described here; for more detailed information, refer to the separate display datasheet.

P725LO
Lamp-Only Modules
This display has been designed to match the Series 725 Alarm Annunciator – it will look identical when viewed from the front. It is available in exactly the same format as the Annunciator with three window sizes, six colours and a choice of lamp or LED illumination. This display is the best choice when LED illumination is required, offering the most competitive ultra-bright illumination. It is fitted with a ‘Lamp Test’ facility as standard.

DF30 Display Facia
The DF30 display facia provides a flexible display panel for both LED or incandescent lamps. This display facia is totally modular allowing systems of almost any shape and size to be constructed. The basic lamp module is 30 x 30mm but these can be configured to give a range of window shapes and sizes by interconnecting multiple windows. This display can also have integral pushbuttons, keyswitches and audible devices. There is no limit to the number or position of these devices. All connections are by rear mounted screw terminals.

Hazardous Area Displays
When supplied through suitable certified interface devices, the System 9000TS can be used to drive a display facia in the hazardous area. The DF30IS is a backlit display certified as Ex II 1G, EEx ia IIC T4. The display gives a bright LED illuminated backlit display that matches the safe area versions. The L20 Intrinsically Safe Multiplexer can also be used to drive a hazardous area display using only two cables into the hazardous area.

IP65 Displays
Where protection from the environment is essential a range of displays sealed to IP65 can be provided. These custom-built units have bright LED display modules wired to rear mounted terminals. The completed assembly is mounted with a gasket to the panel door to maintain the sealing.

Mosaic Displays
Mosaic tiled mimic systems can be driven by the System 9000TS to provide a flexible and informative overview display. The standard mosaic mimic uses a 24 or 25mm tile mounted on a strong aluminium honeycomb grid. Tiles are the moulded type for process mimics or alternatively screen-printed or engraved to form the required display drawing. A wide range of suitable lamps, switches, pushbuttons and displays can also be integrated into the finished mimic. On smaller projects and simpler display requirements a hard wearing, single piece mimic can also be provided.

Alarm Management Software
With its multi-redundant architecture and communications facility the System 9000TS is an ideal front-end to a screen based Alarm Management System. These can be set up in thousands of different ways to suit each individual alarm handling situation. Different display screens have already been developed and these building blocks would be used to provide a custom solution for each client. These systems could also incorporate touch screen displays, dual redundant servers and a range of industrial computers.
Advanced Annunciator Features

When combined with the Output Cards the S9000TS becomes a powerful Alarm Annunciator system, some of the commonly used alarm functions available are shown below.

Repeat Relays
Each alarm way can have an individual repeat relay output in addition to any group relays configured. The relays can be set to be energised or de-energised and as N/O or N/C contact. The relay functions are also user configurable to follow the alarm logic or follow the input.

Output Relay Reflash
Each of the group relays can have a reflash facility enabled. This is where the group relay will change state for 500ms when another alarm within the group occurs. This allows a control room annunciator or monitoring system to indicate each occurrence of a new alarm.

Multiplexer
To cut down on the costs of installing vast numbers of cables across large sites, the System 9000TS can be used as an economical multiplexer system, where all the input contacts are gathered by a single System 9000TS-TX Module and transmitted serially on 4 wires up to 1.2 km away to the receiving module, the System 9000TS-RX Module. The alarms can then be displayed on a display facia or within alarm management software packages.

Sleep Mode
Useful in unmanned/not normally manned situations. Any input can be configured as a “sleep” input. When this input is switched on the drive outputs to the lamps and audibles are disabled. The annunciator will work exactly the same in all other respects; all alarms are monitored as standard and all repeat relays and communications function as normal. As soon as the system is switched out of the “sleep” mode, the display facias will display all alarm information, complete with all first-up details.

First Up
In alarm annunciation applications, it is often essential to know which alarm occurred first. For this reason, the System 9000TS can be supplied with a flexible high resolution first-up facility as standard. Four different first-up sequences are provided to match the ISA standard S18-1 1979 (R 1984). Up to four separate first-up groups can be defined within the one system; each alarm way can be configured as being in one of these four groups.

Sequence Tables

Each alarm channel can be configured to suit the operating sequence required as listed in the ISA publication Annunciator Sequences and Specifications S18.1 1979 (R1985). Systems can be configured with different features on different alarm ways and there is no need to switch the power off. The diagram below shows the most commonly used sequences.

**MANUAL RESET**
Sequence Code M

**AUTOMATIC RESET**
Sequence Code A

**AUTOMATIC RESET FIRST OUT**
Sequence F3A

WITH FIRST OUT FLASHING AND RESET PUSHBUTTON
Installation and Mechanical Details

Standard System

Networked System

The System 9000TS is based on the standard eurorack, manufactured to IEC 297-3 (DIN 1494 Pt.5). The standard subrack size is 3U and 84E wide (19in).

Thirteen module, full 19in rack
Technical Specification

**Inputs**

**Alarm Contacts**
All inputs are opto-isolated (isolation voltage 2.5kV). By using different wiring configurations, the same system can be used for both:
- Volt-free contacts which can have the operating mode configured using the Setup Card, to operate to alarm for contact open or to alarm for contact close.
- Voltage input from 24, 48, 110 or 250VAC/DC.

**Alarm contact and cable resistance**
N/C contact – series resistance of contact cables 20kΩ maximum.
N/O contact – parallel resistance of contact cables 200kΩ minimum.

**Field contact voltage and current**
The voltage for volt-free alarm contacts is fed from the unit at 24VDC at approximately 2mA.
To maintain complete isolation it is possible to use a separate PSU to feed all the alarm contacts.

**Overall system resolution**
1ms

**First-up Discrimination**
1ms

**Alarm Clearance Discrimination**
1ms

**Control Inputs**
Any input can be configured to one of the following control inputs:
- Lamp test
- Acknowledge
- Reset
- System test
- Silence
- First-up reset
- Sleep
- Horn Inhibit

**Outputs**

**Lamp Drive (when Output Cards fitted)**
Each output can drive up to 160mA at 24VDC, making it suitable for multi bulb displays or multiple repeat displays.

**Standard Relays**
Eight standard relays fitted on the Interface Card, these are configurable as system alarms such as watchdog, printer fault etc or group alarms.
Contact rating at 220VDC (250VAC) max, 125VDC @ 0.5A, 24VDC @ 2A, resistive. Selection of N/O or N/C contact by jumper link.

**Repeat and Group Relays**
Group relay card and individual repeat relays for each alarm way. Contact rating at 220VDC (250VAC) max, 125VDC @ 0.5A, 24VDC @ 2A, resistive.

**Synchronisation**
By pulse, IRIG-B or GPS signal

**Printer Port**
Standard parallel port

**Serial Data**
Event/alarm data can be transmitted using the serial communications port to other System 9000TS units, DCS systems, PLCs or computers.
Transmission – RS485C. Full duplex, 1 start bit, 7 data bits, 1 parity, 1 stop bit.
Baud Rate – up to 9600
Protocol – ASCII MODBUS and RTU

**General**

**Supply Voltage**
24VDC nominal (19–36VDC) Standard
A range of power supplies is available to convert from other AC or DC voltages.

**Supply Current (mA)**

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Quiescent: Interface Card</th>
<th>Quiescent: Input Card</th>
<th>Relay current/per relay</th>
</tr>
</thead>
<tbody>
<tr>
<td>24V</td>
<td>150</td>
<td>50</td>
<td>22</td>
</tr>
</tbody>
</table>

Add the current for the lamp drive to the totals of the above cards

**EMC Compliance**
Immunity to EN61000-6-2:2001
Emissions to EN61000-6-4:2001

**LVD Compliance**
The unit is designed and manufactured to safety specification BS EN61010-1:1993

**Environment**
Operating temperature –20°C to +60°C
Storage temperature –20°C to +80°C
Humidity 0–95% RH, non-condensing

**Mechanical Details**
19in Rack
Standard 3U by 19in Eurorack to IEC 297-3 (DIN 1494 Pt.5)
Larger systems can be provided using multiple racks and interconnect cable.

**Mounting**
Industry standard 19” racks with rear terminal access

**Assembly**
All cards plug in to a standard pre-tested motherboard using DIN41612 connectors. This allows simple system expansion of system size at a later date.

**Connections**
Plug and socket terminals of the rising clamp type, maximum cable size 2.5mm². Quick disconnect terminals with locking screws available as an option.

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Due to our policy of continuous product development, we reserve the right to amend specifications without notice.

RTK Instruments Limited
St James Business Park,
Knaresborough, North Yorkshire,
England. HG5 8PJ

Telephone: +44 (0)1423 580500
Facsimile: +44 (0)1423 580501
Web: www.rtkinstruments.com
Email: enquiry@rtkinstruments.com
AMS
Alarm Management Software

For display, monitoring and analysis of your process alarms

- View current or historical alarms
- Filter by time, text or priority in seconds
- Export facility to Access database
- User configurable for text, colour and priority
- Import all alarm settings from Excel spreadsheet
- Archive all alarms/events to computer system
- View and record system errors, inhibited alarms and configuration changes

Designed to work in conjunction with the RTK range of Alarm Annunciators and Alarm Systems the AMS is a powerful graphical Human Machine Interface (HMI).

The AMS Software is designed to provide the user with the ability to view, store, print and export alarm and event data dynamically or for later analysis.

The operator can see the occurrence of new alarms clearly showing the channel, priority/group, time/date and when the alarm has returned to normal.

The standard package will suit most alarm monitoring applications and bespoke configurations can be created to suit particular site or industry requirements.

Following the initial handling of an alarm situation the software can then be used to analyse the details of alarm events by looking at the history for certain alarms, priorities or the events between a certain time/date.
Features & Benefits

Current Alarms
In the normal mode the display will be showing the Current Alarm screen, this gives immediate indication of which alarm channels are still in alarm, if these alarms have been acknowledged and if the fault has cleared. The system will automatically sort the alarm information into chronological order down to the nearest millisecond.

Each channel will show the date/time, description, event type, priority and status as shown below.

Alarm Activation
When an alarm occurs the full alarm details will be displayed on the screen and a coloured flashing background colour is used to inform the operator that a new alarm has occurred. As an option, the software can generate an audible alarm from within the PC.

As the AMS software is capable of displaying various different screens such as History Alarms, System Alarms etc the software automatically switches to the Current Alarm Screen each time a new alarm occurs to ensure that the operator is always kept informed of the current alarm situation.

Alarm Priorities
One of the key decisions an operator has to make when an alarm occurs is how urgent an alarm is compared to other alarms occurring in close succession. Priority levels (0-30) can be used to help the operator determine either the type of alarm (for example pressure, level, temperature, trip, status) or to determine the level of importance. The pre-assigned priority number will appear alongside the alarm description as a prompt.

History Screen
By definition the Current Alarm Screen is used to display active alarms however it is often more important to display and establish the root cause of problems and therefore the History Screen is available to help the user analyse the true sequence of events.

Search by Priority, Time/Date, Channel or Text
Using the History Screen, alarm details can be filtered to only see certain events. The filtering can be by priority/group, channel number or text, date and time range or any combination of the above. So it is a simple task to investigate certain targeted alarms to find exactly what has happened and when on the plant.

System Events and Internal Errors
It is not only the external events that are monitored, the software will also monitor and record significant system events and faults such as when a card is removed or goes faulty, when a card is configured and when system faults occur such as "buffer full" and "paper low" etc. These events allow an engineer analysing the data to see the full picture of what happened and when.

Archive History and Backup on Network
One of the main benefits of linking Alarm Annunciators and Event Recorders to the AMS software is the ability to archive all the alarm information and have this remotely backed-up or linked to a company wide computer network. This archiving process can be set to automatically proceed on defined time scales or triggers.

Multi Level Access
The AMS software is provided with password protection, which allows the client to limit the features available to the user depending on the privileges required for each skill set, i.e. Supervisor, Engineer and Operator, within the software. Each user is assigned a unique login name and password and access to features is limited as required.

Operator Control
The serial communication link between the alarm hardware and the AMS software is bi-directional so it is a simple process to Acknowledge, Mute and Reset alarms from the AMS screen or the Annunciator or both if required.

This allows the operator to remove alarms from the Current Alarm Screen once they have returned to the normal state although full details will still be available within the History Alarm Screen for later analysis.

Audit Trail
It is sometimes necessary to have an official audit trail of the critical alarms on a process or power plant. The AMS can be used to record and archive these alarm events together with the details of when alarms were acknowledged, when the fault cleared and then subsequently reset.

User Configuration
The AMS software is supplied with coloured fonts and backgrounds, which are used to identify each step within the alarm process. A different colour is used for an alarm, acknowledged alarm, return to normal, system alarm, configuration change etc to further assist the operator. To allow the user maximum flexibility, all these key visual parameters can be changed by the user, these include channel description, priority/group, colours etc.
The AMS software is a cost effective solution to many alarm monitoring and analysis applications, but there are many applications in the world-wide market that have specific requirements that are not part of the standard product. As the software application is designed on a flexible and powerful SCADA core many other options and features can be configured into the software. These include lamp-box type displays, analogue input levels, mimic diagrams showing the overall plant, help screens to guide operators to the source of the problem and how this should be resolved.

These systems will always be quoted against an agreed functional specification and would be subject to normal ISO9001 design control procedure and customer approval prior to completion of the system.

**Time Stamp Events to 1ms**
When connected to the RTK 9000TS Sequence of Events Recorder the AMS software will include the full date and time to a resolution of 1ms. This time is actually logged and buffered securely at the 9000TS and transmitted via a serial link to the AMS software. On power networks and process plants this resolution is often necessary to see the REAL chain of events that causes power or process interruption or shutdown.

**ODBC Link**
Using the ODBC standard the AMS software can be used to link all gathered data to proprietry databases such as Access. This allows further detailed analysis of the data using a variety of different software tools.

**Import System Details From Excel**
Customers can use a standard Excel spreadsheet to collate all the information on the alarm channels, including channel description, priority etc. When this is complete it is a simple job to import this data into the AMS system and avoid unnecessary input errors and time delays.

**Auto-shelving**
The 9000TS Event Recorder there are a number of ways that alarms can be automatically or manually inhibited (shelved). This may be because an alarm channel is temporarily out of service or that the system has sensed that the frequency is outside pre-defined limits and as such considered to be erroneous. In all these situations the AMS can show these inhibited alarms on the screen and also log at which time/date the inhibit started and stopped.

**Communicate to different products**
Whilst the AMS is offered with the RTK range of alarm products it can also be used as an Alarm Management Display for other third party products. A huge number of different drivers and protocols are available as standard.

**Graphical User Interface (GUI)**
Using the built-in graphics editor, detailed graphical screens can be quickly assembled and animated. As an addition to these graphics screens, the software is able to utilise ActiveX objects and background images such as photos, or images imported from third party software packages such as AutoCAD.

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**Features & Benefits**

**Analogue Inputs**
The standard AMS package is designed for monitoring of digital inputs but the bespoke system can also monitor, animate and record analogue values and use this information to monitor and analyse trends.

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**Remote Access**
For diagnostic purposes it is possible to design systems with remote access capabilities. The connection can be made using TCP/IP through a public or private telephone system. The system can be accessed using a standard PC, portable PC or Pocket PC technologies.

**“On Call” Module**
The bespoke systems can include the “On Call” module which add the ability to send alarm messages to pagers, mobile phone SMS text messages, E-mails etc. The current engineers that are “On Call” are defined through a fully configurable scheduler. Using a modem it is also possible to remotely assess the situation and directly handle it as necessary.

**Bespoke Systems**

The AMS software is a cost effective solution to many alarm monitoring and analysis applications, but there are many applications in the world-wide market that have specific requirements that are not part of the standard product. As the software application is designed on a flexible and powerful SCADA core many other options and features can be configured into the software. These include lamp-box type displays, analogue input levels, mimic diagrams showing the overall plant, help screens to guide operators to the source of the problem and how this should be resolved.
Due to our policy of continuous product development, we reserve the right to amend specifications without notice.
The DA135 LED Beacon provides an ultra-bright LED flash to warn of abnormal events in any hazardous area. ATEX certified to Ex II 1G for use in any zone. The ruggedised and encapsulated enclosure is sealed to IP65 to ensure reliable operation in harsh environments and is backed up with our 5 year warranty.

Available in five equally bright colours including white and blue, this Beacon is often used as a simple flashing warning signal but there are further unique display features that allow the user to show additional information. These include single, double and triple flash selection and a dual colour version.

Combined with our Intrinsically Safe Sounder and a pushbutton the unit can be configured as a full single point alarm annunciator.
Install in Any Zone
The DA135 is ATEX certified for use in Zones 0, 1 and 2. It can be fitted directly to any reasonably flat surface or mounted onto a pipe using the optional mounting kit shown below. The unit can also be used in safe areas and special terminals are provided for this purpose which avoid any of the normal limitations to full brightness.

Enclosure and wiring, cable entries
The enclosure is made from conductive GRP which provides a rugged IP65 housing suitable for harsh environmental conditions. The unit is also fully encapsulated for even greater protection against corrosive atmospheres and impact damage. A separate terminal housing makes connection a simple matter through the four M20 cable entries. The unit is supplied as standard with a brass tapped plate and blanking plugs in all four entries.

Fully Protected
As the whole unit is fully encapsulated, the terminal board includes two fuses that protect the internal electronics from damage in the case of incorrect connection.

Choice of Five Super-bright Colours
One of five equally bright colours must be selected as shown in the ordering information. As all units are clear until illuminated the display colour is shown on the top certification label. The standard unit has a single colour which can be controlled to flash at a single, double or triple pulse by triggering different control inputs. This allows users to indicate a change in the process using the same unit

Dual Colour
As an option, the DA135 Beacon can be supplied with a two colour display where each colour can be triggered separately from the two control inputs. This is an ideal way of warning an operator of multiple site problems or to indicate that a problem is becoming more critical. Control inputs are fully isolated and the inputs certified as equivalent to "simple apparatus".

Full Alarm Annunciator
RTK is a leading supplier of quality alarm products for the worldwide process and power industry. This IS Beacon has been developed with some of these unique annunciation features. Not only can the Beacon be linked to a Sounder, it can also latch in alarms and allow the operator to go through the normal Acknowledge and Reset functions. The method of operation is consistent with our standard range of alarm annunciators and is user selectable for different functions.

Single Power Feed
An internal current limiting device, combined with the exceptionally high efficiency of LEDs, enables both the DA135 Beacon and a Sounder to be driven through a single barrier/isolator in IIC areas with consequent savings in hardware and plant cabling costs.

Re-alarm
Another user selectable feature is the re-alarm. This allows the Beacon to be acknowledged so the LED goes steady and the Sounder turns off but if the fault condition has not cleared within a programmable time delay (between 1 and 60 minutes) then the alarm will be re-triggered again. This feature is used to prevent critical faults being ignored for extended periods.

Control Inputs
Both control inputs are fully isolated and certified as non-energy storing (Ceq=0, Leq=0) and may be connected into any IS system without affecting the safety, provided the safety input parameters of the unit are not exceeded.

There are two ways of triggering these inputs, as illustrated in the application diagrams below. Firstly by simply linking a control switch/contact from the "control power" available on Terminals 5 and 6, or alternatively, using any 12-40V from an external IS source.
Typical Applications

Stand alone system

DA135 connected as single point annunciator with sounder

DA135 connected as single point annunciator without sounder

Mounting

Horizontal pipe mounting

Vertical pipe mounting

Dimensions
Technical Specification

Certification
Group II, Category 1G, EEx ia IIC T6
(Ta –20ºC to +55ºC)

Location
Zones 0, 1 or 2. Gas Group, IIC, IIB or IIa, Temp Class up to T6

Certificate No.
Baseefa03ATEX0669

Safety Parameter for the supply
Ui = 28V
Ii = 110mA
Pi = 0.8W
The device can be powered from an EEx ia IIC certified interface with output parameters lower than those shown above. Please see the EC Type Certificate for all the safety parameters of the other inputs and outputs.

