

PAGA DATASHEET

JUNHO 2013

Management

central switch VX/AT

Amplifier Module

VA300+/325 W

Amplifier Cage

VA300/CAGE

Fan Unit

VA300/FAN

Power Supply

VA300+/PSU



Master Unit VAP30



Access Unit VAP01

Features

- Various redundancy concepts
- Fully monitored system
- Different interfaces available
- BARTEC VODEC System on a Chip

PAGA Public Address and General Alarm System

Description

The BARTEC VODEC PAGA (Public Address and General Alarm System) is the culmination of over 25 years experience in the design, manufacture and commissioning of high integrity voice/alarm broadcast packages for life safety applications.

The PAGA System is specifically developed for use in aggressive operating environments including potentially hazardous atmospheres. BARTEC VODEC PAGA is designed to reliably operate for extended periods of time without failure or recourse to routine maintenance.

PAGA has been independently certified to meet the strictest climatic conditions specified by leading authorities including CE, Bureau Veritas, RMRS and DNV. The PAGA package can be supplied in a number of system architectures:

- Fully duplicated A+B configuration
- N+1 Hot-Standby configuration key components are duplicated and configured on Hot-Standby
- Combination of A+B and N+1 for ultimate system security

P3-PAGA system units

- **System rack**
Depending on application several sectors/area maybe assigned dedicated PAGA resources with networked connections to communicate inter sector.
- **Operator access units**
- **Loudspeakers**
- **Flashing beacons** (high intensity) in high ambient noise areas

Amplifier cage

The amplifier cage carries loudspeaker amplifiers, type VA300+, which facilitate both drive and management of groups of loudspeaker devices.

Amplifier module

A typical PAGA system might have amplifiers ranging from two units to hundreds of amplifiers depending on the acoustic alarm signals and intelligible speech coverage requirement over the site.

Amplifier power supply

The VA300+ amplifier provides extremely high power density in a compact lightweight modular plug in "cassette" format.

VA300+ amplifier power supply is derived from VA300+/PSU which facilitates dedicated outlets for each amplifier thereby enhancing overall system security.

Management central switch P3-VX/AT

The complete package is managed by the BARTEC VODEC VX/AT control switch.

VX/AT provides

- Secure switching of input/output program
- Generation of internationally specified alarm tone cadence
- Supervision and control of system priorities
- Supervision of the complete PAGA system

There is minimal conventional hard wiring within the central rack, all interconnections are by plug/socket ribbon cable assemblies.

Ports

Connection of field equipment to the host rack is made via an integral "MDF" which houses a number of DIN rail mount termination "ports".

A family of BARTEC VODEC ports enable simple reliable implementation of

- self healing loudspeaker and flashing beacon networks "Loop" based
- mutable loudspeakers
- interfaces to other site systems e.g. PABX, VHF, Radio, SCADA, Fire and Gas, ESD, Supervisory, Event Recording, Entertainment Systems
- on connection to operator access units
- AC/DC power supplies

Page/Party communication

A system can be extended to include Page/Party communications by incorporating a BARTEC VODEC VXS shelf, dual AC supply system energisation by ASD02/08 shelf and pre-recorded messages by RP8/60.

Access units

A range of operator access units are available from the standard BARTEC VODEC VAP01/VAP30 series or "tailor made" human machine interface to client specification.

ATEX certification allows safe access facilities in potentially explosive hazardous areas.



Features

- Highest security
- Single fault tolerant
- Fully duplicated system

Duplicated System Architecture

Description

Where the alarm and voice broadcast (PAGA) system is intended to provide vital life safety/dependant instruction/warnings a fully duplicated A+B configuration is implemented.

The intent is that a single fault, no matter how catastrophic, shall not inhibit the reliable distribution of alarm and voice broadcast to all potential listening positions.

The duplicated PAGA package is arranged such that there is no possibility of common mode failure and design obviates cross transference of possible fault conditions from one sub-system to the remaining working sub-system.

Each compartment is fitted with loudspeakers assigned separately to A and B PAGA sub-systems. The areas where ambient noise exceeds 84 dBA A and B flashing beacons should be fitted. The two sub-systems are strictly segregated with central panels remotely located from each other.

Cables extending from the panels to field devices follow separate routes utilising differing transits, cable race ways, racking and tray work, additionally all cables are mechanically protected.

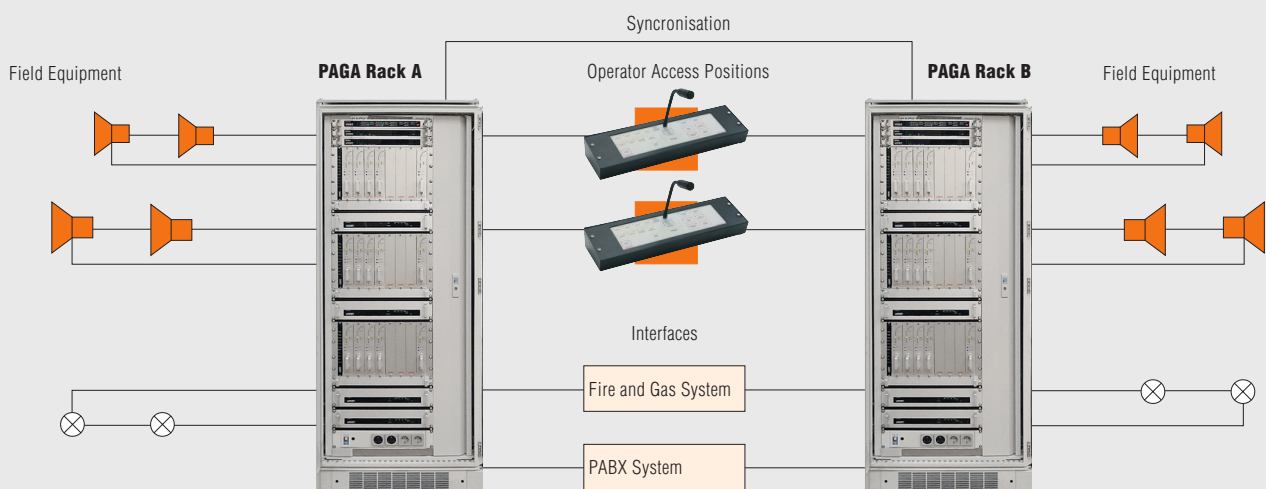
Loudspeaker distribution is arranged such that with either A or B system isolated a minimum signal to noise differential of +6dBA is maintained

at all potential listening locations and that in sleeping area a minimum of +75 dBA at the bed head is maintained. Both A and B systems are normally on line and operate independently. There are no sharing of resources or signals.

Hot-standby equipment within A or B sub-system is normally not required (unless specifically required by client).

The A and B systems are held in synchronisation by an optically coupled cable A to B to A. in the event of loss or corruption of this link the worse case scenario is that alarm tones can no longer synchronise, but coverage is maintained.

Application Offshore Platform - A and B System





N+1 Hot-standby

Features

- Very small size, lightweight
- Plug in/out
- Fully monitored
- Detail LED diagnostics
- 24 V or 48 V battery charger output
- Remote fault report output
- Higher equipment racking density
- Simple quick and easy service
- Early warning of battery system trouble
- Rapid fault location, minimum down time
- Requires only ONE charger to recharge and manage 48 V battery strings, higher reliability
- Integration with other site systems

Description

BARTEC VODEC PAGA Public Address and Alarm system is specifically designed for critical life safety applications.

To improve system availability the BARTEC VODEC PAGA system can be configured in an N+1 architecture. N+1 denotes that certain key. Front end parts of the PAGA system are duplicated with the second hardware set being held in hot-standby. N+1 can apply to loudspeaker power amplifiers and/or host management according to client specification.

In either case field equipment is not duplicated in N+1, i.e. there are non-redundant loudspeaker/beacon networks.

Amplifier replacement is automatic and in addition to supervision of on-line amplification the standby amplifier is monitored also. For ultimate security A+B fully duplicated architecture should be specified, refer to data sheet DS0159.