Supply
For best results the supply voltage should stay between these limits:
20-28VDC through IS Isolator
24-28VDC through Zener Barrier
12-28VDC in safe area
Current: typical 20mA without Sounder, 45mA with Sounder

Recommended Interfaces
Zener Barriers: S951, S953
IS Isolators: WIS1211

Electrical Safety
Non-energy storing simple apparatus. Will not store or generate more than 1.5V, 0.1A, 20mJ or 25mW when connected to intrinsically safe equipment with a maximum open circuit voltage of not more than 28V.

Construction
GRP (glass reinforced plastic) casing to IP65. Transparent acrylic dome for LED housing.
Good resistance to hostile environments, saline atmospheres and impact damage.

Output
Single or Dual colours available from the following: white, red, amber, green and blue.
Brightness typically 0.5J, all colours
Flash rate typically 1 Hz

Cable Entry
Four clearance holes for glands, internal plate tapped to accept 13.5Pg DIN40330 or M20 Isometric fine thread cable glands; shipped with blanking plugs.

Mounting
Direct mounting to walls or flat surfaces. Or pipe/post mounting using PIP68 kit.

Connections
Rising clamp terminals suitable for 2.5mm² cable.

EMC Compliance
Immunity to EN61000-6-2:2001
Emissions to EN61000-6-4:2001

Environment
Operating Temperature: -20 to 55ºC
Storage Temperature: -20 to 80ºC
Humidity: 0-95% RH, non condensing

Protection
IP65

Weight
1.9kg

Accessories
Pipe Mounting Kit PIP68
TAG plate

Order Code

<table>
<thead>
<tr>
<th>DA135</th>
<th>—</th>
<th>XX</th>
<th>—</th>
<th>YY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model Name</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single colour or first of Dual colour RD = Red GN = Green AM = Amber WT = White BL = Blue</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Second of Dual colour RD = Red GN = Green AM = Amber WT = White BL = Blue</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Due to our policy of continuous product development, we reserve the right to amend specifications without notice.
The DA-170 range of LED Clusters provides visual on/off indication of process conditions in hazardous and safe areas. Available in six super-bright colours – red, green, yellow, orange, blue and white – they are standard 22.5mm diameter and seal to IP65 to the panel door.

All colours are matched for equal brightness and all are current limited to 20mA with an integral regulator.

In hazardous areas it is possible to combine LEDs from a single IS interface, two for IIC interfaces and four with a IIB interface. The standard LED Cluster can also be supplied fully mounted in stainless steel boxes ready for immediate mounting on-site.

With the LED’s lower power consumption, lower heat dissipation and far greater life expectancy the DA-170 is an ideal standard indicator for safe and hazardous areas alike.
**Features & Benefits**

**Colours**
The DA-170 Series of LED Clusters is available in six superbright colours including a true white LED. Colours are red, green, yellow, orange, blue and white.

**Low Current Consumption**
The complete DA-170 Range features an integral current regulator to limit the current to 20mA, all colours are matched to obtain consistent brightness across the range including white and blue.

**Simple Connections**
To avoid any wiring problem on site all the LED Clusters have a unique bi-polar input so can be connected to the supply either way around.

**Use in Hazardous Areas**
The typical applications shown below illustrate some of the possible methods of connecting the LED. The way they can be used is extremely varied with numerous means of powering the device and interfacing to third party equipment such as the IS Relays, IS Annunciators and displays.

**Different Lens Options**
There are two different types of DA-170 available which provide the same high intensity illumination but slightly different lens arrangements. The 171 version has a black plastic bezel and a flush lens. The 172 version has a metal bezel and a protruding lens, this allows greater visibility from the side. Both these lens types are also available in the matching pushbuttons and selector switches.

**Interfaces and Systems**
RTK Instruments manufacture a complete range of Zener Barrier and IS Isolators that can be used to power the LED Clusters and provide interfaces to trigger the LEDs. Intrinsically safe alarm and display systems can be designed and constructed to suit individual customer requirements.

**Special Mounting**
RTK has a vast range of experience in supplying LED Clusters pre-mounted, and, if required, prewired to terminals. This can comprise anything from a simple standalone stainless steel enclosure to complex alarm mimics. Please contact the sales office for a detailed quotation.

**Simple Installation**
It is a simple job to mount the DA-170 LED Clusters on any panel door. The lens simply drops through an industry standard 22.5mm diameter hole and the body is screwed securely from the rear. This provides a seal to the panel of IP65.

**Matching Components**
As shown opposite, the LED Clusters can be supplied with a wide range of matching pushbuttons and selector switches. These all comply to the standard classification of ‘simple apparatus’ as defined in EN50014.

**Alarm Applications**
As RTK is a major supplier of industrial alarm systems and components, the DA-170 range of LED Clusters can be linked into either the LN1000 IS Alarm Annunciator or safe area mounting alarm annunciator systems. This method of operation will provide the clearest method of indicating alarm information within a Zone 1 hazardous area.

**Labelling**
Two accessories can be supplied with the LEDs, pre-engraved labels and a plastic label holder.

---

**Typical System Configurations**

- **Single Cluster System: IIC Gas Group**
  - Hazardous area
  - Safe area
  - 24VDC supply
  - BARRIER OR IS INTERFACE UNIT

- **Double Cluster System: IIC Gas Group**
  - Hazardous area
  - Safe area
  - 24VDC supply
  - BARRIER OR IS INTERFACE UNIT

- **Four Cluster System: IIB Gas Group**
  - Hazardous area
  - Safe area
  - 24VDC supply
  - BARRIER OR IS INTERFACE UNIT

---
Technical Specification

Certification
Group II, Category 1G, EEx ia IIC T4 (Ta –20ºC to +60ºC)

Location
Zones 0, 1 or 2. Gas Group IIC, IIB or IIA. Temp Class up to T4

Certificate No.
BAS02ATEX1311

Safety Parameters
Ui = 40V
Pi = 1.2W (max ambient temp. = 60ºC)
Pi = 1.3W (max ambient temp. = 40ºC)
Ci = Li = 0

The device can be powered from an EEx ia IIC certified interface with output parameters lower than those shown above

Supply
14-26VDC, current 20mA

Recommended Interfaces
Zener Barriers: S951, S953
IS Isolators: WIS1210, WIS1211, WIS1213

Environment
Operating Temperature: 0 to 60ºC
Storage Temperature: –20 to 80ºC
Humidity: 0-95% RH, non condensing

Protection
IP65 from the front, IP20 from the rear

Order Code
DAX — 17X

Colour
R = Red
G = Green
Y = Yellow
O = Orange
W = White

Type
171 = Black plastic bezel, flush lens
172 = Metal bezel, protruding lens

Construction
Housing and Mouting Collar
– Polyamide 6.6/reinforced fibreglass FR4
Lens – Polycarbonate

Connections
Raising clamp terminals suitable for 2.5mm² cable

Compliance
Immunity to EN61000-6-2:2001
Emissions to EN61000-6-4:2001

Accessories
DA658: Label Holder
DA659: interchangeable label

LED Cluster Dimensions

Mounting hole clearance:
Spacing between horizontal or vertical centrelines must be at least 50mm to accommodate mounting collar

Matching Switches and Pushbuttons

In addition to the standard LED Clusters, RTK can provide a complete matching range of pushbuttons, selector switches and emergency-stop buttons. These can be selected using the following order code, taking note of the limitations as listed in the additional information panel.

Most of the pushbuttons and selector switches can be supplied in either illuminated or non-illuminated versions so your complete intrinsically safe control panel can have a consistent appearance.

The illuminated versions contain a certified BA9s LED Lamp Type P861 this is suitable for use in Zone 1 or 2 hazardous area, see separate datasheet.
Technical Specification for Illuminated Pushbuttons

Certification
ATEX certified to EN50014:1997 and EN50020:2002
Group II, Category 2G, EEx ia IIC T4
(Ta –20ºC to +60ºC)

Location
Zones 1 or 2. Gas Group IIC, IIB or IIA.
Temp Class up to T4

Certificate No.
Kema03ATEX1021X

Safety Parameters
Ui = determined by li and Pi
li = 2A
Pi = 1W
Ci = Li = 0

The device can be powered from an
EEx ia IIC certified interface with output
parameters lower than those shown above

Supply
With suitable certified interface
18-35VDC, current 20mA

Recommended Interfaces
Zener Barriers: S951-POS, S967-POS
iS Isolators: WIS1211, WIS1212

Environment
Operating temperature: –20 to 60ºC
Storage temperature: –20 to 80ºC
Humidity: 0-95% RH, non condensing

Compliance
Immunity to EN61000-6-2:2001
Emissions to EN61000-6-4:2001

Pushbutton dimensions

Order Code

<table>
<thead>
<tr>
<th>Model Name</th>
<th>Illumination</th>
<th>Contacts</th>
<th>Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>DA170 — PB — NP — RD — 1M1B</td>
<td>IP = Illuminated with plastic bezel</td>
<td>M = Make (N/O)</td>
<td>RD = Red</td>
</tr>
<tr>
<td>SI = Illuminated with metal bezel</td>
<td>NP = Non-Illuminated with plastic bezel</td>
<td>B = Break (N/C)</td>
<td>GN = Green</td>
</tr>
<tr>
<td>NM = Non-Illuminated with metal bezel</td>
<td>SK1 = selector switch, key, 3-position, key remove off</td>
<td></td>
<td>YW = Yellow</td>
</tr>
<tr>
<td></td>
<td>SK2 = selector switch, key, 2-position, key remove on</td>
<td></td>
<td>WT = White</td>
</tr>
<tr>
<td></td>
<td>SK3 = selector switch, key, 2-position, key remove all</td>
<td></td>
<td>BL = Blue</td>
</tr>
<tr>
<td></td>
<td>SK4 = selector switch, key, 3-position, key remove off</td>
<td></td>
<td>BK = Black</td>
</tr>
<tr>
<td></td>
<td>SK5 = selector switch, key, 3-position, key remove all</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SK6 = selector switch, key, 2-position, key remove off, spring return</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SK7 = selector switch, key, 3-position, key remove off, spring return</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EST = emergency stop, twist to release</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ESK = emergency stop, key release</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ESP = emergency stop, pull to release</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Due to our policy of continuous product development, we reserve the right to amend specifications without notice.
# DB-5 Intrinsically Safe Sounder

## 100dBA with 26 user-selectable tones

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATEX certified</td>
<td>Ex II 1G</td>
</tr>
<tr>
<td></td>
<td>EEx ia IIC T4</td>
</tr>
<tr>
<td>Greater than 100dBA output</td>
<td></td>
</tr>
<tr>
<td>26 user selectable sounds</td>
<td></td>
</tr>
<tr>
<td>Two distinctive signals can be</td>
<td></td>
</tr>
<tr>
<td>switched remotely</td>
<td></td>
</tr>
<tr>
<td>Easy to install in all hazardous</td>
<td></td>
</tr>
<tr>
<td>areas</td>
<td></td>
</tr>
<tr>
<td>Low power consumption offers</td>
<td></td>
</tr>
<tr>
<td>application flexibility</td>
<td></td>
</tr>
<tr>
<td>IP65 weatherproof rating</td>
<td></td>
</tr>
</tbody>
</table>

The DB-5 intrinsically safe multitone Sounder is ideally suited for use in areas of high ambient noise. Additionally, for extreme noise levels, they can be linked with the DA135 Intrinsically Safe Beacons to combine audible and visual warnings. They are designed with a re-entrant configuration to combine compactness with maximum efficiency.

One of 26 tones can be selected using a 5-way DIL switch and by switching the incoming negative supply to a third terminal a second tone is sounded. The sounders have suitable low frequencies to conform to BS 5839 Part 1, making them ideal for fire alarm systems and other annunciator applications.

The IP65 enclosure enables the DB-5 Sounder to cope with the harsh environmental conditions found offshore as well as those of the onshore oil, gas and chemical industries.
Sound
26 user selectable tones, see table below for tone types and related volumes. The volume can be adjusted via a single turn potentiometer by 15dB.

To obtain the second tone, the negative supply is switched to a third terminal marked “2nd sound”.

Certification
ATEX certified to EN50014:1997, EN50020:1994 and EN50284:1999 Group II, Category 1G, EEx ia T4 (Ta -20ºC to +55ºC)

Location
Zones 0, 1 or 2. Gas Group, IIC, IIB or IIA, Temp Class up to T4

Certificate No.
BAS00ATEX1259

Supply
12 or 24VDC ±20%, depending on model, current 14mA @ 24V, 12mA @ 12V

Safety Parameters
24V Version
12V Version
Ui = 28v
Ui = 15.7V
li = 28mA
li - 37mA
Pi = 0.81W
Pi = 0.56W
Cl = 0
Ci = 0
Li = 20mH
Li = 20mH + 325Ω + 1000Ω

Please refer to of EC Type Examination Certificate and related System Certificate for full details on suitable interface devices.

Recommended Interfaces
Zener Barriers: S951 (24V version), S931 (12V version)
IS Isolators: WIS1211 (24V version)

Environment
Operating temperature: 0 to 55ºC
Storage temperature: -20 to 80ºC
Humidity: 0-95% RH, non condensing

Protection
IP65

Construction
ABS enclosure with encapsulated electronic module. Colour – red

Connections
Six terminals suitable for cable up to 2.5mm²

Installation Details
Having a deep base and two terminals per input makes these units convenient for looping to other circuits or for siting ‘end-of-line’ resistors. The base has three knock-outs, two on the side and one on the base, to accommodate PG13.5/20mm conduit or cable glands. The units are polarised and a chain may be fitted with an ‘end-of-line’ resistor for reverse polarity testing and to permit line monitoring.

EMC Compliance
Immunity to EN61000-6-2:2001
Emissions to EN61000-6-4:2001

Weight
300g

Tone and Sound Levels with IS Interface

Due to our policy of continuous product development, we reserve the right to amend specifications without notice.

R TK Instruments Limited
St James Business Park,
Knaresborough, North Yorkshire,
England. HG5 8P J

Telephone: +44 (0)1423 580500
Facsimile: +44 (0)1423 580551
Web: www.rtkinstruments.com
Email: enquiry@rtkinstruments.com
DB-7
Intrinsically Safe Sounder

Up to 110dBA with 26 user-selectable tones

The DB-7 is a ruggedised, intrinsically safe multitone Sounder which gives up to 110dBA output. This level of output is suitable for industrial environments with the highest of ambient noise levels. Additionally, they can be linked with the DA135 Intrinsically Safe Beacons to combine audible and visual warnings. They are designed with a re-entrant configuration to combine compactness with maximum efficiency.

Units are available for gas groups IIB and IIC and both feature selectable dual tones. Both of the tones are user selectable using 5 way DIL switches, the second tone being activated by reversing the polarity of the supply.

The IP66 enclosure enables the DB-7 Sounder to cope with the harsh environmental conditions found offshore as well as those of the onshore oil, gas and chemical industries.
Technical Specification

Sound
26 user selectable tones, see table below for tone types and related volumes. Two different tones can be selected using the separate DIL switches, reversing the polarity of the supply will select the second tone.

Certification
Group II, Category 1G, EEx ia IIC or IIB
T4 (Ta –55ºC to +70ºC)

Location
Zones 0, 1 or 2. Gas Group, IIC (or IIB depending on model) or IIA, Temp Class up to T4

Certificate No.
BAS00ATEX1260

Safety Parameters
24V Version: 12V Version:
Ui = 28V Ui = 15.7V
Ii = 123mA (IIB vers.) Ii = 123mA (IIB)
Ii = 61.3mA (IIC vers.) Ii = 61.3mA (IIC)
Pi = 0.653W Pi = 0.563W
Ci = 0 Ci = 0
Li = 10mH + 171.5Ω Li = 10mH + 148.5Ω
(IIC)/46.1Ω(IIB) (IIC)/25.5Ω(IIB)

Recommended Interfaces
Zener Barriers: S951 (24V version), S931 (12V version)
IS Isolators: WIS1211 (24V version)

Recommended Cable
0.5 to 2.5mm² with earthed screen and insulating sheath. Cable parameters are determined by the output parameters of the interface selected

Environment
Operating temperature: –55 to 70ºC
Storage temperature: –55 to 80ºC
Humidity: 0-95% RH, non-condensing

Protection
IP66

Supply
12 or 24VDC ±20%, depending on model, current 34-68mA @ 24V, 25-55mA @ 12V

Recommended Interfaces
Z951 (24V version), SS31 (12V version)
IS Isolators: WIS1211 (24V version)

Recommended Cable
0.5 to 2.5mm² with earthed screen and insulating sheath. Cable parameters are determined by the output parameters of the interface selected

Protection
IP66

Construction
UV stable glass reinforced polyester with stainless steel retaining screws.
Colour – red

Connections
Eight terminals suitable for cable up to 2.5mm²

Installation Details
Having a deep base and extra terminals makes these units convenient for looping to other circuits or for siting “end-of-line” resistors. The base has three knock-outs to accommodate PG13.5/20mm conduit or cable glands. The units are polarised and a chain may be fitted with an “end-of-line” resistor for reverse polarity testing and to permit line monitoring.

EMC Compliance
Immunity to EN61000-6-2:2001
Emissions to EN61000-6-4:2001

Weight
1.0kg

Tone and Sound Levels with IS Interface

<table>
<thead>
<tr>
<th>No</th>
<th>Tones Description</th>
<th>Switch Code</th>
<th>Sound Type</th>
<th>Level dBA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Alternating 800/970Hz at 0.25s</td>
<td>11111</td>
<td>LF 2nd tone</td>
<td>96</td>
</tr>
<tr>
<td>2</td>
<td>Sweeping 800–970Hz at 7Hz</td>
<td>11110</td>
<td>FF 2nd tone</td>
<td>97</td>
</tr>
<tr>
<td>3</td>
<td>Sweeping 800–970Hz at 1Hz</td>
<td>11101</td>
<td>LF 2nd tone</td>
<td>98</td>
</tr>
<tr>
<td>4</td>
<td>Continuous at 2850Hz</td>
<td>11010</td>
<td>HF 2nd tone</td>
<td>107</td>
</tr>
<tr>
<td>5</td>
<td>Sweeping 2400–2850Hz at 1Hz</td>
<td>11001</td>
<td>HF 2nd tone</td>
<td>107</td>
</tr>
<tr>
<td>6</td>
<td>Sweeping 2400–2850Hz at 1Hz</td>
<td>11010</td>
<td>LF 2nd tone</td>
<td>107</td>
</tr>
<tr>
<td>7</td>
<td>Continuous at 970Hz</td>
<td>10101</td>
<td>LF 2nd tone</td>
<td>98</td>
</tr>
<tr>
<td>8</td>
<td>Sweeping 1200–500Hz at 1Hz</td>
<td>10100</td>
<td>LF 2nd tone</td>
<td>107</td>
</tr>
<tr>
<td>9</td>
<td>Continuous at 970Hz</td>
<td>10010</td>
<td>LF 2nd tone</td>
<td>98</td>
</tr>
<tr>
<td>10</td>
<td>Continuous at 970Hz</td>
<td>10001</td>
<td>French fire</td>
<td>93</td>
</tr>
<tr>
<td>11</td>
<td>Alternating 800/970Hz at 7.8Hz</td>
<td>11111</td>
<td>HF 2nd tone</td>
<td>98</td>
</tr>
<tr>
<td>12</td>
<td>Continuous at 970Hz</td>
<td>10101</td>
<td>French fire</td>
<td>93</td>
</tr>
<tr>
<td>13</td>
<td>970Hz at 0.25s on, 1s off</td>
<td>10011</td>
<td>LF 2nd tone</td>
<td>98</td>
</tr>
<tr>
<td>14</td>
<td>Continuous at 970Hz</td>
<td>10010</td>
<td>French fire</td>
<td>93</td>
</tr>
<tr>
<td>15</td>
<td>Continuous at 970Hz</td>
<td>10001</td>
<td>Swedish fire</td>
<td>93</td>
</tr>
<tr>
<td>16</td>
<td>Intermitent 660Hz: 1.8s on, 1.8s off</td>
<td>01111</td>
<td>Swedish fire</td>
<td>93</td>
</tr>
<tr>
<td>17</td>
<td>Continuous at 660Hz</td>
<td>01101</td>
<td>Swedish fire</td>
<td>93</td>
</tr>
<tr>
<td>18</td>
<td>Continuous at 660Hz</td>
<td>01100</td>
<td>Swedish fire</td>
<td>93</td>
</tr>
<tr>
<td>19</td>
<td>Continuous at 660Hz</td>
<td>01100</td>
<td>Swedish fire</td>
<td>93</td>
</tr>
<tr>
<td>20</td>
<td>Alternating 554/440Hz at 1Hz</td>
<td>01100</td>
<td>Swedish fire</td>
<td>93</td>
</tr>
<tr>
<td>21</td>
<td>Intermitent 660Hz at 7.8Hz</td>
<td>01011</td>
<td>Swedish fire</td>
<td>93</td>
</tr>
<tr>
<td>22</td>
<td>Intermitent 660Hz at 7.8Hz</td>
<td>01010</td>
<td>Swedish fire</td>
<td>93</td>
</tr>
<tr>
<td>23</td>
<td>Intermitent 660Hz at 7.8Hz</td>
<td>01001</td>
<td>Swedish fire</td>
<td>93</td>
</tr>
<tr>
<td>24</td>
<td>Sweeping 2400–2850Hz at 50Hz</td>
<td>01000</td>
<td>Swedish fire</td>
<td>93</td>
</tr>
<tr>
<td>25</td>
<td>970Hz pulses, 0.5s on/0.5s off</td>
<td>00111</td>
<td>Swedish fire</td>
<td>93</td>
</tr>
<tr>
<td>26</td>
<td>2850Hz pulses, 0.5s on/0.5s off</td>
<td>00110</td>
<td>Swedish fire</td>
<td>93</td>
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Approvals

<table>
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<tr>
<th>Country &amp; Authority</th>
<th>Standard</th>
<th>Certificate</th>
<th>Approved for</th>
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<tr>
<td>Europe Baseefa EN50014, EN50020 BAS00ATEX1260</td>
<td>EX II 1G EEx ia IIC and IIB T4</td>
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<td>Russia Gost ‘R’ Certification A-0758</td>
<td>OEx ia IIC and IIB T4</td>
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</table>

Due to our policy of continuous product development, we reserve the right to amend specifications without notice.

RTK Instruments Limited
St James Business Park,
Knaresborough, North Yorkshire,
England. HG5 8PJ

Telephone: +44 (0)1423 580500
Facsimile: +44 (0)1423 580501
Web: www.rtkinstruments.com
Email: enquiry@rtkinstruments.com
# DFR30IS Series

**Intrinsically Safe Display Facias**

Backlit LED illuminated displays for all hazardous areas

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
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<tr>
<td>ATEX certified Ex II 2G</td>
<td>EEx ia IIC T4</td>
</tr>
<tr>
<td>3 window sizes</td>
<td></td>
</tr>
<tr>
<td>6 window colours, all LED illuminated</td>
<td></td>
</tr>
<tr>
<td>Modular construction so displays can be matched to your exact requirements</td>
<td></td>
</tr>
<tr>
<td>Integral pushbuttons</td>
<td></td>
</tr>
<tr>
<td>Used as part of a hazardous area alarm system</td>
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</table>

The simple backlit flashing display is still regarded as the clearest way of alerting operators to abnormal conditions on complex processes. The DFR30IS Display Facia provides a clear, bright display and is approved for use in zone 1 or zone 2 hazardous areas. This product is often combined with the RTK range of Alarm Annunciators and certified Interfaces to provide a complete Alarm Management System with displays both in the safe and hazardous areas.

As the unit is modular in design, displays can be created in almost any format, arrangement and size making it possible for users to have exactly the configuration needed for the application.
**Technical Specification**

**Window Details**
The DFR30IS is available in three window sizes: small, medium and large as listed below.
- Small: 30 x 30mm
- Medium: 60 x 30mm (W x H)
- Large: 60 x 60mm

Any combination of these window sizes can be supplied in any format, mixed as required in a single display to make up the appropriate matrix required.

**Window Colours**
All three different window sizes are available in the following six colours:
- Red
- Amber
- Yellow
- White
- Green
- Blue

**Integral Components**
As these Displays are used for alarm indication it is often necessary to include pushbuttons and audibles within the display itself to acknowledge and reset alarms. These are normally fitted in the bottom right hand cell.

**Window Marking**
Displays can be configured with the required filter colours and film legends to suit the exact customer’s requirements or alternatively RTK can supply a template to allow users to create their own legends locally.

**Certification**
ATEX certified to EN50014:1997 and EN50020:2002
Group II, Category 2G, EEx ia IIC T4 (Ta –20°C to +60°C)

**Location**
Zones 1 or 2. Gas Group, IIC, IIIB or IIA, Temp Class up to T4

**Certificate No.**
KEMA03ATEX1021X

**Safety Parameters**
- \( U_i \) = determined by \( I_i \) and \( P_i \)
- \( I_i = 2A \)
- \( P_i = 1W \)
- \( C_i = L_i = 0 \)

The device can be powered from an EEx ia IIC certified interface with output parameters lower than those shown above.

**Supply**
14-26VDC, current 20mA per 30mm window

**Recommended Interfaces**
Zener Barriers: S951, S953
IS Isolators: WIS1210, WIS1211, WIS1213

**Environment**
- Operating temperature: 0 to 60°C
- Storage temperature: –20 to 80°C
- Humidity: 0-95% RH, non condensing

**Protection**
IP41 from the front, IP20 from the rear

**Connections**
Raising clamp terminals suitable for 2.5mm² cable

**Compliance**
Immunity to EN61000-6-2:2001
Emissions to EN61000-6-4:2001

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RTK Instruments Limited
St James Business Park,
Knaresborough, North Yorkshire,
England. HG5 8PJ
Telephone: +44 (0)1423 580500
Facsimile: +44 (0)1423 580501
Web: www.rtkinstruments.com
Email: enquiry@rtkinstruments.com

FM14290
ISO9001:2000
YEAR GUARANTEE
P725LO and DF30 Series Display Facias

A variety of display formats for alarm and status indication

A range of display types, sizes and configurations

Lamp or LED illumination

Modular construction so displays can be matched to your exact requirements

All units available in six window colours

All units supplied complete and ready to panel mount

Low installed depth

Designed to complement the RTK Instruments range of Alarm Annunciators and instrumentation products the Display Facias provide a range of cost effective products to show alarm and plant status in the clearest possible way.

There are three main ranges that cover different applications and industries, all are modular in construction so can be configured to suit the exact shape and size requirements.

Various window sizes and styles are available, all back-lit by either conventional filament lamps or “fit and forget” ultra-bright LED assemblies to provide the clearest possible display to operators.

Alarm text is provided in the form of laser printed film legends, which allows changes to be easily made as plant needs evolve.
P725LO Display Facia

This is a lamp-only version of the best selling 725 Series Alarm Annunciator. Using the same modular construction, frame assembly and illumination method means these displays will match exactly the full annunciator system.

**Display Size**
Almost any size and format can be constructed using the basic cell structure, with a window size being selected from above or if required intermixed windows can be supplied. The maximum overall size either vertically or horizontally is 30 cells.

**Window Colours**
All three window sizes are available in the following six colours for both LED and filament lamp illumination
- Red
- Amber
- Yellow
- White
- Green
- Blue

**Supply Voltage**
24VDC is normally used to power the illuminated windows but alternative voltages such as 12 or 48VDC can be supplied to special order.

Standard systems are supplied with a positive common linked internally. This allows externally switched 0V signals to initiate each channel as required.

As an option, systems with a common 0V can be used instead, allowing +24VDC switched inputs to be used. This must be specified at the time of ordering.

**Integral Components**
As these Displays are used for alarm indication it is often necessary to include pushbuttons and audibles within the display itself to acknowledge and reset alarms. These are normally fitted in the bottom right hand cell.

**Window Marking**
Displays can be configured with the required filter colours and film legends to suit the exact customer’s requirements or alternatively RTK can supply a template to allow users to create their own legends locally.

**Connections**
The standard display has rear mounted rising clamp terminals suitable for solid or stranded cable up to 2.5mm². There is a single terminal for each window and a common return to simplify the system wiring.

**Technical Specification**

**Lamp Version**
28V 50mA 10mm glass wedge 14,000 hour design life
- Small window 45mA
- Medium window 90mA
- Large window 180mA

**LED Version**
“Fit and forget” ultra-bright removable LED assemblies (4 LEDs per assembly) that plug into the standard 10mm wedge lamp socket
- Small window 20mA
- Medium window 40mA
- Large window 80mA

**Environment**
Operating temperature: -20 to 50°C (lamp version)
-20 to 60°C (LED version)

Storage temperature: -20 to 80°C

Humidity: 0-95% RH non condensing

**Protection**
Front of panel IP41
Rear of panel IP20

**Compliance**
Immunity to EN61000-6-2:2001
Emissions to EN61000-6-4:2001
LVD to EN61010-1:1993
Window Details
The DF30 is available in three different window sizes, small, medium and large as listed below.
- Small: 30 x 30mm
- Medium: 60 x 30mm (W x H)
- Large: 60 x 60mm
Any combination of these window sizes can be supplied in any format, mixed as required in a single display to make up the appropriate matrix required.

Display Size
The display can be any format from a single small window (30 x 30mm) to a maximum of 20 ways wide and 20 ways high giving a total display size of 400 small windows. If larger window sizes are required then this maximum is reduced accordingly, i.e. 200 medium windows (30 x 60mm) and 100 large windows (60 x 60mm).

Window Colours
All three window sizes are available in the following six colours:
- Red
- Yellow
- Amber
- Green
- White
- Blue

Incandescent or LED Illumination
The standard display is supplied with dual filament lamps but backlit LED illumination is available for all window sizes and colours. These displays are comparable in brightness to the lamp displays but are virtually maintenance free.

Supply Voltage
The standard systems are supplied ready to connect directly to 24VDC. Systems can also be supplied for 6, 12 or 48VDC or using the integral transformer adapter directly to 110, 240, 380 or 440VAC.

Integral Components
To complete the display package, the DF30 is available fitted with integral pushbuttons, selector switches and audibles. Both pushbuttons and audibles take up a single small window (30 x 30mm).
Any number of pushbuttons and selector switches can be fitted and the position of these is totally flexible.

Window Marking
Display units can be supplied with all windows engraved or fitted with film legends. In the standard display the colour and text is visible at all times but windows can be supplied which are visible only when lit or which have illuminated text only on a black background.

Connections
The standard display has rear mounted screw terminals suitable for 2.5mm² solid or stranded cable. Two terminals are available for each window. If required one terminal from each window can be commoned together to reduce the customer’s wiring requirements.

Technical Specification
Lamp Version
- 28V 40mA BA9S Bayonet lamp
- 14,000 hour design life
- Small window: 40mA
- Medium window: 80mA
- Large window: 160mA

LED Version
- “Fit and forget” ultra-bright removable LED assemblies
- (array of SMT LEDs per assembly)
- Small window: 20mA
- Medium window: 40mA
- Large window: 80mA

Environment
Operating temperature:
- -20 to 50°C (lamp version)
- -20 to 60°C (LED version)
Storage temperature:
- -20 to 80°C
Humidity: 0-95% RH, non condensing

Protection
Front of panel IP41
Rear of panel IP20

Compliance
- Immunity to EN61000-6-2:2001
- Emissions to EN61000-6-4:2001
- LVD to EN61010-1:1993
DF30 Specials

In addition to the standard DF30 Display Facia there are a number of specials that are supplied to suit particular applications, these include the following:

- **DFR30 Version**
  - This is the same as the DF30 Display but has the wider, larger frame to match the 725 Series Annunciator. Overall and cut-out dimensions are the same as the P725LO product.

- **DF30LC Version**
  - This is a lower cost LED illuminated display that can be connected directly to 48 or 110VDC. The rear terminal board includes an efficient DC/DC converter to drive the LEDs from the higher voltage. Available in blocks of 4 wide by 2 high small windows.

- **DF40 Version**
  - The same display type and features but based on a 40mm grid structure giving window sizes of 40 x 40mm, 80 x 40mm and 80 x 80mm.

- **DFR30IS Version**
  - This unit is an Intrinsically Safe backlit display which can be mounted in any Zone 1 or Zone 2 hazardous area. See separate datasheet for full details.

IP65 Displays

**Display Details**

The IP65 displays are custom built using backlit LED display windows of two different sizes, either 24 x 18mm or 36 x 24mm. Both are backlit by multichip LEDs to maintain the security and provide a maintenance free display. Arrays of almost any shape and size can be manufactured to suit the exact display requirements.

The LEDs are available in red, amber and green. These can be combined with IP65 sealed, matching pushbuttons to provide the standard controls for Lamp Test, Accept and Reset.

All the display modules are pre-wired to a row of terminals making connection a simple task. The units are also supplied with a matching gasket to provide the seal to the mounting surface.
LN1000
Intrinsically Safe Annunciator

Modular alarm system for all hazardous areas

ATEX Certified Ex II 1G, EEx ia IIC T4
Ideal for installation in any zone
Up to 32 channels can be powered through one IS interface
Field-mounting product: flameproof or purged cabinets not required
User-programmable alarm sequences to ISA-S18.1 1979
Compatible with a range of intrinsically safe audible and visual alarms
Alarm indication by combined bright LEDs and LCDs

The LN1000 Intrinsically Safe Annunciator provides a unique solution for problems with hazardous area alarm indication. The Annunciator provides a visual display of the alarm status including ‘first-up’ information and can be mounted in the hazardous area for the benefit of operators working in any zone.

The lightweight stainless steel construction gives a compact and simple to install modular unit which can easily be expanded by the addition of extra Alarm Cards.

Maintenance can be carried out live without the necessity of ‘gas checks’ or prior shutdown. Unlike explosionproof, purged and type ‘n’ systems, installation is simple and relatively low cost.

With the addition of a number of ancillary devices a complete intrinsically safe alarm and control package can be provided.
Features & Benefits

Lightweight
The LN1000, being constructed from stainless steel and polyurethane mouldings, is extremely lightweight in comparison to conventional explosionproof and purged systems. This gives great benefits where space and payload are critical factors, especially offshore.

Fully Field Programmable
Each two way alarm card is programmable for different alarm sequences and different functionality.

Time Delays
Each alarm input has a DIL switch selectable adjustable time delay of between 3 and 30 seconds to eliminate false alarms caused, for example, by surging liquids.

System Size
Two chassis sizes are available: 12way and 32way, with the number of two Channel Alarm Cards added to suit the application. Further Alarm Cards can be slotted in at a later date if necessary. Larger systems can be created by linking chassis together.

Extremely Lower Power
Even the 32 channel Annunciator complete with repeat relays on all channels can be powered from a single isolating interface. The WIS1212 is recommended.

First-Up
In alarm annunciation applications it is often essential to know which alarm occurred first in a particular group. To this end, three different first-up sequences and seven different first-up groups are available, all programmable by DIL switches.

Servicing
Because the unit is intrinsically safe, live inspection and maintenance procedures can be carried out at any time. All configuration and maintenance is carried out from the front by simply removing the front facia and withdrawing the cards.

Installation
Installation is relatively simple using intrinsically safe equipment. There is no complicated purged panels to control and no need for explosionproof conduit etc. The front of the unit is sealed to IP65 so is suitable for mounting out in the field in harsh environments.

Mounting
The standard certified product is normally supplied for panel mounting into the customer’s control system. As an extra service RTK can supply the Annunciator pre-mounted into an IP65 stainless steel wall mounting cabinet. For ease of site wiring the LN1000 is then supplied pre-wired to a row of terminals ready for external connection via the bottom gland plate. Two types of wall mounting wiring are available, one with all connections taken to terminals and a lower cost version which just has the basic alarm contact and common outputs wired to terminals.

Group Outputs
The Sequence Card has outputs to drive external sounders and also two group outputs which are DIL switch selectable to follow the alarm logic or the alarm contacts. In conjunction with these group outputs each alarm channel also has two outputs configurable to follow the alarm contact, the audible or the alarm logic. These outputs can be linked to provide group relay outputs for different alarm priorities and give a control output to third party equipment in the safe or hazardous area.

Complete Alarm Package
As specialists in the supply of all types of alarm products RTK can provide all the components necessary to produce a complete alarm package or can even provide the whole package fully wired and ready to install.
The LN1000 Intrinsically Safe Alarm Annunciator functions in the same manner and with the same operational logic as conventional flashing-light alarm panels.

The system is extremely flexible. In its simplest form it consists of a 24VDC power supply, an isolating interface, and a 12 or 32 channel annunciator — shown in the diagram above.

For both large and small systems, the DA-149 Intrinsically Safe Relays are ideal for transferring signals from safe to hazardous areas or in the opposite direction or even within a hazardous area.

Additional audible and visual warning devices can be connected to provide the clearest possible method of attracting the operator’s attention.

**IS Warning Devices**

For large and small systems, the 100dBA DB-5 Sounder and/or a DA135 LED Beacon can be added to attract the operator’s attention in noisy environments. Each can be driven in either of two ways:

- By controlling the 24VDC supply with a DAA149 IS Relay in the safe area (top).

**IS Interface**

The Annunciator and the optional warning devices each operate from any suitable 24VDC supply through an IS isolating interface unit. The recommended interfaces are the RTK WIS1200 Series which, owing to their input/output isolation, do not need a high integrity earth and are therefore easy to install.

**IS Relays**

The DA-149 Series of IS Relays are used for transferring status signals to and from hazardous and safe areas. These unique solid state devices act like the coil and contacts of an electromechanical relay.

**Power Supply Units**

The RT Series Power Supplies will conveniently provide a 24VDC supply from the AC mains to power circuits protected by the WIS1200 Series units. A separate battery backup unit, the DA-161, is available for use with the RT PSU.
Displays

The Annunciator functions in a similar manner to a conventional, safe area annunciator, but because of the limited power available the standard backlit display window is changed to a combined high brightness LED and an LCD.

When an alarm occurs a sounder and/or a beacon will be activated to attract the operator’s attention. A high brightness LED on the LN1000 facia will pinpoint the affected channel(s). A customised legend gives details of the plant parameter that needs attention.

The LCD display gives further details of the alarm situation such as which alarm occurred first and whether the alarm condition has returned to normal.

The LED will always follow the ISA alarm sequence selected. The LCD display can take any of the seven forms shown, where ‘F’ indicates the first alarm to occur in that first-up group and ‘I’ shows that channel is currently inhibited. ‘N’ always indicates that the alarm contacts are in the normal (non-alarm) state.