The BARTEC VODEC VA300/CAGE is fitted with N+1 capability for power amplification as standard.

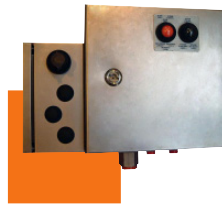
Each VA300/CAGE can support 8 X VA300+ amplifiers out of which it is possible to simply configure slot 8 as hot-standby for the remaining (up to) seven on-line amplifiers.

It is possible to extend the hot-standby to provide support for on-line amplifiers sited in other VA300/CAGE(s) if desired, e.g. system fitted with twenty VA300+ amplifiers (slot 21, 22 and 23 are spare) slot 24 is hot-standby for amplifier 1 - 20.

For greater system security the VX/AT management processor is not configured to enable hot-standby of all switching functions, alarm generation and operator access unit management.

For this application the operator access units feature duplicated N+1 transceivers and microphone transducers. A Vodec NT4 facilitates selection of VX/AT on a master/standby basis. Hot-standby amplifier can be assigned for

- Every seven "on line" amplifiers
- Every three "online" amplifiers
- Single hot-standby can support all "on line" amplifiers up to maximum of sixty four.



Ex p Control unit

Ex PAGA Central Equipment Rack

Description

The PAGA (Public Address and General Alarm) System central panels are available ATEX certified enabling safe voice and alarm broadcast capability in a potentially explosive atmosphere.

Implementation of the Exp central panel obviates disconnection of the PAGA system during an emergency shut down (ESD) scenario thereby guaranteeing continued availability of broadcast service with attendant ultimate package security.

Availability of ATEX certified field equipment. Intrinsically safe operator control access units, intrinsically safe emergency muster microphone, explosion proof loudspeakers and flashing beacons enables the complete PAGA system to operate safely and continuously in a zone 1 potentially hazardous atmosphere.

Incoming mains supply feeders are terminated inside an explosion proof „d enclosure ensuring

safety in event of loss of pressurisation or during purge sub-system boot up.

Inter-panel communications to serve system synchronisation in duplicated A+B PAGA architectures is implemented by fibre optic cable interface thereby guaranteeing safety in event of gas ingress to one of the panel locations.

Exp central panel protection concept is based on Exp pressurisation where the cabinets are automatically purged with “clean” air thereby preventing ingress of potentially flammable mixtures and consequent ignition risk. The BARTEC VODEC Exp package incorporates fail safe purge monitoring to ensure automatic isolation of any potentially incendiary circuit in event of loss of pressurisation. Interlocking ensures that the PAGA panel cannot be activated until pressurisation is of the correct level to guarantee safety in a zone 1 hazardous area.

Features

- certified ATEX for Zone 1
- DC 48 V battery input
- Higher integrity, obviates common mode failure
- No break autonomy, high security system design
- Rapid service/ installation

Technical Data

Safety concept

Exp main cabinet Ex d isolation box

ATEX certification

Zone 1 T4 IIC

Ambient temperature

-10 °C up to +40 °C

Humidity

90 % non condensing

Pressurisation

6 litres per minute

Pneumatic Interface

1/2" NPT for 1/2" tube

Dimensions per rack

2100 mm high including plinth
800 wide
800 deep

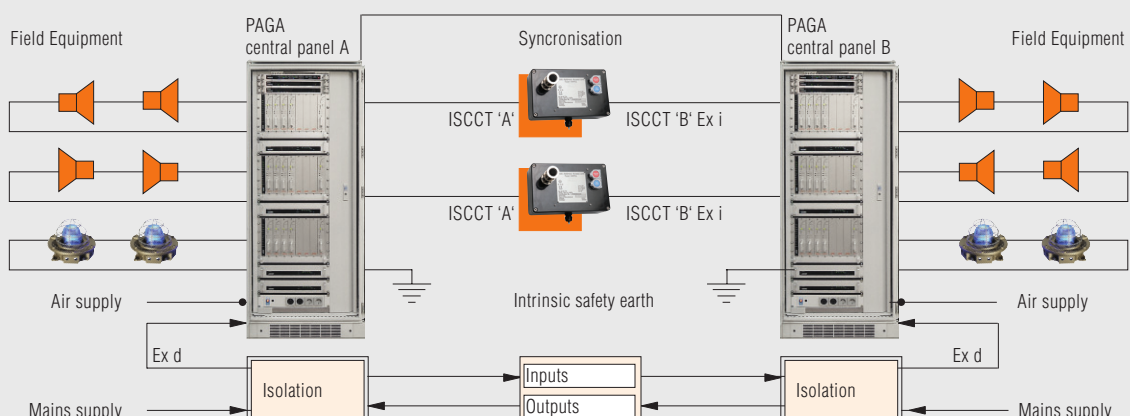
Panel colour

RAL 7035

Weight fully loaded

300 kg

Typical A+B Exp PAGA system execution in Zone 1 hazardous area



VA300+/325 Watt Amplifier



Description

The VA300+ amplifier is designed to provide reliable efficient service in critical life dependant alarm and voice broadcast applications (PAGA).

The unit is based upon a compact industry standard size Euro card module designed to plug in/out of a 6U high card frame (see data sheets DS0003). The VA300+ incorporates an integral supervisory package, which silently and automatically monitors amplifier and the associated loudspeaker line insulation with respect to earth.

The VA300+ fascia carries a detailed LED diagnostic display, inducing ten digit line output meter and robust alloy handle to facilitate rapid withdrawal of the complete assembly and exchange with absolute minimum of down time.

Surface mount manufacturing ensures consistent performance, obviates troublesome wiring looms, multiple printed circuit cards and shrinks the entire power amplifier module/supervisory to a single multi function micro adaptive motherboard.

Unique Vari-mode® (patent pending) output stage configuration eliminates EMC emissions and critical loading requirements associated with pure Class D amplification, whilst maintaining extremely high efficiencies during emergency broadcast request.

Amplifier frequency response bandwidth extends to 25 kHz thereby enabling automatic amplifier/line checking at inaudible supersonic frequencies.

The VA300+ amplifier is fully electronically protected against open/short/any abnormal load or temperature condition with automatic reset (once the condition is resolved) and is almost totally indestructible.

Output to loudspeaker network(s) is standard 100 Volt line with 70 Volt line as an option.

Due to the excellent power density/printed circuit card board area ratio the units are fitted to shallow depth low profile 19 inch racking thereby saving considerable weight and floor space.

The VODEC VA300+ amplifier incorporates automatic supervision for up to eight separate loudspeaker networks.

Each line is equipped with BARTEC VODEC intelligent end of line supervisory device type EOL01, EOL02, EOL03 or EOL04.

No calibration is required other than simple switch selection of quantity of lines to be monitored e.g, 1 to 8. this obviates use of:

- Conventional current monitoring schemes, which provide very poor resolution
- DC supervisory systems that require blocking capacitors to be fitted inside each loudspeaker

Temperature Monitoring and Protection Monitoring

There is a thermal sensor fitted to each amplifier module which is arranged to conduct at temperatures exceeding about 90 °C.

The temperature sensor illuminates the red temperature LED on the front panel of the amplifier; in addition the fans are initiated in the rack.

The temperature sensor has no effect on the operation of the amplifier it self.

Protection

The amplifier is fitted with comprehensive thermal protection which ensures that the amplifier can never be damaged through high ambient temperature.

The point at which the protection is applied is dependant on a number of variables:

- load on the amplifier
- signal level into the amplifier
- type of signal applied to the amplifier
- rail voltage on the amplifier
- ambient temperature

Features

- High efficiency
- Small size
- Greater power density
- Fully integrated supervision
- Life dependant security
- End of line monitoring
- Reduced power consumption
- Plug and play, minimal set up

Technical Data

Supply input

DC 48 V unregulated

Consumption

350 mA Quiescent

8.5 A Max

Efficiency

Better than 80%

Input sensitivity

0 dBm (770 mV RMS)

Frequency response – 3dB points

150 Hz and 20 kHz

Distortion

Better than 2%

Regulation

Better than 3 dB

Line output

100 (70) Volt line within 1dB

Protection

V/I protection and temperature

Power output capability

325 W

Dimensions

50 mm wide

266 mm high (6 units)

160 mm deep

Construction

Anodised alloy fascia and chassis

Finish

Natural alloy

Temperature range

-20 °C to +50 °C

Service location

Safe area internal

Humidity

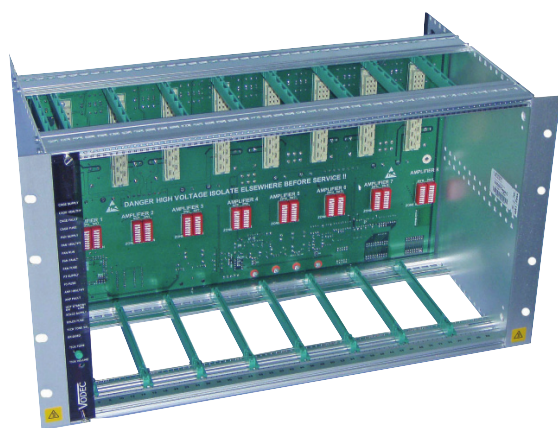
25 to 85% non-condensing

Vibration

Max. shock 1 g any direction

Weight

2.5 kg



Audio Amplifier Shelf

Description

BARTEC VODEC VA300/CAGE is a 6 unit high standard 19 inch rack mount low profile assembly designed to carry up to eight BARTEC VODEC VA300+ plug in/out Public Address Alarm System (PAGA) amplifier modules.

The unit comprises of a robust extruded lightweight alloy frame enclosure and motherboard "back plane" printed circuit card equipped with eight slots.

The back plane is fitted with eight gold plated indirect edge connectors, one per slot, which obviate troublesome hard wired connection looms and allow rapid plug in/out amplifier capability to assure speed of service.

The back plane carries an on board non volatile processing sub-system that enables eight amplifiers to substitute any one of the other seven VA300/CAGE slots in the event of on-line amplifier trouble.

Configuration also allows slot four to support hot-standby amplifier execution in this case amplifier number 4 is hot-standby for amplifier 1 - 3 whilst amplifier number 8 is a hot-standby for slot 5 - 7.

An auxiliary supervisory group fault report output is available to extend VA300/CAGE amplifier module warnings to the host Public Address management hardware.

The VA300/CAGE processor is fitted in a special shock resistant PLCC socket enabling engineers to exchange for tailored project specific micro chip configurations eliminating costly hardware modifications/bespoke wiring.

Each slot is allocated zone selection switches, which enables the engineer to quickly and conveniently pre determine broadcast area assignment for each respective amplifier.

Connection to/from the VA300/CAGE is via locking plug and socket insulation displacement flat ribbon cables which facilitate rapid complete removal of the frame from the rack system in the event of maintenance requirement.

VA300/CAGE is fitted with a display window that provides the engineer with immediate and convenient indication of critical conditions within the VA300/CAGE sub-system.

Status information includes DC supplies and associated proactive devices, fan control/condition, hot-standby amplifier and fault report supervisory.

VA300/CAGE configuration requires no special tools or PC connection and data is retained indefinitely with or without power supply applied. VA300/CAGE/C allows the engineer to issue tick tone on an amplifier by amplifier basis.

Features

- Extremely compact, large scale integration
- Motherboard construction completely eliminates hard wiring
- Integral status display
- High reliability, simplifies service
- Test "tick tone" which can be routed to individual amplifier slots
- Test "tick tone" volume control
- Extensive fault/operation status reporting LD's to provide diagnostic detail concerning power supplies and operating systems.

Technical Data

Supply Input

DC 48 V unregulated supply

Output

DC 6 A max. per slot

Input

Eight 100 Volt (70 volt) line output

Fan control

Fan initiate and supervisory for one off VA300/FAN module

Ambient noise sense (ANS)

Eight ANS microphone input (one per amplifier slot)

Host management

22.5 kHz supervisory control (for automatic amplifier testing) group fault reporting, cage to host. Fan from host (i.e. fan initiated when alarm tones are broadcast)

Dimensions

483 mm wide (19" rack mount)
267 mm high (6 units)
245 mm deep

Colour

Natural anodised alloy

Weight

without amplifier 3.44 kg

Temperature

-20 °C to +50 °C

Humidity

Maximum 80 % non condensing



Features

- Four independent power supply outlets
- DC 48 V battery input
- Plug in/out
- Higher integrity, obviates common mode failure
- No break autonomy, high security system design
- Rapid service/ installation

Audio Amplifier Power Supply

Description

The VA300/PSU+ is an AC to DC converter unit designed specifically for use in critical life safety voice and alarm broadcast systems.

The VA300/PSU+ energises up to four VA300+ audio amplifiers sited in a VA300/CAGE and incorporates no break electronic changeover to an external optional battery sub-system in event of primary AC mains disconnection. The unit consists of four supply converters conveniently fitted in a VA300/PSU+ single housing, each supply is supervised by an integral monitoring sub-system which drives fascia mounted indicators and a volt free power supply status is available to remote possible trouble report.

The unit is housed in a low profile module which connects to the host equipment by plug/socket terminations. VA300/PSU+ is designed for standard 19 inch rack mount execution and high power density enables a 2 unit high 200mm deep footprint.

The unit enables compliance with IMO standard for broadcast equipment (i.e. separate power supplies for each amplifier module) and meets emission and susceptibility standards to IEC60945.

Switch-on surge is managed by staged AC mains connection and full thermal protection is included as well as comprehensive protection for each power supply channel. A timed delay is incorporated to prevent surges due to toroidal transformer residual flux polarity and a 60 ampere rated connector facilitates connection to an external battery pile. This product should be fed from an AC mains supply via a type D breaker. The VA300+ is designed for simple rapid installation and utilises plug/socket connectivity thereby obviating screw/bolt termination. Light weight construction enables safe/convenient transportation and installation into the target equipment.

Technical Data

Power supply input

AC 115 V or AC 230 V $\pm 5\%$

Frequency

50/60 Hz $\pm 5\%$

Maximum power demand

1.8 kVA

Output

Unregulated DC 48 V, four channels

Output capability per channel

1 x VA300 power amplifier module

Dimensions

483 mm wide (19" rack mount)
88 mm high (2 unit)
200 mm deep

Weight

15 kg

Enclosure

Sheet steel zinc

Finish

Zinc and passivated

Fascia

Alloy

Finish

Semi gloss black

Temperature range

-20 °C to +50 °C

Humidity

80 % non condensing



Amplifier Fan Unit

Features

- Three fan assemblies
- Rapid service
- Space saving, light weight

Description

The BARTEC VODEC VA300/FAN is an industrial cooling unit designed to provide efficient airflow through a VA300/CAGE (and associated VA300+ amplifiers) to enhance equipment reliability in elevated ambient temperatures.

The unit comprises of a low profile space saving 1 unit high 19 inch rack mount enclosure, arranged to allow usage in minimal depth shallow cabinets.

VA300/FAN carries three brush-less UL and CSA certified high performance fan blower assemblies, each arranged to operate independently to enhance security and obviate common mode failure.

The complete fan sub-system is automatically supervised under host management control by periodic activation for several rotations during which time sensing electronics determines fan unit status.

The VA300/FAN is configured for plug in/out connectivity to facilitate rapid service and minimise down time in event of maintenance.

Use of military specified bearings ensure trouble free extended life time and initiation only for emergency life broadcasts situations.

Service life to beyond 36000 hours operational usage, easily meeting the requirements for the life span of the host equipment.