Controls

The operator will respond to an alarm situation by pressing the appropriate pushbuttons as follows:

Silence

Silences both the local horn and any sounder connected to the EXT SOUND output. Has no effect on the visual display. This is always overridden by a new alarm.

Acknowledge

Indicates recognition of a new alarm. The exact operation of the unit will depend on the alarm sequence selected.

Reset

Returns the system to normal so the next alarm that occurs will be a first-up.

Test

The test pushbutton simply illuminates all LED and all LCD segments to ensure all displays are functioning correctly.

System Test

By pressing Silence and Test simultaneously the System Test function is initiated. This will simulate an alarm on all inputs to test the full operation of the complete system.

Terminals are also available for additional external pushbuttons to be connected to the Annunciator.

Programming

Each channel of the annunciator can be programmed independently to respond in a pre-determined manner to the inputs from the alarm contacts on the plant and the operator’s pushbuttons. A range of ISA alarm sequences are supported and selected by DIL switches. The following are details of the main programmable features:

- Alarm contacts may be normally open or normally closed.
- After an alarm has been acknowledged the LN1000 may return to normal automatically as soon as the contact does so, or it may require to be reset manually.
- A 3-30 second time delay may be added to eliminate false triggering of alarms.
- Each alarm can be selected into one of seven first-up groups or no group.
- The unit can be programmed for three different first-up sequences or ringback sequence. Ringback indicates to the operator when an alarm contact has returned to the normal (non-alarm) state.
- The audible can be set to resound after a programmable time delay.
- Group Outputs and Alarm Outputs can be configured to follow the alarm logic, follow the audible or follow the alarm contacts. All these outputs can be set to drive high or low.
Ancillary Equipment

As a leading supplier of Alarm Annunciators and Alarm Systems, RTK Instruments is able to specify, design, manufacture and commission a complete alarm system for the client’s exact application and industry requirements.

The parts shown below detail some key components that are used in these hazardous area alarm systems but many other options are available from the range of safe and hazardous area Alarm and Display Products.

**WIS Series Intrinsically Safe Isolators**

The WIS1200 Series of Alarm/Solenoid Drivers are suitable to drive the Annunciators, Sounder, Beacons and other display devices and as they are all manufactured by RTK Instruments have the benefit of been proven together as a system with the appropriate field mounted device.

**DA-149 Intrinsically Safe Relays**

An essential interface between safe and hazardous area equipment and different units within the hazardous area, this unique design simulates an electromechanical relay but uses only a fraction of the normal current required. The inputs and outputs are certified as equivalent to “simple apparatus” so simplifying overall system design.

**DB5 and DB7 Intrinsically Safe Sounders**

Triggered from the LN1000 these IP65 certified Sounders have outputs greater than 100dBA. The user can select from 26 different tones.

**Field or Panel Mount Intrinsically Safe Displays**

These displays can be directly connected to the field mounted transmitter or sensor and can be used to display the desired parameter but also provide an alarm input into the LN1000 to make up a complete display and alarm package.

**DA135 Intrinsically Safe Beacons**

Driven from the group outputs of the LN1000 these high brightness warning Beacons will attract an operator’s attention even in areas of extremely high ambient noise levels. IP65 and fully encapsulated, this rugged design is suitable for all harsh environmental conditions.

**RT Series PSU**

A range of industrial Power Supplies to convert from various AC or DC supply voltages.

**DA-161 Battery Backup**

Can be used in conjunction with the RT Series Power Supplies.
Sequences and Specifications S18.1 1979 (R1985). Systems can be configured with different features on different alarm ways and there is no need to switch the power off. The diagram below shows the most commonly used sequences.

**MANUAL RESET**

Sequence Code M

**AUTOMATIC RESET**

Sequence Code A

**MANUAL RESET FIRST OUT**

Sequence F2M-1

**AUTOMATIC RESET FIRST OUT**

Sequence F3A

**AUTOMATIC RESET FIRST OUT**

Sequence F1A

**RINGBACK**

Sequence Code R

(A) = A flashing

N = On when contacts in normal state

F = First-up alarm

(A) = A flashing

FN = First Silenced

FN = First out reset

FN = First Alarm

FN = Subsequent Alarm

FN = Abnormal

FN = Audible

FN = Silent

FN = LCD

FN = LED

(\(\text{Normal}\)) = Normal
Engraving

The legends identifying each channel are engraved on 1.6mm Traffolyte to customers’ requirements. They are located behind the front panel membrane and can be changed on site if necessary. The standard colour is black text on a white background but can optionally be in the following colour combinations:

Black text on orange or yellow backgrounds

White text on black, red, green, blue or brown backgrounds.
Technical Specification

Safety Description

Certification
Group II, Category 1G, EEx ia IIC T4
(Ta –20ºC to +60ºC)

Location
Equipment and related alarm contacts can be located in Zones 0, 1 or 2, Gas
Group IIC, IIB or IIA, Temp Class up to T4

Certificate No.
Baseefa02ATEX0184

Safety Parameters
Ui = 30V
Ii = 165mW
Pi = 1.2W
Ci = 47nF
Li = 0.44mH

The device can be powered from an EEx ia IIC certified interface with output
parameters lower than those shown above. Please see the EC Type
Certificate for all the safety parameters of the inputs and outputs.

Recommended Interfaces
IS Isolators: WIS1212

Inputs

Alarm Inputs
User selectable as normally open or
normally closed.
LN1000-12: maximum 12 inputs which
must be isolated
LN1000-32: maximum 32 inputs which
must be isolated

Inhibit Inputs
Each alarm channel can be individually
inhibited to prevent alarms being
activated.

Pushbutton Inputs
As standard four membrane
pushbuttons are fitted to the front facia,
however, terminals are provided so
remote pushbuttons can be wired into
the LN1000. Pushbuttons are:
Test, Acknowledge, Reset, Silence.

Outputs

Sequence Card Outputs
Ext Sound: Used to switch a DA-149
IS Relay to control external
sounders
Groups: Two group outputs to drive
DA-149 IS Relays. One is
configurable to follow the
alarm logic or alarm
contacts and the second
works as a reflash output
which gives a 1 second
pulse on the occurrence of
each new alarm.

Alarm Card Outputs
Each 2 channel alarm card has two
group outputs per alarm channel. These
can be configured to follow the alarm
logic, follow the input or follow the horn.
These outputs are ideal to drive the
DA-149 IS Relays which in turn can be
used to control external safe or
hazardous area mounting equipment.

General

Supply
Via suitably certified isolated interface
sited in the safe area; the WIS1212 is
recommended.

Power requirements
18-35VDC at 75mA max into the
WIS1212 interface.

EMC Compliance
Immunity to EN61000-6-2:2001
Emissions to EN61000-6-4:2001

Environment
Operating temperature: 0 to 60ºC
Storage temperature: –20 to 80ºC
Humidity: 0-95% RH, non condensing

Protection (Panel Mount)
Door to case and case to panel: IP65
Rear of enclosure: IP20

Protection (Wall Mount)
IP65

Connection
Rising clamp type terminals, for
conductors up to 2.5mm²

Recommended cable
0.5 to 2.5mm² two core with earthed
screen and insulated sheath

Construction
Case: Stainless steel
Front facia: High impact
resistant polyurethane
Membrane: Polyester

Weight
12 way panel mount: 3.8kg
32 way panel mount: 8.0kg
12 way wall mount: 20.0kg
32 way wall mount: 44.0kg
Above is for the chassis c/w Sequence
Card – add 120g for each Alarm Card
required.

Order Code

<table>
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<tr>
<th>LN1000</th>
<th>Chassis size</th>
<th>Alarm channels</th>
<th>Mounting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12 or 32 way</td>
<td>Number of alarm channels</td>
<td>P = panel</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>W1 = wall mount</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>supply and inputs wired to terminals</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>W2 = wall mount</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>all inputs and outputs wired to terminals</td>
</tr>
</tbody>
</table>

Due to our policy of continuous product development, we reserve the right to amend specifications without notice.
LN870
Intrinsically Safe Light Tower

A multi-tier Light Tower for status indication in hazardous areas

The LN870 Light Tower provides visual on/off indication of process conditions in safe and hazardous areas. The unit is available up to a maximum of five tiers and each tier can be selected from five super-bright colours: red, amber, white, blue and green.

Each tier has a unique prism cut lens and internal reflective cone to improve visibility and requires one LED Lamp for illumination which is current-limited to take a maximum of only 20mA. Available for hazardous area use in both zones 1 and 2, up to two tiers can be driven from a single IIC interface.

There is a choice of pole or direct mounting, both incorporating a special vibration absorber.

With the LED’s low power consumption, low heat dissipation and long life expectancy, the LN870 is an ideal indicator for safe and hazardous areas alike.
Tiers
Can be stacked up to five tiers high using five different colours in any order.

Colours
Each tier available in five super-bright colours. Colours are red, amber, green, blue and white.

High Reliability
All tiers illuminated with high reliability LED lamps designed to provide a minimum of 100,000 hours service life.

Low Current Consumption
All LED Lamps operate at 20mA or less and feature integral current limiting to maintain consistent brightness over the operating range of the voltage supply.

Use in Hazardous Areas
In hazardous areas the light tower LED lamps must be powered through suitable intrinsically safe isolators or barriers. Up to two LED lamps and therefore two tiers can be driven from a single IIC interface.

Mounting
A special anti-vibration absorber built into the lower portion of the moulding effectively reduces vibration to the LED Lamps.
The unit can be pole or direct base mounting.

Configuration
It is easy to change the order of the colours. Lenses simply unscrew and LED Lamps can be installed in any position.

Certification
ATEX certified to EN50014:1997 and EN50020:2002
Group II, Category 2G, EEx ia IIC T4
(Ta –20ºC to +60ºC)

Location
Zones 1 or 2. Gas Group, IIC, IIB or IIA, Temp Class up to T4

Certificate No.
Kema03ATEX1022X

Safety Parameters
\( U_i = 45V \)
\( I_i = 2A \)
\( P_i = 1.2W \) (max ambient temp. = 60ºC)
\( P_i = 1.3W \) (max ambient temp. = 40ºC)
\( C_i = L_i = 0 \)
The device can be powered from an EEx ia IIC certified interface with output parameters lower than those shown above.

Supply
With suitable certified interface
18-35VDC, current 20mA per tier

Recommended Interfaces
Zener Barriers: S967-POS, S985-POS
IS Isolators: WIS1212, WIS1213 (IIB only), WIS1215

Environment
Operating temperature: –20ºC to 40ºC
(\( P_i <=1.3W \))
Operating temperature: –20ºC to 60ºC
(\( P_i <=1.2W \))
Storage temperature: –20 to 80ºC
Humidity: 0-95% RH, non condensing

Protection
IP40, IP54 option available

Construction
Heat and shock resistant polycarbonate

Connections
Two flying leads per lamp/tier both marked with tier number. Terminations must be rated to IP20 minimum

Mounting
Direct base or optional pole mounting, both have vibration absorbing base

Compliance
Immunity to EN61000-6-2:2001
Emissions to EN61000-6-4:2001

Weight
350g for one tier and 50g for each additional tier

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Due to our policy of continuous product development, we reserve the right to amend specifications without notice.
NEX7250
Alarm Annunciator

Designed to Type “n” standards for Zone 2 hazardous areas

Suitable for use in Zone 2 hazardous areas

Certified to the ATEX Directive 100a in accordance with EN50021:1999

Ultra-bright LED illumination as standard in six colours

Multi-redundant design (ensuring no single point can cause failure)

Fully field programmable for all standard ISA sequences plus a range of options

Options for RS485 serial interface and repeat relay per channel

The NEX7250 Zone 2 Programmable Alarm Annunciator offers a range of features and benefits normally reserved for use in safe area annunciators only.

The heart of the system is the field proven Series 725 Alarm Annunciator which is available in 3 individual window sizes 30 x 30mm, 30 x 60mm or 60 x 60mm.

Reliability of the system is vastly improved over conventional systems with the use of ASIC (Application Specific Integrated Circuits) technology for each pair of alarms, removing any reliance on common control cards.

The standard unit is wall mounting but panel mounting versions can also be supplied. Both types have a hinged plexiglass viewing window sealed to IP54.

Systems are available in a range of formats and sizes and all carry the same approval to internationally recognised Zone 2 standards.
Technical Specification

Certification
Self certified to EN50021:1999 under the ATEX Directive 100a
Group II, Category 3G, EEx nA (L) IIC T4 (Ta -20ºC to +50ºC)

Location
Zone 2. Gas Groups IIC, IIB or IIA.
Temp Class up to T4

Number of alarm ways
Systems are available in a range of sizes from 2 to 120 channels and with a choice of three window sizes.

Material
Industry standard, steel, wall mounting enclosures or bespoke panel mounted versions both sealed to IP54. Stainless steel options can be supplied as an option.

Connections
On the wall mounted version the Annunciator is wired to a row of terminals. The panel mounted version can be connected directly to the Annunciator. Terminals are suitable for cable sizes up to 2.5mm² and would be wired via the appropriate gland plate.

Cable Entries
Units are fitted with removable un-drilled gland plates to allow access to customer connections.

Pushbuttons, Sounders and Beacons
Remote pushbuttons & certified Sounders and Beacons can all be catered for as part of the overall alarm system.

Hinged Door
The front plexi-glass cover of the enclosure is hinged to allow easy access for configuration, wiring and commissioning.

Outputs
Units are equipped with dual common alarm and dual horn relays as standard. Individual repeat relays per channel and RS485 serial interface options are available on request.

Environment
- Operating Temperature: 0 to 50°C
- Storage Temperature: -20 to 80°C
- Humidity: 0-95% RH, non-condensing

Supply
85-264VAC or 24VDC

Protection
IP54

Detailed Specification
Please refer to the Series 725 datasheet for full details on the Alarm Annunciator specification.

Specials
The details shown below are typical arrangements only, systems can be designed and manufactured to each customer's exact requirements.

Wall Mounted Version

Panel Mounted Version
P607 Series
Trip Amplifiers and Converters

Versatile designs for all standard process signals

- Compact plug-in DIN-rail and surface mounting enclosure
- Single or double trip versions
- Operates on all normal process signals – voltage, current, resistance, RTD, thermocouple
- Analogue output option
- Mains or 24VDC powered
- “Power on” and “trip state” indication
- Trips are individually switch selectable to trip on rising or falling input signal
- Trip adjustment by multiturn trim-pot or ten turn dial

The P607 range of DIN-rail and surface mounting Trip Amplifiers provides a compact selection of instruments suitable for many industrial control applications. The units can be supplied to operate on all standard process control signals, including temperature monitoring devices such as RTDs and thermocouples.

The normally energised relays will de-energise when the incoming signal exceeds the trip level selected by the set pot or pots. LED indicators will show when a channel is in a tripped condition. All units can have voltage or current analogue re-transmission making the unit an integral Converter and Trip Amplifier.

The units are of the plug-in type to facilitate fast replacement in the unlikely event of a unit failure, thus keeping plant down-time to a minimum. Temperature monitoring units can also have optional probe failure indication and alarm.
Technical Specification

Inputs

DC Ranges
Voltage Current
0–10mV 0–1mA
0–100mV 0–10mA
0–1V 4–20mA
0–10V 0–100mA
0–100V 0–1A

Positive and negative going input signals can be catered for to special order.

Temperature Ranges
Platinum RTD (Pt100), resistance thermometer:
100Ω at 0°C (DIN43760 and BS1904) 2 or 3 wire; 0–100°C; 0–150°C; 0–200°C
Thermocouples: Type J to BS4937 part 3; Type K to BS4937 part 4; Type T to BS4937 part 5
Automatic cold junction compensation: 0–200°C; 0–250°C; 0–500°C; 0–1000°C

Resistance Ranges
Any value between 100Ω and 10kΩ

Other input ranges to special order

Outputs

Trip Outputs
Two sets of contacts, selectable as normally open or normally closed. Relays de-energise on trip as standard. Optional energise on trip if required.

Contact Rating:
240VAC 3A resistive; 24VDC 3A resistive.

Trips are user configurable to trip on rising or falling input

Analogue Output
Factory set as 0–10VDC (max current 5mA) or 4–20mA (max load 500Ω).
Accuracy ±0.05% of span

Other outputs to special order

Indication
By light emitting diodes
Power on: Green, flashes on probe failure
Trip 1 and Trip 2: Red

Supply

Mains Version
110VAC ±10% 50/60Hz
230VAC ±10% 50/60Hz
Power consumption approx. 4.5VA

DC Version
Nominally 24VDC (19-28VDC) at approximately 120mA

General

Trip Adjustment
Either screwdriver adjust multturn potentiometer or lockable 10 turn dial. Adjustable over the range of 0% to 100% of span

Set Point Resolution
Better than 0.1% of span

Repeatability
Typically 0.1% of span

Trip Level Hysteresis
Normally set at approximately 1%. Other values/adjustable to special order

Probe Failure Option
In the event of a probe failure (open circuit thermocouple, open or short circuit RTD) the ‘power on’ LED will flash and will continue to flash until the fault has been rectified. This fault circuit can optionally trip the relays.

Temperature Coefficient
±0.02%/°C of full scale

Isolation
Relay outputs and supply totally isolated.
Maximum isolation voltage 500VAC or 750VDC. Input is not isolated from analogue output.

Environment
Operating temperature: 0 to +60°C
Storage temperature: –20 to +80°C
Humidity: 0-95% RH, non condensing
Protection: IP40

Compliance
Immunity: EN61000-6-2:2001
Emmissions: EN 61000-6-4:2001
LVD: EN61010-1:1993

Input Impedance
Voltage input 100kΩ/V
Current input
0–1mA 100Ω
0–10mA 10Ω
4–20mA 5Ω
0–100mA 1Ω
0–1A 0.1Ω

Ordering information
P607 Trip Amplifier, type of trip adjustment, supply voltage, input range, analogue output option, thermocouple type, probe failure option

Due to our policy of continuous product development, we reserve the right to amend specifications without notice.
P666/P665
Signal Isolator/Signal Convertor

Total isolation or low cost conversion

Total isolation, input, output and supply (P666)

Compact plug-in DIN-rail and surface mounting enclosure

Operates on all normal process control signals – voltage, current, resistance, RTD and thermocouple

Mains (selectable 110/230VAC) or 24VDC powered

User selectable current or voltage output

Span and zero controls accessible from the front

Excitation voltage option

The P666/P665 range of DIN-rail mounting Signal Converters and Isolators consists of compact instruments suitable for many industrial control applications. Both these units will convert all normal process control input signals to voltage or current outputs; the P666 Isolator will also totally isolate the input and output from the supply and from each other. Where input/output isolation is not required, the P665 Converter will isolate the input and output from the supply but not from each other.

The Signal Isolators are ideally suited for eliminating earth loop problems and common mode voltages. The units are plug-in types to facilitate fast replacement in the unlikely event of a unit failure, keeping plant down-time to a minimum.

The range of Signal Isolators and Converters is compatible with the RTK Type P607 range of Trip Amplifiers.
**Technical Specification**

### Inputs

**DC Ranges**

- Voltage: 0–10mV 0–1mA
- 0–100mV 0–10mA
- 0–1V 4–20mA
- 0–10V 0–100mA
- 0–100V 0–1A

Positive and negative going input signals can be catered for to special order.