Technical Data

Mains supply
DC 48 V, unregulated supply

Voltage tolerance
DC 36 V to 56 V

Supply current
259 mA

Power consumption
12 W

Enclosure
Extruded alloy anodised

Dimensions
483 mm wide (19" rack mount)
44.5 mm high (1 unit)
160 mm deep

Weight
1.56 kg

Temperature range
-20 °C to +50 °C

Humidity
80 % non condensing

Levels

Background level	45 dBA
Operating level	57 dBA
Fan noise level	12 dBA

Noise
> 12 dBA@1 meter from fans



VA 300-MON8

Description

The BARTEC VODEC VA300/MON-8 is a 1 Unit high 19-inch rack mount panel designed to allow the engineer to monitor program output from each of the VA300 amplifiers fitted to a Vodec VA300/CAGE. The unit consists of a compact miniature loudspeaker, volume control and eight way selector (corresponding to eight amplifier slots in the VA300/CAGE). Connection to the VA300/MON-8 is by twisted pair ribbon (transports program output from each amplifier selected) which routes amplifier outputs from either:

- The BARTEC VODEC EOL03A or
- LTP series of amplifier loudspeaker termination ports.

The complete assembly eliminates conventional hard-wiring by the employment of a "motherboard" style construction utilising a multi-sided printed circuit board. Plug in/out connections enable rapid installation and maintenance supporting hot-swap capability.

Implementation of VA300/MON-8, (note that EOL03A can be substituted by LTP2, and 4 BARTEC VODEC termination ports), connectivity in terms of the monitor panel is identical in each case.

Features

- Small size compact 1U high design
- Smaller and lighter overall central panels
- Plug/socket connectivity
- Rapid service/maintenance minimises down time

Technical Data

Supply

No separate power supply required.
The unit is driven by VA300/CAGE amplifiers

Consumption

500 mW

Number of channel input selections

Eight

Dimensions

44.5mm High, 50mm Deep, 483.5mm Wide

Weight

1 kg

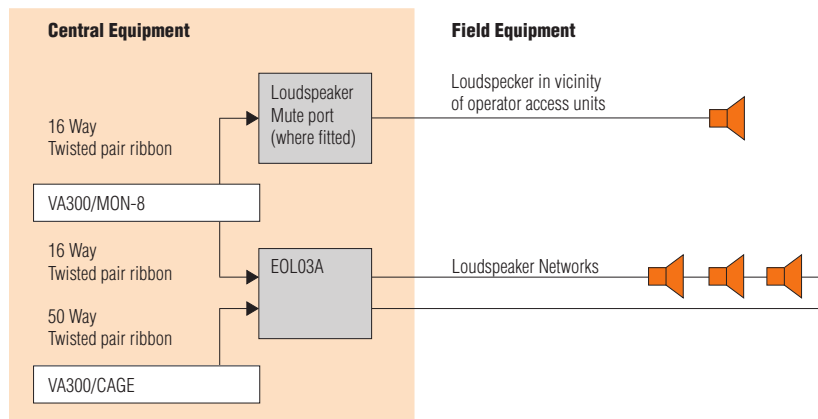
Colour/Finish

Natural anodised alloy with
black silk screen legend

Temperature Range

-20 °C to +60 °C

Connection diagram





VAP30 Access Unit

Features

- Duplicated microphone transducers for A+B or N+1 systems.
- Emergency Direct Connection
- Monitored microphone voice coil.
- Full monitored.
- Highest integrity for life safety.
- Early warning of system deterioration

Description

The VAP30 is a heavy-duty indoor microphone unit designed to allow public address/paging system. The VAP30 can be supplied certified to provide safe operation in potentially explosive atmospheres and is ATEX approved accordingly.

The VAP30 comprises of a robust steel enclosure, which is equipped with an industrial operator membrane keypad and hyper-cardioid noise cancelling microphone fitted to a flexible gooseneck stem.

The operator keypad array is specially designed to provide tactile feed back to the user and ergonomic layout. Large sized of keys according to operational importance simplifies paging and alarm (PAGA) system operation.

Duplicated status LED's are fitted to indicate the availability of control command by the central equipment.

For ultimate integrity the unit is available with two independent microphone transducers, which can be arranged to each drive dedicated amplification and loudspeaker arrays.

For dual circuit execution, two VAP100 series processor/pre-amplifier modules are fitted to obviate common mode failure possibility, which are serviceable on a plug in/out basis.

In highly critical life safety applications Emergency Direct Connection (EDC) is fitted as standard on VAP100d processors.

This allows the host amplification to be controlled independently of the data processing sub-system/ data transportation protocol.

The VAP30 can be equipped with up to two conventional push button actuators which are independently wired to the central equipment, these allow selection of project specific special requirements.

The VAP30 is equipped with a high performance VAP100 line driver that enables the unit to be located remotely from the host loudspeaker amplification.

Automatic monitoring is included to supervise microphone voice coil, pre-amplification and critical paths to the central equipment.

The VAP30 requires no local mains supply, the unit is energised by phantom power sourced from the host central equipment panel. Connectivity to the unit depends on which VAP100 transceiver type is fitted.

VAP100 line drivers

VAP100 line drivers are available in industrial version and also in Ex version:

VAP100a (Ex version)

ATEX certified Intrinsically Safe allows use in Zone 1 IIC T4 hazardous areas.

(Must be used in conjunction with BARTEC VODEC central equipment, part type ATE44 and MTL7758 barrier set)

VAP100d (Industrial version)

Safe area configurable operating system (Must be used with VAP30 or ATE4 for either single or quad usage)

Where N+1 or A+B PAGA system architectures are required the assigned VAP100 transceiver is fully duplicated.

The VAP30 can be console mounted or fitted into a low profile desk top enclosure. A range of special finishes are available from 316 g stainless steel to client specified RAL Colours.



VAP01 Access Unit

Description

The VAP01 is a rugged corrosion proof microphone unit designed to allow public address/paging system access in external hostile climatic conditions.

The VAP01 can be supplied certified to provide safe operation in potentially explosive atmospheres and is ATEX certified accordingly.

The robust glass reinforced polyester enclosure is equipped with up to three push buttons. Up to two hyper-cardioid noise cancelling microphones are fitted behind a protective wire guard, which can be arranged to each drive, dedicated amplification and loudspeakers.

The VAP01 is equipped with a high performance line driver. The line driver enables the unit to be located remotely from the host loudspeaker amplification.

Automatic monitoring is included to supervise microphone voice coil, pre-amplification and critical paths to the central equipment.

The access unit VAP01 requires no local mains supply, the unit is energised by phantom power sourced from the host central equipment panel. The connectivity to the unit is via a twisted pair for either the VAP01-11 or VAP01-21 variants and two pairs for either the VAP01-12, VAP01-22, VAP01-13 or VAP01-23 variants.

Explosion protection

Ex protection

II 2G Ex ib IIC T4

Certificate

ITS09ATEX26420

Features

- Duplicated microphone transducers
- Monitored microphone voice coil
- Two pair interconnection cable
- High integrity life safety secure
- Totally rot-proof, long product life
- Early warning of system deterioration
- Easy installation, low cost, simple installation

Technical Data

Mains supply

Phantom powered DC 5 V

Current consumption

approx. DC 20 mA

Output to line

0 db (770 mV RMS)

Frequency response

100 Hz to 10 kHz

Microphone

Hyper-cardioid response
noise cancelling type

Number of push buttons

up to three push buttons

Dimensions

260 mm wide
159 mm high
96 mm deep

Weight

2.5 kg

Colour

Black

Material enclosure

GRP Glass re-enforced polyester

Gland entry

2 x M20

Temperature

-40 °C to +50 °C

Humidity

Up to 100 %

Environmental rating

IP66

Shock and vibration

1 g

Virtual Access PAGA Control Panel



Features

- Simple user interface
- Customized screen layout
- Variety of connection interfaces

Description

The BARTEC VODEC V-VAP is a Windows™ application designed to run on a standard Personal Computer.

The application enables the user to control and access a BARTEC VODEC PAGA system by either touch screen or point and click data entry.

The facility is also supplied with two hardware support components:

- Desk top microphone with hyper cardioid goose neck microphone VAP-00.
- VAP100z Line Interface/Transceiver

Audio control, status data are superimposed on a single screen cable pair connected back to the rack location.