### Temperature Ranges

Platinum RTD (Pt100), resistance thermometer:

- 100Ω at 0°C (DIN43760 and BS1904)
- 2, 3 or 4 wire; 0–100°C; 0–150°C; 0–200°C

Thermocouples: Type J to BS4937 part 3; Type K to BS4937 part 4; Type T to BS4937 part 5

Automatic cold junction compensation:

- 0–200°C; 0–250°C; 0–500°C; 0–1000°C

### Resistance Ranges

Any value between 100Ω and 10kΩ

*Other input ranges to special order*

### Outputs

The standard output is user selectable by jumper links between 0–10V (maximum load 10mA) and 4–20mA (maximum load of 1kΩ). Adjustment is approximately ±10% of the span by means of multturn potentiometers.

*Other output ranges to special order*

---

**Excitation Voltage**

To power two wire transducers or bridge type inputs. 9–12V DC at 10mA.

**Supply**

**Mains Version**

- 110VAC ±10%, 50/60Hz
- 230VAC ±10%, 50/60Hz

Selectable by jumper links

Power consumption approximately 3VA

**DC Version**

Nominally 24VDC (19–28VDC) at approximately 125mA

### General

**Linearity**

Better than 0.05% of span

**Supply Voltage Rejection**

Output change < 0.01% of span/% change in supply voltage

**Common Mode Rejection**

Better than 0.2% of span for 240VAC or 400VDC

### Isolation

P666: 3 port – input, output and supply

P665: isolation from supply only

Maximum isolation 500VAC or 700VDC

### Surge Voltage

Maximum 1.5kV

1.2/50µs surge withstands test

IEC 255.4 as per IEEE std 472–1975

### Temperature Coefficient

±0.01% /°C of full scale

### Environment

- Operating temperature: 0°C to +60°C
- Storage temperature: –20°C to +80°C
- Humidity: 0–95% RH, non-condensing
- Protection: IP40

### Compliance

- Immunity: EN61000-6-2:2001
- Emissions: EN 61000-6-4:2001
- LVD: EN61010-1:1993

### Input Impedance

<table>
<thead>
<tr>
<th>Voltage Input</th>
<th>100kΩ/V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Input</td>
<td>0–1mA</td>
</tr>
<tr>
<td></td>
<td>10Ω</td>
</tr>
<tr>
<td></td>
<td>0–10mA</td>
</tr>
<tr>
<td></td>
<td>10Ω</td>
</tr>
<tr>
<td></td>
<td>4–20mA</td>
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<tr>
<td></td>
<td>5Ω</td>
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<tr>
<td></td>
<td>0–100mA</td>
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<tr>
<td></td>
<td>1Ω</td>
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<tr>
<td></td>
<td>0–1A</td>
</tr>
<tr>
<td></td>
<td>0.1Ω</td>
</tr>
</tbody>
</table>

### Ordering Information

P666 Signal Isolator or P665 Signal Converter, supply voltage, input range, output range, thermocouple type (if relevant), excitation voltage (if required).
P766
Signal Isolator

3-port isolation, mains or DC powered and only 22m wide

- Compact plug-in DIN-rail mounting enclosure
- Mains (selectable 110/230VAC) or 24VDC powered
- 3-port isolation to 1500VDC
- Low input impedance and high drive capability
- Span and zero controls accessible from the front
- Wide choice of input and output ranges
- 'Power On' indication

The P766 DIN-rail mounting Signal Isolator is a compact device suitable for many industrial control applications. The design is suitable for both signal isolation and conversion, with a vast range of possible inputs and outputs available as standard.

The unit is only 22mm wide and can be supplied as mains or 24VDC versions.

Both the output and the mains supply are user selectable via jumper links.

The unit is ideally suited to eliminate earth loop problems and common mode voltages, and provides 3-port isolation to 1500VDC.
## Technical Specification

### Inputs

<table>
<thead>
<tr>
<th>DC Ranges</th>
<th>Voltage</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–100mV</td>
<td>0–1mA</td>
<td></td>
</tr>
<tr>
<td>0–1V</td>
<td>0–10mA</td>
<td></td>
</tr>
<tr>
<td>1–5V</td>
<td>4–20mA</td>
<td></td>
</tr>
<tr>
<td>0–10V</td>
<td>0–100mA</td>
<td></td>
</tr>
<tr>
<td>0–100V</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Temperature Ranges**

Platinum RTD (Pt100), resistance thermometer

- 100Ω at 0°C (BS EN 60751:1996)
- 2 or 3 wire
- 0–100°C
- 0–150°C
- 0–200°C

**Resistance Ranges**

Potentiometer input: 1K, 2K and 5K

*Other output ranges to special order.*

### Supply

**Mains Version**

- 110VAC ±10%, 50/60Hz
- 230VAC ±10%, 50/60Hz

Power consumption approximately 2VA

**DC Version**

Nominally 24VDC (19-28VDC) at approximately 80mA

### General

**Linearity**

Better than 0.1% of span

**Offset Error**

Better than 0.1% of span

**Load Stability**

Better than 0.01% of span per 10Ω

**Output ripple**

Better than 0.1% RMS of span

**Supply Voltage Rejection**

Output change < 0.01% of span/% change in supply voltage

**Isolation**

Maximum 1000VAC or 1500VDC

**Temperature Coefficient**

±0.02% /°C of full scale

### Environment

- Operating temperature: 0°C to +50°C
- Storage temperature: −20°C to +80°C
- Humidity: 0–95% RH, non-condensing
- Protection: IP40

### Compliance

- Immunity to EN61000-6-2:2001
- Emissions to EN61000-6-4:2001
- LVD to EN61010-1:1993

### Input Impedance

- Voltage input: 100kΩ/V
- Current input:
  - 0–1mA . . . . . .100Ω
  - 0–10mA . . . . .10Ω
  - 0/4–20mA . . . . .5Ω
  - 0–100mA . . . . .1Ω
  - 0–1A . . . . . .0.1Ω

### Ordering information

P766 Signal Isolator, supply voltage, input range, output range.

---

Due to our policy of continuous product development, we reserve the right to amend specifications without notice.

[Diagram of the product with inputs and outputs labeled]
P861
Intrinsically Safe LED Lamp

For use in pilot lights and illuminated pushbuttons

The P861 LED Lamp provides visual on/off indication of process conditions in both safe and hazardous areas. Available in a choice of six super-bright colours (red, orange, yellow, green, blue and white), they are ideally suited for use as part of a panel mounting indicator or illuminated pushbutton assembly.

The P861 itself is a standard BA9s Intrinsically Safe LED Lamp which can be supplied as part of a pilot light or illuminated pushbutton or alternatively supplied separately to be used in any suitable standard switch or lamp assembly.

With the LED lamp being current limited to take a maximum of only 20mA, it is possible to drive two lamps from a single IIC interface without any effect on the brightness.
**Technical Specification**

**Colours**
The P861 Series of LED Lamps are available in six super-bright colours. Colours are red, orange, yellow, green, blue and white.

**High Reliability**
All LED lamps are designed to provide a minimum of 100,000 hours service life.

**Low Current Consumption**
All LED lamps operate at 20mA or less and feature integral current limiting to maintain consistent brightness over the operating range of the voltage supply.

**Use in Hazardous Areas**
In hazardous areas the LED lamps must be powered through suitable intrinsically safe Isolators or Barriers. Up to two LED lamps can be driven from a single IIC interface.

**Configuration**
Easy to replace or change the colour of a panel indicator. Access is from the front of the panel and no tools are required. Simply unscrew the lens and replace the BA9s LED lamp.

**Certification**
ATEX certified to EN50014:1997 and EN50020:2002
Group II, Category 2G, EEx ia IIC T4 (Ta –20ºC to +60ºC)

**Location**
Zones 1 or 2. Gas Group IIC, IIB or IIA, Temp Class up to T4

**Certificate No.**
Kema03ATEX1021X

**Safety Parameters**
\[ U_i = \text{determined by } I_i \text{ and } P_i \]
\[ I_i = 2A \]
\[ P_i = 1W \]
\[ C_i = L_i = 0 \]

The device can be powered from an EEx ia IIC certified interface with output parameters lower than those shown above

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**BA9s LED Lamp**
The P861 LED Lamp itself has a standard BA9s fitting and, when installed in accordance with the certificate and relevant standards, can be used in any suitable pilot light or pushbutton.

**Supply**
With suitable certified interface
18-35VDC, current 20mA

**Recommended Interfaces**
Zener Barriers: S951-POS, S967-POS
IS Isolators: WIS1211, WIS1212

**Environment**
Operating temperature: –20ºC to 60ºC
Storage temperature: –20ºC to 80ºC
Humidity: 0-95% RH, non condensing

**Compliance**
Immunity to EN61000-6-2:2001
Emissions to EN61000-6-4:2001

**Illuminated Pushbutton and Pilot Light**
The P861 LED Lamp can be supplied as an integral part of the DA170 Series of Illuminated Pushbuttons. These are industry standard 22mm pushbuttons which can be supplied in a range of different formats such as rotary, non-illuminated and emergency stop.

**See separate datasheet for full details**

**Construction**
Housing/mounting collar – Polymide6.6 and FR4 fibreglass
Lens – Polycarbonate

**Protection**
IP65 when panel mounted, IP20 from the rear

**Connections**
Screw terminals rated to IP20 minimum for cables from 0.5 to 2.5mm²

**Mounting**
Lamp – BA9s bulb holder
Pushbutton, Pilot Light – Through 22.5mm diameter hole

---

**Order Code**

```
P861  —  XX
```

**Model Name**

```
RD = Red
GN = Green
AM = Amber
YW = Yellow
WT = White
BL = Blue
```

Due to our policy of continuous product development, we reserve the right to amend specifications without notice.
P866
Signal Bisolator/Trisolator

Dual and triple isolated outputs from a single input

The P866 range of DIN-rail mounting Signal Bisolators and Trisolators consists of compact instruments suitable for many industrial control applications. These units will convert and isolate standard process control inputs and give multiple current or voltage outputs.

The P866 will totally isolate the input from all the outputs, from the supply and from each other.

The Signal Bisolator and Trisolator are ideally suited for applications where multiple isolated outputs are required from a single incoming signal.

As an optional extra, the P866 Isolator can also have a 24VDC isolated transmitter supply which can be used to power two wire transmitters in the field.

The range of Bisolators and Trisolators is compatible with the RTK Type P607 Trip Amplifiers and Type P666/P665 Signal Isolators and Converters.
Technical Specification

Inputs

<table>
<thead>
<tr>
<th>DC Ranges</th>
<th>Voltage</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10mV</td>
<td>0-1mA</td>
<td></td>
</tr>
<tr>
<td>0-100mV</td>
<td>0-10mA</td>
<td></td>
</tr>
<tr>
<td>0-1V</td>
<td>0/44-20mA</td>
<td></td>
</tr>
<tr>
<td>1-5V</td>
<td>0-100mA</td>
<td></td>
</tr>
<tr>
<td>0-10V</td>
<td>0-1A</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AC Ranges</th>
<th>Voltage</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 300V</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Temperature Ranges

Platinum RTD (Pt100), resistance thermometer 100Ω at 0°C
(BS EN 60751:1996)
2, 3 or 4 wire
0-100°C, 0-150°C, 0-200°C

Resistance Ranges
Any range between 100Ω and 10kΩ Ω

Other input ranges to special order

Excitation

To power 2 wire transmitters
24VDC at 40mA
Isolated to 500VAC or 700VDC

Outputs

The standard output is user selectable by jumper links between:

0-10V (maximum load 10mA)
4-20mA (maximum load 600Ω)

Adjustment is approximately ±10% of the span by means of multturn potentiometers for each output channel.

Other output ranges to special order

Supply

85-264VAC (88-360VDC)

Power consumption approximately 6VA

General

Linearity
Better than 0.05% of span

Supply Voltage Rejection
Output change <0.01% of span /% change in supply voltage

Common Mode Rejection
<0.2% of span for 240VAC or 400VDC

Isolation

3 Port – input, outputs and supply

Maximum isolation 500VAC or 700VDC

Surge Voltage

Maximum 1.5kV
1.2/50µs surge withstands test IEC 255.4 as per IEEE std 472-1975

Temperature Coefficient
±0.01%/°C of full scale

Environment

Operating temperature

0°C to +60°C

Storage temperature

−20°C to +80°C

Humidity

0-95% RH, non-condensing

Protection

IP40

Compliance

Immunity to EN61000-6-2:2001

Emissions to EN61000-6-4:2001

LVD to EN61010-1:1993

Input Impedance

DC Voltage input: 100kΩ/V

DC Current input: 0/4–20mA 10Ω

Ordering Information

P866/2 Signal Bisolator or P866/3 Signal Trisolator. Input range, output ranges, excitation voltage (if required).

Due to our policy of continuous product development, we reserve the right to amend specifications without notice.

RTK Instruments Limited
St James Business Park,
Knaresborough, North Yorkshire,
England. HG5 8PJ

Telephone: +44 (0)1423 580500
Facsimile: +44 (0)1423 580501
Web: www.rtkinstruments.com
Email: enquiry@rtkinstruments.com

FM14290
ISO9001:2000
5 YEAR GUARANTEE
# PEX7250
Explosion Proof Alarm Annunciator

For total programmability in hazardous areas

<table>
<thead>
<tr>
<th align="center">Suitable for use in Zone 1 and Zone 2 Hazardous areas</th>
</tr>
</thead>
<tbody>
<tr>
<td align="center">Certified EEx d IIB T5 to EN50018</td>
</tr>
<tr>
<td align="center">Ultra-bright LED illumination as standard</td>
</tr>
<tr>
<td align="center">Multi-redundant design (ensuring no single point can cause failure)</td>
</tr>
<tr>
<td align="center">Fully field programmable for all standard ISA sequences plus a range of options</td>
</tr>
<tr>
<td align="center">Dual horn relays and dual group relays</td>
</tr>
<tr>
<td align="center">RS485 serial interface and repeat per channel options</td>
</tr>
</tbody>
</table>

The PEX7250 Explosion Proof Alarm Annunciator offers a vast range of features and benefits normally reserved for use in safe area annunciators only. The heart of the system is our field proven Series 725 Alarm Annunciator which is available in 3 individual window sizes 30 x 30mm, 30 x 60mm or 60 x 60mm. Reliability of the system is vastly improved over conventional systems with the use of ASICs (Application Specific Integrated Circuits) for each pair of alarms, removing any reliance on common control cards. The standard enclosure is copper-free cast alloy, finished in a light grey two-part epoxy paint, making it ideal for offshore applications.

Systems are available in a range of formats and sizes and are certified for use in Zone 1 hazardous areas. All systems are automatically covered by our standard 5-Year Warranty.
Technical Specification

Certification
ATEX certified to EN50014:1997, EN50018:1994 Group II, Category 2GD, EEx d IIB T5

Location
Zones 1 or 2. Gas Group, IIC, IIB or IIA, Temp Class up to T5

Certificate No.
Based on CESI00ATEX036U

Number of alarm ways
Systems are available in a vast range of sizes depending on window size from 1 to 56 points in a single enclosure.

Materials
The EEx d enclosure: copper-free cast alloy. EEx de Control Station and EEx e Terminal Box: GRP

Connections
The annunciator is wired to a row of terminals suitable for cable sizes up to 2.5mm². On larger systems, the terminals are mounted within an EEx e terminal box below the EEx d enclosure.

Cable Entries
Five M20 cable entries are included as standard. Alternative quantity and size of metric or NPT threads can be provided on request.

Pushbuttons
Test, Accept and Reset are included as standard, additional control pushbuttons can be added as required. These are mounted in an attached, certified EEx de Control Station.

Cover
The cover is hinged as standard, to allow easy access for wiring and commissioning.

Outputs
Units are equipped with dual group relays and dual horn relays as standard. Individual repeat relays per channel and RS485 serial interface options are available on request.

Environment
Operating temperature: 0 to 50°C
Storage temperature: -20 to 80°C
Humidity: 0-95% RH, non-condensing

Protection
IP65 as standard, IP66 can be obtained using suitable sealant and gasket.

Detailed Specification
See the Series 725 datasheet for full details on the Alarm Annunciator specification.

Specials
The details shown here demonstrate our standard range of EEx d IIB Annunciators. RTK Instruments can quote for alternatives and IIC systems on request.

Due to our policy of continuous product development, we reserve the right to amend specifications without notice.

RTK Instruments Limited
St James Business Park, Knaresborough, North Yorkshire, England. HG5 8PJ
Telephone: +44 (0)1423 580500
Facsimile: +44 (0)1423 580501
Web: www.rtkinstruments.com
Email: enquiry@rtkinstruments.com
PPM4-P
Programmable Process Meter

User scaleable meters for all standard process inputs

User programmable display between -1999 and 9999
Operates on all normal process control signals – voltage, current
Easy to program and accessible from the front
Microprocessor design for higher accuracy and reliability
Range extension modules to cover most AC and DC input requirements
Optional IP65 gasket

The PPM4 range of Process Meters meets the needs of most process display requirements where the input is known but where it is necessary to alter the display scaling at the installation or commissioning stage.

Using surface mount and microprocessor technology the PPM4 provides a highly accurate meter with the ability to scale the display and store these settings to EEPROM.

The meter comes as standard with an isolated excitation voltage to supply transducers and power current loops.

Two status inputs are also provided as standard for TARE and HOLD functions. An optional alarm relay output is available which provides a programmable setpoint for control applications.

Other optional items include an IP65 gasket to seal to the panel door and software/interface cable to allow calibration from a computer.
Technical Specification

Inputs

Standard Versions
1 Selectable between ±20mA and ±100mV
2 0-10V
Other ranges available by using a “Range Extension Module”.
Any current from ±50mA to ±2A
Any voltage from ±200mV to ±1000VDC
and ±100mVAC to ±750VAC
Other input ranges to special order

Due to our policy of continuous product development, we reserve the right to amend specifications without notice.

Outputs

Alarm Relay & Front Panel LED
Optional single trip relay with changeover contacts, rated at 2A, 230VAC resistive.
The setpoint is fully user programmable

Excitation Voltage
5 or 10VDC stabilized or 24VDC unregulated, max current 35mA

Supply

Mains Version
115VAC ±10%, 50/60Hz
230VAC ± 10%, 50/60Hz
Power consumption 6VA

Universal Low Voltage
11-30VDC and 10-24VAC

Display

4 digit red LED 14.2mm high (0.56”), user programmable in the range –1999 to 9999. High brightness red LED to indicate setpoint exceeded.

Green display available to special order.

The display is updated two times per second and is fully scaleable using jumper links and the two front pushbuttons.

Due to our policy of continuous product development, we reserve the right to amend specifications without notice.
PPM4-T
Temperature Meter

Fully linearised, high accuracy panel meters

Display range between –1999 and 9999
Linearised to 0.1% accuracy
Available as thermocouple or RTD input
Easy to setup and accessible from the front
Microprocessor design for higher accuracy and reliability
Optional 2A alarm relay
Optional IP65 gasket

The PPM4 range of Temperature Meters uses surface mount and microprocessor technology to provide a highly accurate meter fully linearised for the majority of commonly used thermocouples and RTDs giving accurate and reliable readings across the complete sensor temperature range.

The user can program the PPM4 to display in °C or in °F. An optional alarm relay output is also available which provides a programmable setpoint for control applications.

Other optional items include an IP65 gasket to seal to the panel door and software/interface cable to allow calibration from a computer.
Technical Specification

Inputs

Thermocouples
To BS EN 60584-1:1996
- Type K (NiCh/NiAl) –270 to 1372°C
- Type J (Fe/NiCu) –210 to 1200°C
- Type T (Cu/CuNi) –270 to 400°C
- Type N (Nicrosil-Nisil) –200 to 1300°C

RTDs
To BS EN 60751:1996
- Pt100 –200 to 850°C
- Pt130 –200 to 500°C
Other input ranges to special order

Outputs

Alarm Relay & Front Panel LED
Optional single trip relay with changeover contacts, rated at 2A, 230VAC resistive.
The setpoint is fully user programmable from the front of the meter.

Supply

Mains Version
115VAC ±10%, 50/60Hz
230VAC ± 10%, 50/60Hz
Power consumption 6VA

Universal Low Voltage
11-30VDC and 10-24VAC

Display

4 digit red LED 14.2mm high (0.56”). High brightness red LED to indicate setpoint exceeded.
Green display available to special order.
The display is updated two times per second and can be selected to display in °C or °F.

General

Accuracy
Better than 0.1% of span ±1 digit with linearisation error of 0.3%

Reference Junction Rejection
Better than 0.1%/ºC after 30 minutes

Common Mode Rejection Ratio
>120dB

Series Mode Rejection Ratio
>60dB at 50/60Hz

Analogue to Digital Converter
Dual slope conversion, with 5 updates per second

Temperature Coefficient
0.01%/ºC of full scale (max) excluding RJC errors, ±50ppm/ºC (typical)

Sensor Break
If the sensor breaks, the display will show O/C. The alarm relay will go to the trip state.

Environment
Operating temperature: 0°C to 50°C
Storage temperature: –10°C to 70°C
Humidity: 0-90% RH, non-condensing

Protection
IP65 with optional gasket
IP20 on the rear

Calibration
All user configuration is stored in EEPROM. All calibration can be undertaken from the front of the unit.
An optional cable and software pack is available to program from a computer.
(Part Number PPM4CAL)

Input Impedance
All inputs >10MΩ

Connections
Plug in screw terminals of the rising clamp type suitable for 2.5mm² cable

Compliance
Imunity to EN61000-6-2:2001
Emissions to EN61000-6-4:2001
LVD to EN61010-1:1993

Weight
450g

Ordering Information
PPM4 Meter, supply voltage, sensor type.
Relay output (optional), IP65 gasket (optional)

Due to our policy of continuous product development, we reserve the right to amend specifications without notice.
## RT Series
### AC and DC Power Supplies

Quality power conversion products

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5, 12 or 24VDC Output</td>
<td>Designed to complement the RTK range of Alarm Annunciators and related instrumentation, the RT Series provides a range of cost effective supplies to convert from various AC or DC supply voltages to 5, 12 or 24VDC. All units provide a fully regulated and stable output which is protected against over-voltage, over-current and short circuit. CE marked and certified to UL and CUL standards gives you the confidence you need when installing these products as a critical element in the system. Dual Redundant versions of these Power Supplies are also available for critical applications, see separate datasheet on RT-AD Range.</td>
</tr>
<tr>
<td>Choice of AC and DC Supply</td>
<td>CE marked and UL, CUL listed</td>
</tr>
<tr>
<td>Wide supply range</td>
<td></td>
</tr>
<tr>
<td>High reliability</td>
<td></td>
</tr>
<tr>
<td>Fully protected output</td>
<td></td>
</tr>
<tr>
<td>Mounting accessories</td>
<td></td>
</tr>
</tbody>
</table>
General Specification

Supply AC Versions
Universal 88-264VAC (120-370VDC) or switch selectable between 88-132VAC and 176-264VAC.

Supply DC Versions
Nominal 24VDC (19-36VDC).
Nominal 48VDC (36-72VDC).
Nominal 110VDC (72-144VDC).

Outputs
From 25W to 500W for 5, 12 or 24VDC.

Adjustment
+/-10% from rated voltage via single turn potentiometer.

Over-voltage Protection
115-145% rated output voltage.

Overload Protection
105-150% shut off, AC recycle to restart short circuit and overload.

Typical Tolerance
± 1-2% depending on exact model.

Typical Efficiency
80-85%

Typical Ripple and Noise
150mV on 24VDC output supply.

Safety Standards
UL1012, UL60950-1, TUV EN60950-1.

EMC Standards
EN5022 class B, EN61000-2-2,3, EN61000-4-2,3,-4,--5,6,8,11, ENV50204.

Environment
Operating temperature 0-60ºC. Can operate at higher temperatures when suitably de-rated.

Connections
9.5mm Terminal Block.

Accessories
Mounting plates and DIN-rail mounting brackets and clips.

RT-A Range (AC Supply)

<table>
<thead>
<tr>
<th>MODEL</th>
<th>WATTAGE</th>
<th>SUPPLY</th>
<th>OUTPUT</th>
<th>WEIGHT</th>
<th>DIMENSIONS (W x H x D)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RT-A-25-5</td>
<td>25W</td>
<td>88-264VAC</td>
<td>5VDC @ 5.0A</td>
<td>0.39</td>
<td>99 x 97 x 36mm</td>
</tr>
<tr>
<td>RT-A-25-12</td>
<td>(120-370VDC)</td>
<td></td>
<td>12 VDC @ 2.1A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RT-A-25-24</td>
<td></td>
<td></td>
<td>24VDC @ 1.1A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RT-A-40-5</td>
<td>40W</td>
<td>88-264VAC</td>
<td>5VDC @ 8.0A</td>
<td>0.44</td>
<td>129 x 98 x 38mm</td>
</tr>
<tr>
<td>RT-A-40-12</td>
<td>(120-370VDC)</td>
<td></td>
<td>12VDC @ 3.5A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RT-A-40-24</td>
<td></td>
<td></td>
<td>24VDC @ 1.6A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RT-A-60-5</td>
<td>60W</td>
<td>88-264VAC</td>
<td>5VDC @ 12.0A</td>
<td>0.51</td>
<td>159 x 98 x 38mm</td>
</tr>
<tr>
<td>RT-A-60-12</td>
<td>(120-370VDC)</td>
<td></td>
<td>12VDC @ 5.0A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RT-A-60-24</td>
<td></td>
<td></td>
<td>24VDC @ 2.5A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RT-A-100-5</td>
<td>100W</td>
<td>88-132VAC</td>
<td>5VDC @ 20.0A</td>
<td>0.65</td>
<td>199 x 98 x 38mm</td>
</tr>
<tr>
<td>RT-A-100-12</td>
<td>(176-264VAC)</td>
<td></td>
<td>12VDC @ 8.5A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RT-A-100-24</td>
<td>Selectable</td>
<td></td>
<td>24VDC @ 4.5A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RT-A-150-5</td>
<td>150W</td>
<td>88-132VAC</td>
<td>5VDC @ 30.0A</td>
<td>0.8</td>
<td>199 x 110 x 50mm</td>
</tr>
<tr>
<td>RT-A-150-12</td>
<td>(176-264VAC)</td>
<td></td>
<td>12VDC @ 12.5A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RT-A-150-24</td>
<td>Selectable</td>
<td></td>
<td>24VDC @ 6.5A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RT-A-300-5</td>
<td>300W</td>
<td>88-264VAC</td>
<td>5VDC @ 50.0A</td>
<td>1.18</td>
<td>215 x 115 x 50mm</td>
</tr>
<tr>
<td>RT-A-300-12</td>
<td>(124-370VDC)</td>
<td></td>
<td>12VDC @ 24.0A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RT-A-300-24</td>
<td>Selectable</td>
<td></td>
<td>24VDC @ 12.5A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RT-A-500-5</td>
<td>500W</td>
<td>88-264VAC</td>
<td>12VDC @ 40.0A</td>
<td>1.9</td>
<td>170 x 120 x 39mm</td>
</tr>
<tr>
<td>RT-A-500-12</td>
<td>(124-370VDC)</td>
<td></td>
<td>24VDC @ 20.0A</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

RT-D Range (DC Supply)

<table>
<thead>
<tr>
<th>MODEL</th>
<th>WATTAGE</th>
<th>SUPPLY</th>
<th>OUTPUT</th>
<th>WEIGHT</th>
<th>DIMENSIONS (W x H x D)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RT-D-25*-5</td>
<td>25W</td>
<td>24, 48VDC</td>
<td>5VDC @ 5.0A</td>
<td>0.39</td>
<td>99 x 97 x 36mm</td>
</tr>
<tr>
<td>RT-D-25*-12</td>
<td>(see below)</td>
<td></td>
<td>12 VDC @ 2.1A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RT-D-25*-24</td>
<td></td>
<td></td>
<td>24VDC @ 1.1A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RT-D-50*-5</td>
<td>50W</td>
<td>24, 48VDC</td>
<td>5VDC @ 10.0A</td>
<td>0.51</td>
<td>159 x 98 x 38mm</td>
</tr>
<tr>
<td>RT-D-50*-12</td>
<td>(see below)</td>
<td></td>
<td>12VDC @ 4.2A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RT-D-50*-24</td>
<td></td>
<td></td>
<td>24VDC @ 2.1A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RT-D-100*-5</td>
<td>100W</td>
<td>24, 48, 110VDC</td>
<td>5VDC @ 20.0A</td>
<td>0.65</td>
<td>199 x 110 x 50mm</td>
</tr>
<tr>
<td>RT-D-100*-12</td>
<td>(see below)</td>
<td></td>
<td>12VDC @ 8.5A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RT-D-100*-24</td>
<td></td>
<td></td>
<td>24VDC @ 4.5A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RT-D-150*-12</td>
<td>150W</td>
<td>24, 48, 110VDC</td>
<td>12VDC @ 12.5A</td>
<td>0.8</td>
<td>199 x 110 x 50mm</td>
</tr>
<tr>
<td>RT-D-150*-24</td>
<td>(see below)</td>
<td></td>
<td>24VDC @ 6.3A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RT-D-300*-12</td>
<td>300W</td>
<td>24, 48, 110VDC</td>
<td>12VDC @ 27.5A</td>
<td>1.1</td>
<td>215 x 115 x 50mm</td>
</tr>
<tr>
<td>RT-D-300*-24</td>
<td>(see below)</td>
<td></td>
<td>24VDC @ 14.6A</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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RTK Instruments Limited
St James Business Park,
Knaresborough, North Yorkshire,
England. HG5 8PJ

Telephone: +44 (0)1423 580500
Facsimile: +44 (0)1423 580501
Web: www.rtkinstruments.com
Email: enquiry@rtkinstruments.com
System 9000
Alarm Annunciator

Ultimate flexibility and reliability in a rack-mounted format

Exclusive ASIC/micro-controller technology

Multi-redundant design (no single point of failure) including PSU and communications

Modular, rack-mounted design expandable to thousands of alarm points

Fully field programmable using the integral Setup Card or RTK configuration software

Alarm sequences to ISA-S18.1-1979 (R 1984)

Wide range of displays including mimic diagrams, LED light boxes

The System 9000 Alarm Annunciator offers the latest in combined ASIC/micro-controller technology to provide an annunciator of unparalleled reliability and programmability. The system gives flexibility and security at a cost-effective price.

A unique “multi-redundant” design is used in the System 9000 which avoids the need for a central controller and also provides “multi-redundant” PSU and communications.

The programming flexibility means that users can easily configure hundreds of options including alarm sequence, time delays, relay operation, first-up grouping, functionality, communications etc. The range of displays to complement the System 9000 is also extensive, from the ultra-bright LED illuminated P725LO, hazardous area displays and alarm management software screens.
Features & Benefits

- Provides independent annunciation of critical plant alarms whilst communicating back to the host DCS, PLC, ESD, SCADA or computer system
- Fully field programmable, from integral Setup Card or your configuration software
- Suitable for systems from a basic eight-way annunciator to a plant-wide alarm management system
- Total flexibility in choice of system size, display style, operation and options
- Field proven technology, with hundreds of thousands of alarm points already in operation worldwide
- Options available for multiplexing, sequence of events recording, etc.

With the continued improvements in the complexity of process plants combined with the pressures to strive for greater operating efficiency, it is even more important that alarm annunciators offer the clearest means of showing alarms combined with the best reliability and highest integrity.

RTK has designed the System 9000 rack mounted alarm system with this in mind. Based on the field proven and highly acclaimed range of panel mounted Annunciators, the system employs exclusive ASIC and microcontroller technology with additional safety, communications and configuration facilities.

Total Configurability
All the facilities are field programmable using the in-built keypad or downloaded from a pc using RTK’s Setup Software. All features are configurable for each individual alarm way and can easily be set up in minutes without the need to learn a special programming language. All the alarm sequences specified in the ISA publication “Annunciator Sequences and Specifications” are available in addition to a wide range of additional features.

Displays
The System 9000 is suitable to drive almost any display, such as complex mimic diagrams, simple LEDs, or backlit lamp displays of a vast range of shapes and sizes. RTK Instruments can offer a whole range of display options for the System 9000, which are fully detailed in a separate datasheet.

Total Flexibility
The modular construction and the advanced programming facilities mean that the System 9000 Alarm Annunciator can be supplied to match any process alarm application. The 19in racking system allows almost unlimited system expansion, and the Setup Card allows configuration down to each individual alarm way for both sequence and operation.

High Density Packaging
A standard rear mounting 19in 3U Eurorack forms the basis of the System 9000. Each rack can contain up to 14 eight channel active input cards giving a total of 109 alarm ways and three pushbuttons per rack. Racks can easily be linked together to produce alarm systems of almost unlimited size.

First Up
In alarm annunciation applications, it is often essential to know which alarm occurred first. For this reason, the System 9000 has a flexible high resolution first-up facility as standard. Four different first-up sequences are provided to match the ISA standard S18-1 1979 (R 1984). Up to four separate first-up groups can be defined within the one system; each alarm way can be configured as being in one of these four groups.

Relay Outputs
The standard system has relay outputs for all the commonly used functions, such as a horn relay, watchdog relay and total group relay (with optional reflash). If additional relays are required, then the optional Group Relay Card may be needed. This card will expand the relay outputs from the system by an additional eight.

Each alarm way can also be supplied with individual user configurable repeat relay outputs.

Communications
The communications facility allows the System 9000 to act as a data acquisition system and transmit alarm information serially to SCADA systems, computers, plcs, DCS systems etc. With the unique ‘multi-redundant’ design, all cards can communicate directly to the host system so there is no risk of card failure causing the communications to halt. This method of data transmission will operate over 1.2km and uses standard MODBUS protocol.

Isolated Inputs
Inputs are generally normally open or normally closed volt-free contacts. All inputs are opto-isolated as standard and can accept 24VDC signals without alterations. There are options for the higher field contact voltages of 48, 110 and 250VDC.

Bulb Fault Indication
If any alarm way is unable to light its window, because either both lamps are open circuit or missing, or one of the lamps has failed short circuit, then a green ‘status’ LED on the input card flashes to indicate this problem. The lamp test pushbutton can then be pressed to find the faulty window. None of the above malfunctions will prevent the alarm annunciator from detecting and sounding alarms.

Servicing
All alarm ways are configured from the keypad on the Setup Card mounted on the left hand side of the rack, or on systems with communications, this can be downloaded from the Setup Software. In the unlikely event of a card failure, the cable connections can be unplugged from the card and the card itself unplugged from the rack. This allows very fast card replacement without the need for any rewiring.
Setup Card
Each system is supplied with a Setup Card. This card is not a master module; it is not required for the system to run correctly. The function of the Setup Card is to allow users to configure the input cards to their required operation. Once configured, all settings are stored on the EEPROM on the Active Input Cards. The Setup Card also filters and protects the incoming power supply and provides the common relay outputs.

Alarm Management Software
With its multi-redundant architecture and communications facility the System 9000 is an ideal front-end to a screen based alarm management system. RTK can provide alarm management software and complete systems using industrialised computers and screens. These are developed in conjunction with the users to provide the clearest possible means of showing alarms, the priority of these alarms and exactly what to do in each alarm situation. These systems can also provide a means of logging all alarm and event history for analysis at a later date.

Mounting
The standard method of mounting is directly onto the backplate of a control panel. The rack can easily be supplied as a normal front mounting 19in subrack suitable for direct mounting into 19in racking systems.

Power Supply
The supply voltage range for the system is wide enough for unregulated and battery backed supplies. The nominal 24VDC supply can be anywhere within the range 19-36VDC without affecting system performance. Alternative supply systems such as 48VDC can also be provided.

Interfacing
The System 9000 is ideally suited to interface to other plant equipment. Even basic systems come complete with output relays to link to external indicating devices and displays. The relays can be expanded to cover multiple group relays and individual repeat relays for all alarm ways.

Using the powerful communications features it is possible to interface to existing PLCs, SCADA systems, Emergency Shutdown Systems and plant-wide distributed control systems. The Annunciator can monitor and display critical alarms and communicate the results into the normal monitoring systems, giving another level of safety and independence from the general monitoring or control system.

Pushbutton Inputs
The standard requirement for the majority of alarm annunciators is three pushbuttons for Lamp Test, Accept and Reset. The System 9000 not only allows these standard functions, but can also allocate a further five inputs to operate additional more advanced control features. If these are not required, they are simply not used. The additional functions are Silence, System Test, First-up Reset, Sleep and Horn Inhibit.

RTK Engineering’s Total Security Concept

‘Multi-redundant’ design
The System 9000 maintains the unique ‘multi-redundant’ design. Each alarm board contains an ASIC (Application Specific Integrated Circuit) which is capable of complete system control – if one board fails, or is removed, then another ASIC on another board will takeover system control, avoiding a single source of system failure and vastly increasing the system MTBF. An in-built watchdog relay will give an alarm if any Active Input Cards fail or are removed.

‘Multi-redundant’ Communications
This principle is now extended to the communications. All active alarm boards have full communications facilities – if a single board fails, an alarm is sounded but normal communications will continue with all the remaining boards. Again, this removes the single source of communication failure and goes far beyond a dual redundancy system.

‘Multi-redundant’ Power Supply
Each alarm card has its own in-built fully isolated dc/dc converter, again providing distributed power supplies across the whole alarm system, so the system does not rely on a single power supply card.

Line Monitoring
The integrity of the rack itself is without question, but what of the connections to the outside world?

Alarm contacts: The System 9000 can be supplied complete with an extensive line monitoring facility. If the connections to the alarm contact go either short circuit, open circuit or high resistance then an alarm is sounded to identify the problem.

Lamp Failure: The connection to the lamp display module can also be fully monitored, so that if any alarm way is unable to light its lamps the system will also sound an alarm. Both features can have volt-free relay contact outputs.
Displays

To complement the System 9000 Alarm Annunciator, RTK Instruments offers a wide range of displays from simple lamp arrays to full mosaic mimic diagrams. Most of the displays are modular in design to enable RTK to match your exact needs, rather than compromising on the nearest available shape and size. The main display types are illustrated and described here; for more detailed information, refer to the separate display datasheet.

P725LO Lamp-Only Modules
This display has been designed to match the Series 725 Alarm Annunciator – it will look identical when viewed from the front. It is available in exactly the same format as the annunciator with three window sizes, six colours and a choice of lamp or LED illumination. This display is the best choice when LED illumination is required, offering the most competitive ultra-bright illumination. It is fitted with a ‘Lamp Test’ facility as standard.

DF30 Display Facia
The DF30 display facia provides a flexible display panel for both LED or incandescent lamps. This display facia is totally modular allowing systems of almost any shape and size to be constructed. The basic lamp module is 30 x 30mm but these can be configured to give a range of window shapes and sizes by interconnecting multiple windows. This display can also have integral pushbuttons, keyswitches and audible devices. There is no limit to the number or position of these devices. All connections are by rear mounted screw terminals.