Where the access unit is remotely located then transportation media other than direct copper cable connection can be employed e.g. fibre optic cable VOIP or radio.

In this case identical hardware to fibre optic connectivity is assigned except that the FOP transceiver is replaced by BARTEC VODEC C40 VOIP module.

This VOIP module supports uni-cast connectivity via a standard RJ45/Ethernet connectio.

The V-VAP is fully supervised to ensure that an early warning of system deterioration is signalled to the operator.

In this case the audio circuit is checked from microphone voice coil to switching matrix within

the host equipment rack and the control system is tested by watchdog software in the V-VAP interface.

For highly critical applications an A+B or in some cases N+1 PAGA topology is specified.

Full duplication of interface to A and B PAGA central racks is implemented by dual VAP100z transceiver and associated hardware connectivity.

Technical Data

Mains supply

Phantom powered DC 5 V

Current consumption

approx. DC 20 mA

Output to line

0 db (770 mV RMS)

Frequency response

100 Hz to 10 kHz

Microphone

Hyper-cardioid response
noise cancelling type

Weight

2.5 kg

Colour

Black

Connectivity

USB

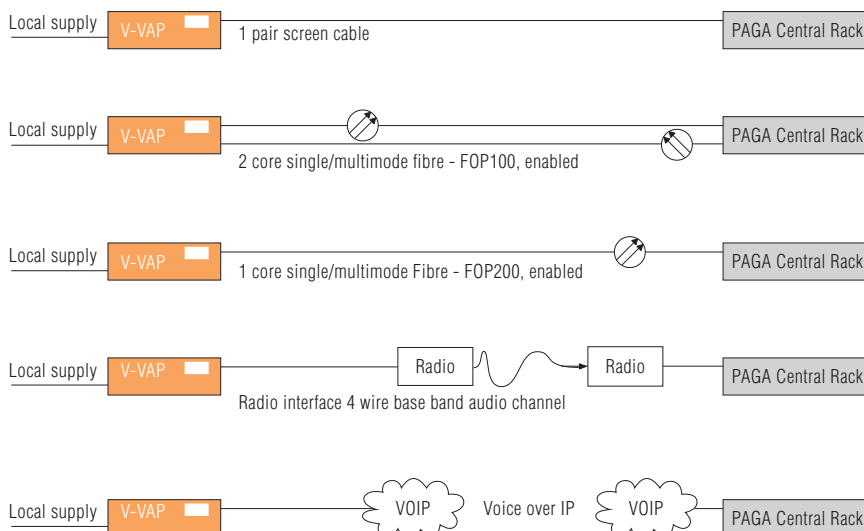
Material enclosure

Alloy

Temperature

-40 °C to +50 °C

Connection diagram





Photographs shows Alarm Inhibit Panel

P3-Alarm Inhibit Panel

Description

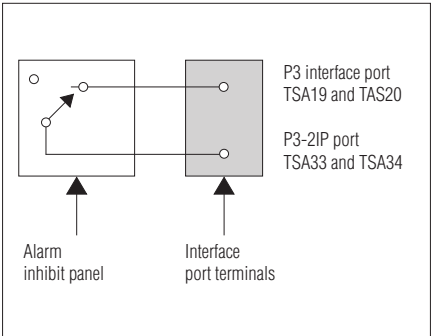
BARTEC VODEC PAGA system can be connected to a site Fire and Gas detection system to allow the automatic initiation of alarm tones signal.

An automatic alarm inhibit panel can be optionally specified which disables the interface to the external site detection package thereby preventing spurious alarm trigger during, for example, maintenance procedures.

The panel comprises of a 19 inch rack mount 1U (44.5 mm) face plate which is equipped with a key operated maintained switch assembly.

The key switch status is indicated on P3 management P3-VX-AT and is repeated at master PAGA access control positions as a further warning that the auto input is disabled.

The inhibit key switch contact arrangement is based on a N/O (normally open) "closed to inhibit" auto alarms philosophy and is connected to the host P3 PAGA system via either a P3-Interface port or a P3-2IP interface port by a single pair of conductors.



Switch is shown in the auto alarm inhibited position. The auto alarm inhibit panel is located on the front face of the host 19 inch equipment rack.

Technical Data

Switching voltage
DC 5 V

Loop current
1 mA

Fail safe contact arrangement
Normally open quiescent, closed to disable

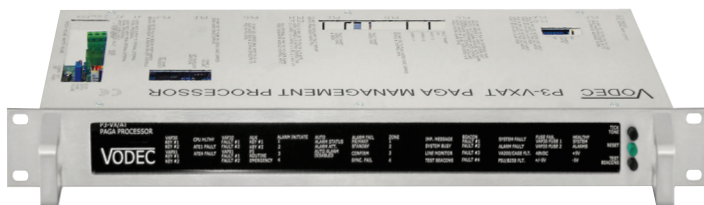
Dimensions (h x w x d)
44.5 mm x 483 mm x 50 mm

Weight
1 kg

Temperature range
-20 °C to +70 °C

Humidity
80 % non condensing

Colour
Semi-gloss black



VX/AT Management Central Switch

Features

- System on a Chip Technology
- Up to 32 microphone access panel inputs
- Supervises up to 512 amplifier modules
- Fully supervised critical path
- Interfaces to other life critical systems

Description

The BARTEC VODEC VX/AT is designed to provide access priority and zoned area switching of electronically generated alarms and live voice program inputs as a central component of a high integrity Public Address and Alarm (PAGA) broadcast system.

The VX/AT unit comprises of a low profile space saving 1 unit high 19 inch enclosure 160 mm (6,5 inch) minimal depth enclosure.

As standard the VX/AT switch accepts connection of up to four microphone access control positions, expandable to client specification.

The unit generates a selection of secure alarm cadences and provides interface to other telecommunication packages:

- Entertainment distribution system
Muting in emergency
- Telephone system
Telephone subscribers can store and replay messages over the PAGA loudspeakers (BARTEC VODEC RP8 required)
- Fire and Gas Detection system
Automatic initiation of PAGA alarm tones
- Supervisory system
PAGA trouble warnings
- Un-interruptible power supply
Secure mains supply to PAGA

A single BARTEC VODEC VX/AT switch can automatically supervise

- up to 64 or 512 power amplifier modules VA300+
- up to 32 microphone access panels
- battery charger
- flashing beacons

The unit incorporates comprehensive signal processing to ensure highest speech intelligibility.

The LED diagnostic display and test tone/supervisory reset control, enables the engineer to issue test tick tone on a zone by zone basis.

Supervisory routines automatically check critical path performance from operator microphone through to loudspeaker network and end of line devices.

The complete unit is connected to the host amplification equipment by "quick release" plugs and sockets. This allows rapid service replacement on a plug and play basis.

VX/AT switch generates both IMO and PFEER/NORSOK alarm tone menus with alternative alarm tone cadences/frequencies readily programmed on request.

Alarm tones are fully monitored and the package is equipped as standard for high criticality duplicated A/B system operation.

The alarm tone package is fully synchronised when used in A/B applications. Service is maintained in the event of failure of an alarm tone generator in either A/B system.

Priority access ensures that routine broadcasts are automatically over-ridden by critical input requests.

BARTEC VODEC System on a Chip

The VX/AT switch is based upon highly secure VSOC technology which obviates sequentially executed stored program.

Instead the VSOC chip is configured by tamper-proof switches located inside the unit.

This eliminates dependency on PCs and flash memory that are not sufficiently secure enough for a life safety system.

The user is able to make limited configuration changes to the PAGA system with training.

No annual software licence is required to run the VX/AT switch.

Technical Data

Power supply

DC 48 V

Consumption

25 W

Heat emission

10 W

Voice inputs

- 2 x VAP30 as standard
- 2 x VAP01 as standard
- 2 x Auxiliary audio
- 1 x telephone interface

Alarm tones

- 4 x IMO
- 4 x PFEER/NORSOK

Broadcast zones

4 zones

Test tick tone

1 kHz tick issued at second intervals

Compression on voice inputs

up to 40 dB

Frequency response

150 Hz to 7 kHz
tailored to optimise speech intelligibility

Line monitoring level

-6 dB

Audio input/output level

0 dB

Audio VAP input level

-3 dB

Dimensions

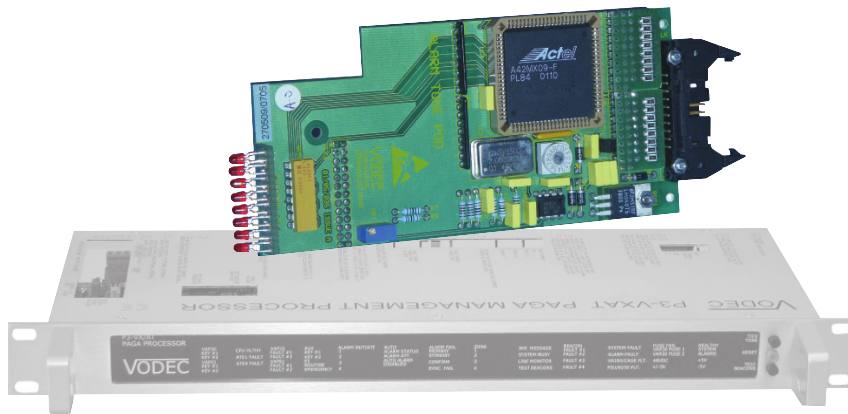
483 mm wide (19" rack mount)
44.5 mm high (1 unit)
160 mm deep

Weight

1.4 kg

Temperature range

-20 °C to +50 °C



Features

- System on a Chip technology
- Supplied fully configured
- Highly secure, no boot-up/processing time, near instant operation
- Complies with international standards

Hot-Standby Alarm Tone Generator System

Description

For highly critical voice alarm broadcast applications (PAGA) it is essential to provide redundancy of critical hardware to improve overall PAGA system security.

BARTEC VODEC SAT8 is a compact plug in/out module designed to operate in conjunction with BARTEC VODEC VX/AT PAGA management switch.

The SAT8 is a self-contained alarm tone generation sub-system that can be configured to provide back-up to the host VX/AT alarm generation package on a "hot-standby" N+1 basis.

When N+1 alarm tone generation is required the SAT8 is plugged into the host VX/AT motherboard which is then configured to recognise the additional hardware by simple on-board DIL switch/plug link selection.

The SAT8 can be arranged to supply alarm tone signals as the primary source (i.e. on-line) with the host alarm generation sub-system on hot-standby or the SAT8 can be a slave back-up tone source. Preference is set by tamperproof plug linking.

Technical Data

Power supply input

DC 5 V or DC 24 V via auxiliary connector

Power supply input tolerance

± 20% on DC 24 V input,
± 5% on DC 5 V rail

Consumption

10 mA

Number of embedded alarm tone cadence

12 to comply with PFEER, NORSOK and IMO standards

Output

1 X 0dBm 770 mV

Alarm initiate input

12 N/C contacts rated 0.25 A @ DC 24 V
volt/earth free

Weight

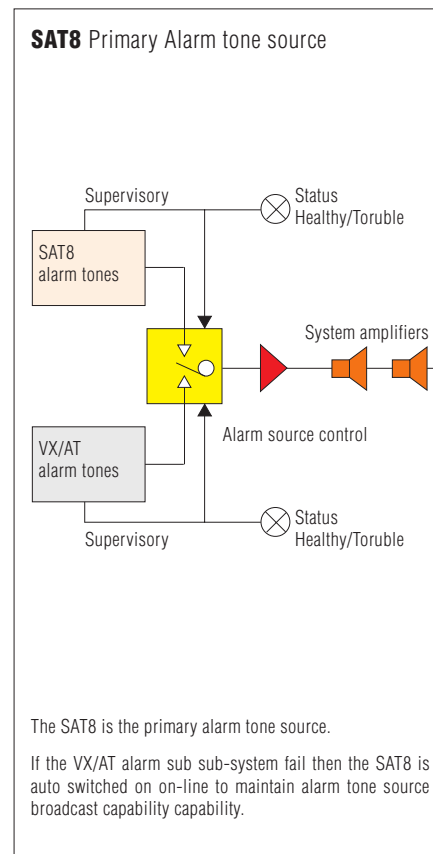
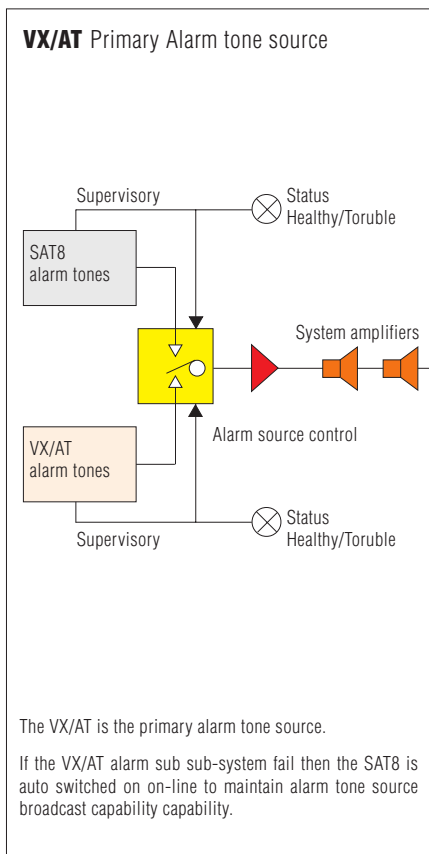
0.25 kg

Material

Glass fibre through hole plate PCB

Temperature range

-20 °C to +50 °C





Message Store

Features

- User friendly record/replay facility
- Possible to inject alarm tone warnings
- Use in highly secure duplicated PAGA applications with galvanic A/B isolation
- Monitored critical path

Description

The BARTEC VODEC RP8/60 message store is 1U low profile 19 inch rack mount enclosure, which carries a single motherboard style PCB.

The unit facilitates record and replay of up to eight separate high definition voice messages, each retained in non-volatile electrically alterable memory.

Voice message text duration is up to 60 seconds for each channel, i.e. total of 8 minutes storage time.

Messages are downloaded into the RP8 by a plug in microphone or audio source (e.g. prerecorded message) at base band audio.

User selects voice channel to be recorded into and depresses the „record“ button. Speech is now recorded on the selected channel memory.

Upon release of „record“ button the recording into the requested channel store is terminated. The user can now monitor the recorded program via a plug in headset by depressing „playback“ (without broadcasting over host system loudspeakers).

Once the recording is accepted the user deselects the voice store channel and the message is set for broadcast system for playback only the message is retained indefinitely regardless of power supply status.

It is possible to interleave a recorded message with an alarm tone menu held in highly secure anti-fuse VSOC (Vodec system on a chip).

Alarm tones can be protected by tamperproof switch selection which obviates external equipment/tool connection.

Each message/alarm is selectable by „dry“ volt free contact with in built priority to ensure that critical messages over-ride low priority messages, i.e. message #1 over-rides #2 and so on.

An integral status display indicates which message is currently selected for playback/ recording.

Technical Data

Power supply

DC 48 V can be derived from host
VA300/CAGE

Consumption

100 mA

Record input sensitivity (analogue)

50 mV pk-pk

Band width

300 Hz - 3kHz

Message text length - each channel

60 seconds x 8

Output

0 dBm duplicated A + B outputs

Control output

Duplicated isolated „key“ host PAGA contacts

Control inputs

8 volt free contacts

Number of separate messages

8 channels

Dimensions

450 mm wide
44.5 high (1 unit)
160 mm deep (minus the handles, 45 mm)

Temperature range

-20 ° C to +50 °C



Fibre Optic Interface

Features

- Compact, module design
- Audio and signalling over one or two fibres
- Cost effective
- Adjustment-free operation and installation

Description

The Vodec FOP 100/200 series offers a range of fibre optic transceivers with four data channels, two audio channels and two contact closures, all full-duplex, providing a solution for inter-sector PAGA communications.