Hazardous Area Displays
When supplied through suitable certified interface devices, the System 9000 can be used to drive a display facia in the hazardous area. The DF30IS is a backlit display certified as Ex II 1G, EEx ia IIC T4. The display gives a bright LED illuminated backlit display that matches the safe area versions.

IP65 Displays
Where protection from the environment is essential a range of displays sealed to IP65 can be provided. These custom-built units have bright LED display modules wired to rear mounted terminals. The completed assembly is mounted with a gasket to the panel door to maintain the sealing.

Mimic Displays
Mosaic tiled mimic systems can be driven by the System 9000 to provide a flexible and informative overview display. The standard mosaic mimic uses a 24 or 25mm tile mounted on a strong aluminium honeycomb grid. Tiles are the moulded type for process mimics or alternatively screen-printed or engraved to form the required display drawing. A wide range of suitable lamps, switches, pushbuttons and displays can also be integrated into the finished mimic. On smaller projects and simpler display requirements a hard wearing, single piece mimic can also be provided.

Alarm Management Software
With its multi-redundant architecture and communications facility the System 9000 is an ideal front-end to a screen based Alarm Management System. These can be set up in thousands of different ways to suit each individual alarm handling situation. Different display screens have already been developed and these building blocks would be used to provide a custom solution for each client. These systems could also incorporate touch screen displays, dual redundant servers and a range of industrial computers.
Advanced Features

The Best of Both Worlds
Ideally, critical plant alarms should be hard wired to a dedicated alarm system like the System 9000 and data passed onto the DCS as a secondary function. This offers the best of both worlds in that the System 9000, which has been specially developed to offer high speed event capture and True First Out Discrimination, also provides the clearest possible indication of critical plant conditions. The System 9000 provides an independent, highly reliable, modular alarm system employing multiple redundant design features. It should be used to complement centralised DCS platforms that have been primarily developed for control and monitoring.

Most of the features listed here are supplied as standard as part of the normal software; the system is simply configured exactly as required for each application. Further options exist from RTK to provide complete systems, undertake programming and commissioning, and provide alternative mounting arrangements. Please consult the Sales Office for further information on any of these options.

Timers
Delay timers can be incorporated into the System 9000 on both the inputs and the outputs. This facility can avoid the possibility of nuisance alarms by setting an input time delay, so that the alarm contact must be in alarm for a certain time before triggering the input circuitry.

Repeat Relays
Each alarm way can have an individual repeat relay output in addition to any group relays configured. The relays can be set up as energised or de-energised on alarm and N/O or N/C contact. The relay functions are also user configurable to follow the alarm logic or follow the input.

Group Relay Card
An additional card is available for those systems requiring more than the standard 3 relay outputs. The card has 7 additional group relays and an further 3 horn relays, all of which are fully configurable. Any alarm way in a system can be configured into any of the 8 possible groups or 4 possible audible groups. Three of these group relays can alternatively be configured to give outputs for ‘line fault’, ‘communications fault’ and ‘bulb failure’.

Output Relay Reflash
Each of the group relays can have the reflash facility enabled. This is where the group relay will change state for approx 0.5s when another alarm in that group occurs. This allows a control room annunciator or monitoring system to indicate each occurrence of a new alarm.

Alarm Indication via PLCs
The cost of digital output cards for PLCs to drive conventional backlit displays can be avoided by simply communicating all the alarm information serially to a System 9000 annunciator. The Annunciator will then convert the serial information and drive the lampbox display.

Multiple Input Reflash
It is often necessary to connect more than one alarm contact to a single alarm display window. This can be configured from the Setup Card so that up to 24 alarm contacts can all link to a single alarm window. After an alarm has occurred and been accepted then another alarm occurring in the same group will cause the display window to flash again (reflash) to indicate the occurrence of a new alarm.

Discrepancy
Rather than simply monitoring the state of a single alarm contact, it is possible to configure the Annunciator to monitor two or more contacts to ensure they correspond. If the two contacts go out of sync, a fault has occurred and the alarm will sound.

Boolean Logic
In a similar way to the discrepancy control, multiple inputs can be linked together by standard OR and AND functions. For example, the system can be programmed so that an alarm will only occur if four particular inputs are all on at the same time.

Sleep Mode
Useful in unmanned/not normally manned situations. Any single input can be configured as a “sleep” input. When this input is switched on the drive outputs to the lamps and audibles are disabled. The annunciator will work exactly the same in all other respects; all alarms are monitored as standard and all repeat relays and communications function as normal. As soon as the system is switched out of the ‘sleep’ mode, the display facias will display all alarm information, complete with all first-up details.

Multiplexer
To cut down on the costs of installing vast numbers of cables across large sites, the System 9000 can be used as an economical multiplexer system, where all the alarm contacts are gathered by a single System 9000TX Module and transmitted serially on 4 wires up to 1.2 km away to the receiving module, the System 9000RX Module. The alarms can then be displayed on a display facia or via VDU screens.

Complete Systems
RTK can provide the System 9000 mounted in a wall mounted or floor standing cabinet and provide all the necessary wiring to the displays, PSUs and terminals ready for final installation on site. These panels are quoted on site. These panels are quoted on site. These panels are quoted on site. These panels are quoted on site. These panels are quoted on site. These panels are quoted on site. These panels are quoted on site. These panels are quoted on site. These panels are quoted on site. These panels are quoted on site. These panels are quoted on site. These panels are quoted on site. These panels are quoted on site. These panels are quoted on site. These panels are quoted on site. These panels are quoted on site. These panels are quoted on site. These panels are quoted on site. These panels are quoted on site. These panels are quoted on site. These panels are quoted on site. These panels are quoted on site. These panels are quoted on site. These panels are quoted on site. 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Each operating sequence required as listed in the ISA publication *Annunciator* sequences and specifications S18.1 1979 (R1985). Systems can be configured with different features on different alarm ways and there is no need to switch the power off. The diagram below shows the most commonly used sequences.

### Sequence tables

#### Manual Reset

**Sequence Code M**

- **Process Normal**
  - Sequence Normal
  - Visual Off
  - Audible Silent

- **Process Abnormal**
  - Normal
  - Sequence Acknowledged
  - Visual On
  - Audible Silent

**Sequence Code A**

- **Process Normal**
  - Sequence Normal
  - Visual Off
  - Audible Silent

- **Process Abnormal**
  - Normal
  - Sequence Acknowledged
  - Visual On
  - Audible Silent

**Sequence Code R**

- **Process Normal**
  - Sequence Normal
  - Visual Off
  - Audible Silent

- **Process Abnormal**
  - Normal
  - Sequence Acknowledged
  - Visual On
  - Audible Silent

### Automatic Reset

**Sequence Code M**

- **Process Normal**
  - Sequence Normal
  - Visual Off
  - Audible Silent

- **Process Abnormal**
  - Normal
  - Sequence Acknowledged
  - Visual On
  - Audible Silent

**Sequence Code A**

- **Process Normal**
  - Sequence Normal
  - Visual Off
  - Audible Silent

- **Process Abnormal**
  - Normal
  - Sequence Acknowledged
  - Visual On
  - Audible Silent

**Sequence Code R**

- **Process Normal**
  - Sequence Normal
  - Visual Off
  - Audible Silent

- **Process Abnormal**
  - Normal
  - Sequence Acknowledged
  - Visual On
  - Audible Silent

### No Lock In

**Process Normal**

- Sequence Normal
  - Visual Off
  - Audible Silent

- **Process Abnormal**
  - Normal
  - Sequence Acknowledged
  - Visual On
  - Audible Silent

### Ringback

**Process Normal**

- Sequence Normal
  - Visual Off
  - Audible Silent

- **Process Abnormal**
  - Normal
  - Sequence Acknowledged
  - Visual On
  - Audible Silent

### Automatic Reset First Out

**Sequence Code M**

- **Process Normal**
  - Sequence Normal
  - Visual Off
  - Audible Silent

- **Process Abnormal**
  - Normal
  - Sequence Acknowledged
  - Visual On
  - Audible Silent

**Sequence Code A**

- **Process Normal**
  - Sequence Normal
  - Visual Off
  - Audible Silent

- **Process Abnormal**
  - Normal
  - Sequence Acknowledged
  - Visual On
  - Audible Silent

**Sequence Code R**

- **Process Normal**
  - Sequence Normal
  - Visual Off
  - Audible Silent

- **Process Abnormal**
  - Normal
  - Sequence Acknowledged
  - Visual On
  - Audible Silent

### Manual Reset First Out

**Sequence Code M**

- **Process Normal**
  - Sequence Normal
  - Visual Off
  - Audible Silent

- **Process Abnormal**
  - Normal
  - Sequence Acknowledged
  - Visual On
  - Audible Silent

**Sequence Code A**

- **Process Normal**
  - Sequence Normal
  - Visual Off
  - Audible Silent

- **Process Abnormal**
  - Normal
  - Sequence Acknowledged
  - Visual On
  - Audible Silent

**Sequence Code R**

- **Process Normal**
  - Sequence Normal
  - Visual Off
  - Audible Silent

- **Process Abnormal**
  - Normal
  - Sequence Acknowledged
  - Visual On
  - Audible Silent

### Automatic Reset First Out

**Sequence F3A**

- **Process Normal**
  - Sequence Normal
  - Visual Off
  - Audible Silent

- **Process Abnormal**
  - Normal
  - Sequence Acknowledged
  - Visual On
  - Audible Silent

**Sequence F2M-1**

- **Process Normal**
  - Sequence Normal
  - Visual Off
  - Audible Silent

- **Process Abnormal**
  - Normal
  - Sequence Acknowledged
  - Visual On
  - Audible Silent

**Sequence F1A**

- **Process Normal**
  - Sequence Normal
  - Visual Off
  - Audible Silent

- **Process Abnormal**
  - Normal
  - Sequence Acknowledged
  - Visual On
  - Audible Silent
Installation and Mechanical Details

Standard system with Communications

Local Annunciation

System 9000

Alarm Management Software

DCS/ESD

Printer

Multiplexed system

System 9000TX

System 9000RX

The System 9000 is based on the standard eurorack, manufactured to IEC 297-3 (DIN 1494 Pt.5). The standard subrack size is 3U and 84E wide (19in). This module will fit the Setup Card and up to 14 Active Input Cards. For smaller systems, a half rack version is available, this is 42E wide (10 1⁄2 in) and will fit the Setup Card and up to 5 Active Input Cards. The units can be supplied as rear mounting for direct fixing to backplanes or front mounting for use in 19in racks. Larger systems can be supplied by interconnecting multiple racks. All signals are fully buffered using the Interconnect Card, so no signal deterioration will occur even on extremely large systems.

Five module, half 19in rack

Fourteen module, full 19in rack
Technical Specification

**Inputs**

**Alarm Contacts**
All inputs are opto-isolated (isolation voltage 500VDC). By using different wiring configurations, the same system can be used for both:

- Volt-free contacts which can have the operating mode configured using the Setup Card, to operate to alarm for contact open or to alarm for contact closed.
- Voltage input from 19VDC minimum to 36VDC maximum with a common 0V for the 24VDC system and 38 to 58VDC for the 48VDC system.

**110V field contact voltage option**

**Alarm Contact and Cable Resistance**
- N/C contact – series resistance of contact cables 20kΩ maximum.
- N/O contact – parallel resistance of contact cables 200kΩ minimum.

**Field Contact Voltage and Current**
The voltage for volt-free alarm contacts is fed from the unit at 24VDC at approximately 2mA.

To maintain complete isolation it is possible to use a separate PSU to feed all the alarm contacts.

**Input Transient Filter (24V input)**
Signals narrower than approx 40ms at 30V will not trigger the annunciator.

Tolerable transient at higher voltages:
- 100V for 2ms
- 7 data bits, 1 parity, 1 stop bit
- Baud Rate – up to 9600
- Protocol – ASCII MODBUS and RTU

**Control Inputs**
Any input can be configured to one of the following control inputs:
- Lamp test
- Acknowledge
- Reset
- System test
- Mute
- First-up reset
- Sleep
- Horn Inhibit

**Outputs**

**Lamp Drive**
Each output can drive up to 160mA at 24VDC, making it suitable for multi bulb displays or multiple repeat displays.

**Standard Relays**
Standard relays fitted on the Setup Card: Horn, Group and Watchdog.

- Contact rating 3A at 24VDC resistive or 2A at 240VAC resistive. Selection of N/O or N/C contact by jumper link.

**Repeat and Group Relays**
Group relay card and individual repeat relays for each alarm way. Contact rating 3A at 24VDC resistive or 2A at 240VAC resistive. Relay outputs may be normally energised or normally de-energised and contacts can be N/O or N/C.

**Communications**
Alarm data can be transmitted using the serial communications port to other System 9000 units, DCS systems, PLCs or computers.

Transmission – RS485C. Full duplex, 1 start bit, 7 data bits, 1 parity, 1 stop bit.

Baud Rate – up to 9600

Protocol – ASCII MODBUS and RTU

**General**

**Supply Voltage**
24VDC nominal (19–36VDC) Standard
48VDC nominal (38–58VDC)

A range of power supplies is available to convert from other ac or dc voltages.

**Supply current (mA)**
- 24V: 120
- 48V: 60

**Quierscent**:
- Setup Card: 40
- Active Input Card: 30

**Relay current/per relay**
- 22 mA
- 10 mA

**EMC Compliance**
Immunity to EN61000-6-2:2001
Emissions to EN61000-6-4:2001

**LVD Compliance**
The unit is designed and manufactured to safety specification BS EN61010-1:1993

**Environment**
Operating temperature –20°C to +60°C
Storage temperature –20°C to +80°C
Humidity 0–95% RH, non-condensing
Protection IP41

**Mechanical Details**

**19in Rack**
Standard 3U by 19in Eurorack to IEC 297-3 (DIN 1494 Pt.5) for up to 109 alarm inputs and 3 control inputs.

Standard 3U by 10in Eurorack to IEC 297-3 (DIN 1494 Pt.5) for up to 37 alarm inputs and 3 control inputs.

Larger systems can be provided using multiple racks and interconnect cable.

**Mounting**
Either rear mounting direct to backplate or front mounting in a standard 19in racking system.

**Assembly**
All cards plug in to a standard pre-tested motherboard using DIN41612 connectors. This allows simple system expansion of system size at a later date.

**Connections**
Two part rising clamp terminals, maximum cable size 2.5mm². Side mounted and front mounted screw terminals are available.

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Due to our policy of continuous product development, we reserve the right to amend specifications without notice.
Series 725
Programmable Alarm Annunciator

Multi-redundant design for greater reliability

The Series 725 Alarm Annunciator provides the ideal solution to all your alarm system requirements. Whatever the size or complexity of your alarm scheme the Series 725 can be configured to provide the best solution. With a field proven multi-redundant ASIC design this Annunciator gives the best in reliability, flexibility and programmability for all applications and industries.

With a range of three window sizes, six colours and a choice of bulb or ultra-bright LED illumination, a format and size will be available to match your exact requirements. Each individual alarm way is fully programmable from the front, using the integral programming module. This allows the user to select many different features giving thousands of possible combinations.

Numerous relay outputs are included as standard to connect to external equipment and individual repeat relays or communications can be supplied as an option.

Modular construction from 1 to 256 alarm channels

Multi-redundant design so there is no single point of failure

Choice of window sizes

Available in six colours with conventional filament lamps or removable LED assemblies

Each channel programmable from the front

Low cost RS485 bi-directional Communications option

Panel or 19” rack mounting or fully integrated into wall mounting or floor standing enclosures
Features & Benefits

Modular Construction
The modular design of the 725 Series allows units to be assembled in almost any size and shape to suit the individual customer's requirements. Units can be constructed from a single alarm channel to a maximum of 256 channels with a choice of three window sizes.

ASIC Technology
The Series 725 Annunciator builds on the success of previous designs using ASIC technology but taking the design to new levels of reliability.

Multi-Redundant Design
As Annunciators are often used to monitor critical plant alarms it is essential the unit provides the highest reliability possible. With this design there is no common CPU or common services module, which can cause complete system failure. All alarm cards in the Series 725 can act as the master controller, if a card does fail then only two alarm points are affected. This design combined with the huge reduction in component count gives a far higher Mean Time Between Failures.

Fully Field Programmable
The user may select from a vast range of different operating functions and alarm sequences including all the standard sequences defined in the ISA publication 'Alarm Sequences and Specifications S18.1 1979(R1985)'. The modular design of the 725 Series allows units to be assembled in almost any size to suit the customer's exact requirements. Units can be constructed from a single alarm channel to a maximum of 256 channels with a choice of three window sizes. All programmed information is stored in EEPROM giving repeatability, total reliability and requiring no battery backup.

Service From The Front
All normal servicing and maintenance is carried out from the front of the unit without the need for special tools. This includes bulb/LED removal, legend changes and all programming. When commissioning the unit it is a simple matter to check and amend all programmed settings from the front of the unit without removing power, boards, backplates or alarm bezels. This programming module can also be used as a diagnostic tool to indicate the current state of the associated field contacts.

Pushbutton/Programming Module
As standard the bottom right cell is fitted with an integral pushbutton and audible module. This provides six pushbuttons and a 90dB audible together with a 'power on' LED. The rubber keypad is designed for harsh environments with an effective tactile feel to aid operators. It is this keypad that is dropped down to become the programming module when configuring the system.

Shallow Depth
Even with the advanced programming facilities the unit is still only 145mm deep, a fraction of the depth of traditional annunciator systems.

Pre-configured
If specified at the time of ordering, systems can be supplied pre-configured and complete with the associated coloured filters and film legends, ready to install and commission.

Auto-mute and Auto-acknowledge
It is a frequent requirement of alarm systems to have an automatic mute or even automatic acknowledge after a certain time delay. This is another programmable feature supplied as standard on all units.

Expandability
Each Annunciator can be expanded using a factory supplied ribbon cable to link to additional units. Systems consisting of multiple Annunciators can be daisy chained together to form larger systems with common features. All first-up information, synchronised flash rates and pushbutton functions are linked through this ribbon cable.

Sleep Mode
Increasingly Alarm Annunciators are used in applications where the primary supply is produced from batteries, typically substations, which are not permanently manned. To conserve power in these situations the Annunciator can be placed in "Sleep" mode. In this mode the Annunciator works as normal, latching in alarms and driving repeat relays, but the drive to the lamps, horn and pushbutton inputs are disabled. When the unit is removed from "Sleep" mode all alarm information is available in the normal way.

Serial Communication
Bi-directional RS485 communication is available as a low-cost option. This can be used to receive alarm information from or transmit to third party equipment. Each alarm channel can be configured to accept alarm inputs from the standard alarm contact or via the communications. The communications can be used to create systems linking two or more Annunciators together as repeat or grouped displays.
### Inputs & outputs

#### Inputs
All inputs are opto-coupled and comply to the stringent requirements of the European Directive on electromagnetic compatibility and the low voltage directive. This ensures there is no possibility of false alarms. The standard input voltage is 24V but units can be supplied with field contact voltages of 48, 125 or 250V. All versions are capable of accepting AC or DC voltages.

#### Common Outputs
As standard the Series 725 has five relay outputs to cover all normal alarm applications. These are as follows:

1. Critical Audible Relay
2. Non-critical Audible Relay
3. Critical Group Relay
4. Non-critical Group Relay
5. Special Function Relay

Each of the group relays can have a reflash facility to indicate the occurrence of a new alarm within the group. The Special Function Relay can be set to act in a number of different ways to suit the particular application. This function can be selected from one of the following:

- Total Group Relay
- Ringback Audible Relay
- First-Up Relay
- Watchdog Relay

#### Audible Outputs
The standard unit will be supplied with an integral 90dB(A) audible and two audible relays (critical and non-critical). Each alarm way can be programmed to be in one, both or neither of these two groups. The integral audible will always sound on the critical group.