The two audio channels offer broadcast quality, while the two contact closure channels have potential Volt free output which can be configured.

Each data channel is fully independent and offers transmission speeds from DC to 64 kb/s.

Available data interfaces are RS-232, RS-422, 4- or 2- wire RS-485, TTY Manchester and Bi=Phase. Data channels are in FOP 100V1A applications.

FOP 100 The FOP series transceivers are available in one or two fibre versions for both single mode and multimode applications.

Technical Data

Data

Number of channels	4 (full duplex)
Data interfaces	2x RS-232 2x RS-422/485
Data rate per channel	DC to 64 kbit/s (512 ksamples/sec)
Connector type	RJ 45

Audio

Number of channels	2 (full duplex)
Bandwidth	40 Hz to 15 kHz
Input/output level	0dBV (+6dBV max)
Connector type	RJ45

Optical 1240 TRX

Output wavelength	1310
Fibre type	Single mode
Budget	22
Connector type	FC

Management

LED status indicators

DC	Power on indicator (green)
SYNC	Full duplex link (green), local (red) or remote sync error (yellow)

Network management SNM Compatible

Contact closure

Number of channels	2 (full duplex)
Input	+5 V pull up 10 K Ω
Activation threshold	0.75 V
Output (potential free)	Normally open
Switch rating	2 A at 30 V DC

Environmental

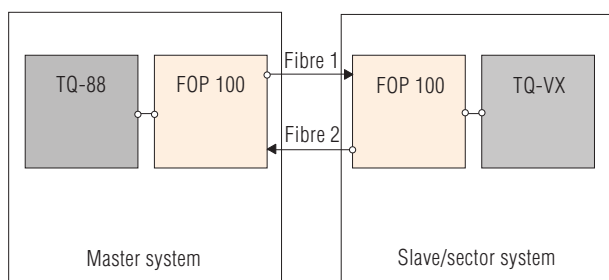
Operating temperature range	- 30 °C to +70 °C
Humidity	< 95 % (no condensation)
Power supply	DC 12 V, derived from host Optical 1210 TRA/TRB

Optical 1210 TRA/TRB

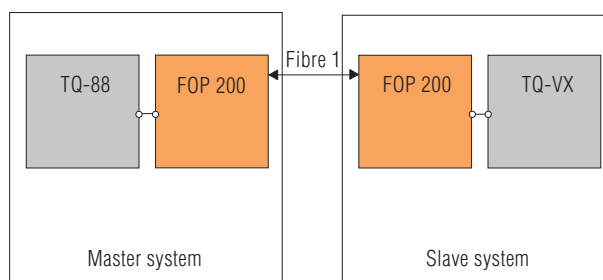
Output wavelength	850/1300
Fibre type	Multimode
Budget	19 (15)
Connector type	ST

Optical 1250 TRA/TRB

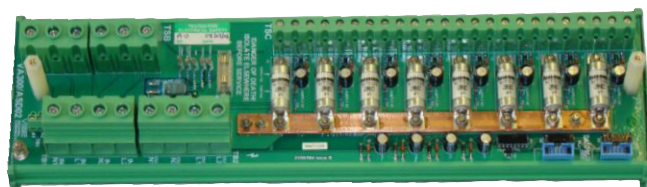
Output wavelength	1310/1550 nm
Fibre type	Single mode
Budget	22
Connector type	FC (others optional)
Dimensions	128 x 35 x 190 mm
Weight	450 g



Single mode fibre - FOP 100 - 1240 TRX
Multi mode fibre - FOP 100 - 1200 TRX



Single mode fibre - FOP 200 - 1250 TRB
Multi mode fibre - FOP 200 - 1200 TRB



Features

- High security applications
- On board fuse protection for each outlet
- Detailed diagnostic display monitors fuses, each input, each output
- No break "bump free" power supply autonomy
- Diversity of supply and simple maintenance/service
- Rapid fault finding simplified service minimal down time

ASD02 and ASD08

Description

Where a public address (PAGA) system is installed to provide broadcast of potentially life saving emergency speech and alarm tone signals a high integrity configuration is required. This also extends to the AC mains supply energising the PAGA package.

For additional security it is possible to duplicate AC mains supply inputs "PRIMARY" and "SECONDARY" thereby ensuring continued PAGA capability in event of failure of either AC supply input.

The BARTEC VODEC ASD02 automatically manages the selection of AC mains supply inputs and provides the engineer with details status display on a "front of rack" LED annunciator panel type ASD08.

The ASD02 provides eight independently fuse protected outputs. Which are assigned to VA300+PSU, amplifier power supply units, flashing beacon power supply and auxiliary devices.

The ASD sub-system comprises of two parts i.e. ASD02 is a clip on/off DIN rail mounted assembly which facilitates termination mains supply inputs.

The ASD08 power management LED annunciator comprises of a low profile 1 unit high 19 inch rack mount panel.

With an integral display window it is fitted with secondary fault reporting contacts to enable possible interface to the site DCS/ SCADA/ Telecom supervisory package.

On board high power supply management ensures galvanic isolation between the primary/secondary AC mains supply inputs and facilitates priority selection of online/standby power supply source.

The ASD02 carries on board neon indicator sets to facilitate rapid fault finding and service and dedicated high rupture capacity cartridge fuses provide supervised protection for each supply output.

Display is extended from the ASD002 via optically isolated outputs which control a rack mount ASD08 LED annunciator display units.

A tamper proof test switch is fitted to ASD02 to enable the engineer to manually check the operation of the target PAGA system on the hot-standby mains supply.

Technical Data

ASD02

Dimensions

500 mm deep
150 mm wide
100 mm high

Weight

2 kg

Temperature range

-20 °C to +60 °C

Capacity

8 x supervised outlets each rated 25 A total module capacity is 125 A

Supply voltage

110/120 V AC 50/50 Hz

ASD08

Dimensions

483 mm wide (19" rack mount)
44.5 mm high (1 unit)
50 mm deep

Weight

0.5 kg

Temperature range

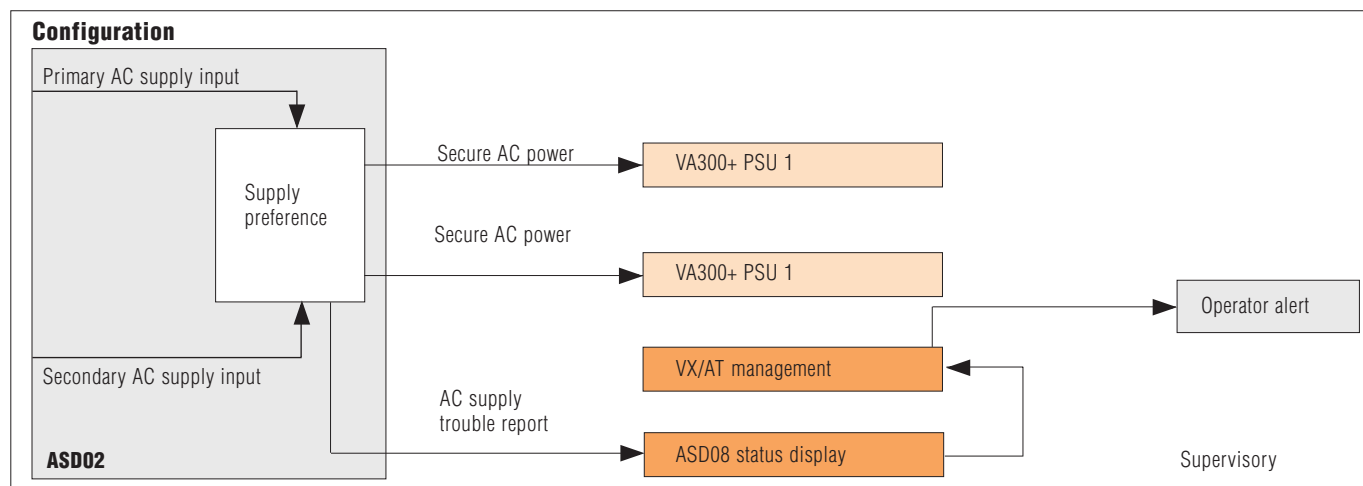
-20 °C to +50 °C

Capacity

2 x ASD02 module

Supply voltage

48 C DC derived from VX/AT host management system or VA300/CAGE





B250 Battery Charger

Features

- Very small size, light weight
- Fully monitored
- Detail LED diagnostics
- 24 V or 48 V battery charger output
- Remote fault report output
- Simple quick service
- Early warning of battery system trouble
- Rapid fault location, minimum down time
- Requires only ONE charger to recharge and manage 48 V battery strings

Description

The BARTEC VODEC B250 Battery charger unit is specifically designed to manage, float charge and re-charge valve regulated lead acid (VRLA) batteries (sometimes referred to as sealed lead acid batteries).