#### Group Outputs With Reflash Facility
Two group relays are provided as standard (critical and non-critical). As with the audible relays, each alarm way can be programmed to be in one, both or neither group. Each group relay can also be set to have a reflash facility. This means the first alarm in the group will change the state of the relay and any subsequent alarms within the same group will cause the relay to pulse for approximately 0.5 seconds.

#### Auxiliary Relays
Each alarm way can be supplied with an individual repeat relay. Each relay can be programmed to be energised or de-energised on alarm and both normally open and normally closed contacts are available on customer terminals. The repeat relays can be set to follow the alarm logic, follow the field contact or follow the display.

#### Connections
All connections are made to the rear of the unit, using two part screw terminals capable of taking 2.5mm² cable.

### General

#### Complete Alarm System
Everything is contained within the standard 725 Annunciator to provide a complete alarm monitoring system. This includes all pushbuttons and a local audible.

#### First-Up
In alarm annunciation applications it is often essential to know which alarm occurred first in a particular group. To this end, four different first-up sequences and four different first-up groups are available, all user programmable from the front.

#### Power Supplies
The supply required to power the Annunciator is nominally 24VDC. This can be a simple unregulated low cost source as the annunciator itself will provide all the necessary smoothing and regulation.
RTK can supply suitable Power Supplies or DC/DC Converters if converting from higher AC or DC voltages including the RT-AD Dual Redundant Supplies.

#### CE Marked
Designed within the stringent requirements of the European EMC and LVD directives ensures that the Annunciator conforms to the highest standards of both safety and function.

#### Wall, Panel and Rack Mounting
The standard unit is supplied as a panel mounting version ready for customers to drop into a single cut-out.
If required RTK can supply the 725 Annunciator fully integrated into wall mounting or floor standing enclosures or mounting within standard 19” plates.

### Display

#### Window Sizes
This flexible unit is designed to be fully modular using a cell based structure.
Each cell can house:
- One large window (60 x 60mm)
- Two medium windows (60 x 30mm)
- Four small windows (30 x 30mm)

Window sizes can be mixed as required.

#### Backlit Illumination
Each window is backlit by long life incandescent lamps or ‘Fit & Forget’ removable LED Assemblies. All colours are available for both lamps and LEDs. These colours are red, amber, yellow, white, green and blue.
Annunciator Options

Illumination (Option LED)
The use of LEDs is becoming more popular and these can be supplied as an optional extra. The 10mm glass wedge bulb is replaced with a small ultra-bright LED Assembly which plugs into the same lampholder as the bulb.

Tropicalised (Option TRO)
In harsh environmental conditions where there may be moisture or chemicals within the atmosphere, there is an option to tropicalise the unit. This consists of covering all the pcbs with a conformal coating and using sealed relays.

Repeat Relays (Option RLY)
The five common relays are always fitted as standard but there is an option of having individual repeat relays for all alarm ways.

Customer Specified Response Time (Option CRT)
As standard the alarm will be activated by signals over 22ms in duration. If this time is either too long or too short to suit the particular application there is an option to increase or decrease this response time.

Disable Horn (Option DHN)
If the integral horn is not required when the audible relays are being used, this can be disabled.

Field Contact Voltage (Option FC**)
The standard unit uses either volt-free contacts or 24V signals to trigger alarms. It is possible to change the field contact voltage to alternatives such as 48V, 125V or 250V. All versions are capable of accepting AC or DC voltages.

Rack Mounting
The Annunciators can be supplied pre-mounted in standard 19° aluminium mounting plates. A maximum of 7 cells will fit across a 19° front plate.

RS485 Serial Communications (Option COM)
All Series 725 Annunciators can be fitted with the optional serial communications card, which is usually located in the cell directly above the pushbutton module. This card provides RS485 bi-directional communication to and from third party devices using modbus ASCII or modbus RTU protocols as standard. All pushbutton controls can be local to the annunciator or driven remotely via the communications link. Up to 64 annunciators can be multi-dropped on the same communications connection.

Adjustable Response Time (Option AD*)
If specified at the time of ordering each channel can be supplied with user adjustment of the response time across any range up to 2 seconds.

Three Horn Relay Outputs (Option 3HN)
It is possible to change the operation of the common relays to have three horn relays and a single group relay rather than two of each. With this option the method of programming of the relays remains the same but their operation is altered slightly.

Three Group Relay Outputs (Option 3GP)
It is possible to change the operation of the common relays to have three group relays and a single horn relay rather than two of each. With this option the method of programming of the relays remains the same but their operation is altered slightly.

Systems and Specials

Systems
RTK Instruments has extensive systems experience and can supply an alarm annunciator as part of a complete alarm system. This may include installing in wall mounting or floor standing enclosures, integrating into mimic displays or wiring together with other switchgear, power supplies or battery backup systems. Because of the varied nature of this type of special system, they are priced on application against an agreed specification.

Greater Ingress Protection
The Series 725 facia is rated at IP41. Optional hinged plexiglass covers are available in all sizes for IP54 applications. For extreme environmental conditions enclosures with viewing windows are available to meet IP66 and IP67 standards.

Lamp-only Module

Matching Display
To complement our Series 725 Annunciator the 725LO lamp-only unit is available, which provides the same flexibility of display size, window colours and illumination by lamp or removable LED assemblies. The display can be supplied complete with lamp test facilities or with integral audible and pushbuttons if required. With lamp-only versions the lamps or LEDs are simply wired to customer terminals for connection to remote devices as required. See separate datasheet for full details.
Alarm Sequences

Each alarm channel can be configured to suit the operating sequence required as listed in the ISA publication *Annunciator* 1979 (R1985). Systems can be configured with different features on different alarm ways. The diagram below shows the most commonly used sequences.

**MANUAL RESET**

Sequence Code M

**AUTOMATIC RESET**

Sequence Code A

**NO LOCK IN**

**RINGBACK**

Sequence Code R

**AUTOMATIC RESET FIRST OUT**

Sequence Code F3A

**Manual Reset First Out with First Out Flashing and Reset Pushbutton**

**Automatic Reset First Out with No Subsequent Alarm Flashing and Silence Pushbutton**

**Manual Reset First Out with No Subsequent Alarm State**

**Automatic Reset First Out with No Subsequent Alarm State**
Window Size & Layout

The Series 725 Annunciator is modular in design allowing customers to quickly design each alarm system to suit their exact requirements for both window size and number of windows. The system is built up of multiple cells; each cell has dimensions of 60 x 60mm and can be configured as a single large window (60 x 60mm), two medium windows (60 x 30mm) or four small windows (30 x 30mm). The units are built up from pre-tested components so custom solutions can be provided with the best possible lead times.

Units can be configured into almost any shape and size as long as the overall width or height is less than 30 cells.

Windows are numbered depending on window size as shown in the examples below. Please refer to these numbers when providing legend/configuration details.

Rear View/Removable Customer Terminals
System Configuration

Dimensions

The dimensions are very simple to work out using the following formula or alternatively read from the table below.

Overall dimensions = [(No of cells) x 60] + 24mm
Cutout dimensions = [(No of cells) x 60] + 14mm

<table>
<thead>
<tr>
<th>NO OF CELLS</th>
<th>OVERALL (MM)</th>
<th>CUTOUT (MM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>84</td>
<td>74</td>
</tr>
<tr>
<td>2</td>
<td>144</td>
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</tr>
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<td>3</td>
<td>204</td>
<td>194</td>
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<td>4</td>
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<td>5</td>
<td>324</td>
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<td>6</td>
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<td>8</td>
<td>504</td>
<td>494</td>
</tr>
<tr>
<td>9</td>
<td>564</td>
<td>554</td>
</tr>
<tr>
<td>10</td>
<td>624</td>
<td>614</td>
</tr>
<tr>
<td>11</td>
<td>684</td>
<td>674</td>
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<tr>
<td>12</td>
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<td>14</td>
<td>864</td>
<td>854</td>
</tr>
<tr>
<td>15</td>
<td>924</td>
<td>914</td>
</tr>
<tr>
<td>16</td>
<td>984</td>
<td>974</td>
</tr>
</tbody>
</table>

Film Legends

As fully approved details of alarm text is often not available at the time of order, acetate film legends are generally used. RTK can supply the Series 725 Annunciator complete with alarm legends or they can be generated by the customer using a Microsoft Excel software template. This allows the user to create their own legends locally. Once the details have been entered they can be printed onto acetate film via a laser printer. This software template makes the production of legends in different languages, sizes and fonts very straightforward.

Bezel Assembly

The diagram below shows how the bezel assembly is constructed using different layers to diffuse the light, colour and window and show the text using a film legend insert. These assemblies are simple to move around in the Annunciator frame and to change colour or text on site.

Order Code

```
P725  M  6W  4H  6T  18A  LED
```

- **Model**
- **Number of cells wide**
- **Number of cells high**
- **Number of active alarm ways**
- **Window size**
  - Small (S)
  - Medium (M)
  - Large (L)
  - Intermixed (INT)
- **6-button TAR module**
  - 6T
- **No pushbutton module**
  - NT
- **Options**
  - LED
  - DHN
  - AD
  - TRO
  - FC
  - 3GP
  - RLY
  - RAC
  - 3HN
The inputs are all bipolar so can accept AC or DC voltages.

Alarm Contacts
The standard unit is suitable for volt-free contacts or 24VDC powered inputs. Each input can be easily set to operate from either a Normally Open or Normally Closed field contact.

Isolation
All customer inputs are optically coupled as standard and are capable of withstanding 1000V Megger test to ground.

Field Contact Voltage
This voltage is distributed through the annunciator to field contacts, 24VDC is supplied as standard. Options for 48, 125 and 250V are available. The inputs are all bipolar so can accept AC or DC voltages.

Response Time
- Standard units 22ms
- Customer defined fixed response time from 1ms to 2s, specified at time of order
- Adjustable response time typically 5-50ms (Option AD1)

First-up Discrimination
Better than 5ms

Pushbuttons
Both integral and terminals for remote fitting
- Lamp Test
- Acknowledge
- Reset
- First-up Reset
Optional remote pushbutton/programming assembly.

Repeat Relays
Each alarm way can have individual repeat relays. Changeover contact available. Relay ratings at 220VDC (250VAC) max, 125VDC @ 0.5A, 24VDC @ 2A, resistive. Two relays per channel can be provided (Option RL2).

Audible
3kHz piezoelectric buzzer at 90dB 30cm.

Communications (Optional)
RS485 2 or 4 wire, Modbus, ASCII or Modbus RTU protocol user selectable. Master and Slave configurations. Supports bi-directional communications Ethernet Modbus TCP/IP. Alarm Management software. Other protocols available on request.

Display
Window Sizes
- Small: 30 x 30mm
- Medium: 60 x 30mm (W x H)
- Large: 60 x 60mm

Window Colours
Red, Amber, Yellow, White, Green and Blue for both Lamp and LED illumination.

Illumination
Small window Single Bulb/LED
Medium window Dual Bulb/dual LED
Large window Four bulb/four LEDs

The LEDs are ultra-bright LED Assemblies that plug into the standard 10mm wedge style lampholder.

Lamps
28V 50mA 10mm glass wedge.
14,000 hour design life.

LED Assemblies
10mm base ‘Fit and Forget’ plug-in LED Assemblies, typically 20mA, minimum 11-year life expectancy.

General
Supply Voltage
24VDC Nominal (19-28VDC)

Supply Current Per Alarm Point
(at 24VDC supply)
Quiescent: 9mA
Lamps: Small window 45mA
Medium window 90mA
Large window 180mA
LEDs: Small window 20mA
Medium window 40mA
Large window 80mA

Relays: All window sizes 10mA per relay
Additional current for pushbutton module, common relay and audible is nominally 100mA.

Compilation
Immunity to EN61000-6-2:2001
Emissions to EN61000-6-4:2001
LVD to EN61010-1:1993

Surge Immunity
To AMSI/IEEE C37.90:1989

Environment
Operating temperature (lamp version)
-20 to 50°C
Operating temperature (LED version)
-20 to 60°C
Storage temperature
-20 to 80°C
Humidity
0-95% RH, non condensing

Protection
Front of panel: IP41
Rear of enclosure: IP20
Optional covers and enclosures to protect from IP54 up to IP67

Connections
Two-part rising clamp type terminals, for conductors up to 2.5mm²

Weight
Approximately 0.3kg per module.
The UC625 Alarm System, developed from the field proven P625 range of alarm annunciators, offers the latest in ASIC technology packed into a compact design for applications where panel space is at a premium.

The field proven multi-redundant ASIC design of this annunciator provides the user with the best combination of flexibility and reliability. The UC625 is designed as a complete alarm system with integral redundant supplies, audibles, relays and pushbuttons for the most cost effective solution for monitoring critical process alarms.

Programmable alarm sequence, signal duplicating relays, dual horn relays, LED display, proven ASIC technology and dual redundant universal power inputs make the UC625 an ideal choice for all industrial sectors.
Features & Benefits

Various Sizes
Various sizes are available from 12 to 40 alarm points. Each unit is supplied with two additional alarm points for monitoring the two integral power supplies.
Dimensions are as follows:

<table>
<thead>
<tr>
<th>No. of Ways</th>
<th>Overall in mm</th>
<th>Cut-out in mm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Height</td>
<td>Width</td>
</tr>
<tr>
<td>12</td>
<td>154</td>
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<tr>
<td>16</td>
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<td>320</td>
</tr>
<tr>
<td>40</td>
<td>154</td>
<td>348</td>
</tr>
</tbody>
</table>

Auxiliary Relays
Each channel is equipped with an integral relay facility, typically used to initiate inputs to third party devices such as RTU, SCADA or DCS systems.
On board DIL switches or jumpers allow the user to select the manner in which the relay responds; normally energised or de-energised relay state and if the contact is normally open or normally closed in the non-alarm state.

Inputs
All inputs are optically coupled and comply to the stringent requirements of the European Electromagnetic Compatibility and Low Voltage Directives.
The standard input voltage is 24VDC but 48VDC, 125VDC or 250VDC are available as an option.

Integral Redundant Power Supplies
In order to maintain the highest level of reliability in safety critical applications, all models are equipped with integrated dual power supplies. The standard unit is equipped with two fully isolated universal input supplies, each capable of accepting either 85-264VAC or 88-360VDC. As an option the secondary supply can be suitable for 24VDC if specified at the time of order.

Power Consumption
Power consumption is kept to a minimum by the use of super-bright LEDs.

Auto Accept Timer
In unmanned applications it is common to have an automatic accept facility after a pre-set time, typically one minute; this is a standard feature on the UC625.

Dual Horn Facility
Two horn relays are fitted as standard and each pair of alarm ways can be selected to operate either a critical or non-critical integrally mounted horn relay.
In substation applications it is common for one relay to be used to operate the externally mounted station bell and the second relay to be used to operate a common power failure audible alarm.

Sleep Mode
All units are equipped with ‘Sleep’ mode which is typically used in substation applications where the visual and audible outputs are disabled during unmanned periods to reduce drain on the station batteries. Whilst in ‘Sleep’ mode, the alarm logic will continue to react in the normal way including the operation of the group alarm relays and individual repeat and common alarm relays – ONLY the drive signals to the LEDs and the audibles are disabled until the unit is placed back into the ‘Run’ mode.

Input Response
As standard, the input response is set to 22ms for optimum performance, however this delay is user programmable and can be reduced or extended to suit the exact site conditions.
**Features & Benefits**

**Film Legend Engraving**
Because the exact text is often not known at the time of order, the UC625 has been developed to use acetate film legends which allows users to easily generate their own legends using a computer and laser printer.

**Connections**
All connections are made on the rear of the unit using two-part quick disconnect rising clamp terminals accepting up to 2.5mm² cable.

**Common Outputs**
As standard, each unit is fitted with three common relays: Critical Audible Relay, Non-Critical Audible Relay and Common Alarm Relay. The common alarm relay is equipped with a reflash feature to indicate the occurrence of a new alarm within the unit.

**Power Failure Alarms**
Two channels within the annunciator are reserved for power failure monitoring. One monitors the presence of the primary supply and the other monitors the presence of the auxiliary supply.

**Pushbutton Controls**
Integral pushbuttons are provided for Functional Test, Acknowledge, Mute, and Reset which control the operation of the standard alarms within the instrument. The two power failure alarms have their pushbutton control lines wired to Customer terminals for connection to remote Functional Test, Accept and Reset pushbuttons. As an option, all alarms ways can be controlled from the integral pushbuttons.

**Illumination**
The UC625 is equipped with 8mm super-bright red LEDs for increased reliability and minimal power consumption.

**IP Rating**
Flush panel units are IP51 rated, optional IP54 weatherproof doors or IP56 wall mounted enclosures are available.

**Tropicalisation**
In harsh environments where moisture or chemicals may be present in the atmosphere, there is an option to tropicalise the unit. This consists of spraying the unit with a conformal coating.

**Serviceability**
All normal servicing and maintenance is carried out from the front of the unit without the need for special tools.

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**Sequence Tables**
Technical Specification

Inputs

Alarm Contacts
All inputs are optically coupled and can be used for volt free Normally Open or Normally Closed contact inputs. Voltage inputs can also be used, these can be 24, 48, 125 or 250VAC/DC.

Alarm Contact and Cable Resistance
N/C contact-series resistance of contact cables 5kΩ max.
N/O contact-parallel resistance of contact cables 150k Ω min.

Surge Immunity
IEEE/ANSI C37.90.1
IEC 61000-4-4, 2KV

Input Response Time
The standard unit has a response time of 22ms. DIL switches are used to select alternative response times.

First-up Discrimination
Better than 5ms.

Input Protection
Inputs are protected against accidental connection to mains voltages (240VAC, 50Hz) or a 1000V Megger Test.

Outputs

Visual
Back illumination by 8mm super-bright LEDs plus green Power On LED.

Relays
Individual signal duplicating relays, contacts rated at 60VDC max, 24VDC @ 2A max.
Horn and group relays, contacts rated at 220VDC max, 125VDC @ 0.5A, 24VDC @ 2A.

Audible
Two integral audibles are included as standard, which can be inhibited as required.

Supply

Supply 1
Voltage range 85-264VAC or 88-360VDC.

Supply 2
Voltage range 85-264VAC or 88-360VDC (Optional 24VDC).

General

Connections
Two part rising clamp terminals, for cables up to 2.5mm².

EMC Compliance
Immunity: EN61000-6-2:2001

Order Code

UC625 —⭐ —⭐ — H — ⭐ — 024D — R

MODEL NO.

NO OF ALARMS

LED COLOUR

SUPPLY 1

**SUPPLY 2

FIELD CONTACT VOLTAGE

REPEAT RELAYS

UC625

12

RD = Red

H = Universal

Optional

L = 24VDC

024D = 24V

R = Repeat

16

YL = Yellow

88 to 360VDC or 88 to 265VAC

Optional Powered Inputs

048 = 48V

110 = 110V

250 = 250V

20

AM = Amber

24

GN = Green

28

WH = White

32

36

40

Due to our policy of continuous product development, we reserve the right to amend specifications without notice.

RTK Instruments Limited
ST James Business Park,
Knaresborough, North Yorkshire,
England. HG5 8PJ

Telephone: +44 (0)1423 580500
Facsimile: +44 (0)1423 580501
Web: www.rtkinstruments.com
Email: enquiry@rtkinstruments.com

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