The unit forms a key part of the no break power supply subsystem for use with our emergency alarm and voice broadcast package when AC mains autonomy is specified.

B250 comprises of a minimal depth low profile 19 inch rack mounting enclosure, designed to engage just 1 unit of rack space, which houses a single motherboard style electronics module. 24 V or 48 V battery strings without recourse to multiple charger arrays.

The unit fascia carries detailed supervisory LED status and 3.5 digit high visibility LED voltmeter/ammeter readouts to facilitate rapid service and maintenance.

The rear panel facilitates plug in/out connections of AC mains supply, battery charger output voltage and supervisory output to host management processor; there are no screw terminations/hard wired connections.

The B250 incorporates extensive automatic monitoring to verify critical path from battery pile to charger, including all fuses, and supervision of AC mains supply input and correct charger output voltage. Group fault warning volt free contact is available to remote external equipment and comprehensive LED diagnostics are fitted as standard.

Temperature compensation is incorporated to ensure that the unit is protected in adverse operating conditions and full open/short circuit protection is incorporated. The B250 is designed to operate in conjunction with Vodec VRLA battery strings rated up to 150 ampere hours.

Technical Data

Supply input

Selectable by internal plug link
AC 115 V/AC 230 V $\pm 10\%$

Frequency

50/60 Hz $\pm 10\%$

Maximum load power

400 VA

Power factor

0.99 almost unity

Charger output

26 V to 27.5 V preset to 26.5 V
52 V to 55 V preset to 53 V

Maximum charger current

7.5 A

Dimensions

483 mm wide
44.5 mm high
160 mm deep

Weight

approx. 5 kg

Connections

AC supply input IEE male, Charger output
4 pin male Phoenix connector, Supervisory
8 pin male Phoenix connector

Storage temperature range

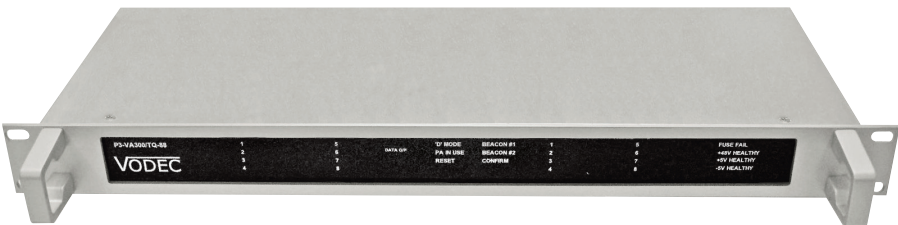
-20 °C to +50 °C

Operating temperature range

-20 °C to +50 °C

Humidity

25 % to 80 % non condensing



Features

- Distributed connection system topology
- High security, each sector supports local PAGA access/operation
- Simple expansion no impact on existing installation
- Eliminates possible common mode failure in event of catastrophic breakdown of master or inter connecting cables

Networking

Description

The BARTEC VODEC TQ/VX and TQ-88 system allows the distribution of amplification to remote areas of a petrochemical/industrial site thereby enabling localised drive and management of loudspeaker networks.

A conventional PAGA (Public Address and General Alarm system) broadcast system comprises of central equipment racks with associated loudspeaker circuits radially/loop wired from the central cabinet.

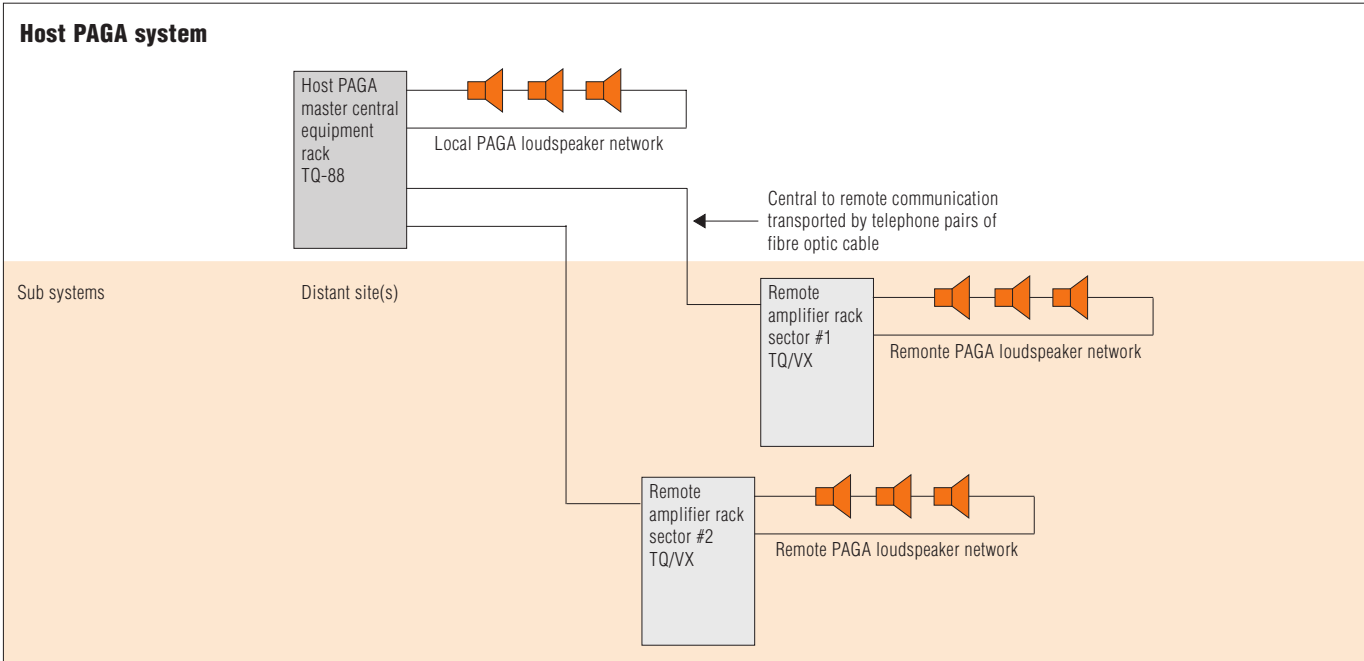
This arrangement works well where loudspeaker networks are located in the immediate vicinity of the central equipment rack however where PAGA broadcast coverage is required to distant/remote site(s) then:

- The reduction in broadcast sound pressure level due to copper losses in the interconnecting loudspeaker cable becomes prohibitive.
- The cost of multi core loudspeaker cable networks increase installation price dramatically.
- The attenuation of network supervisory/test signals due to cable capacitance becomes too high to enable reliable system monitoring. In many cases cable capacitance also degrades speech intelligibility.

The solution to achieving efficient, quality and cost effective PAGA broadcast capability to distant loudspeaker networks is to remote the associated amplification to the vicinity of the target loudspeaker.

Technical Data

- Maximum number of sector slave panels**
512
- Number of slave panels per VA300/TQ-88**
8
- Interconnecting cable-copper**
3x twisted pairs
- Maximum distance**
3000 metres min CSA 0.5 mm²
5000 metres min CSA 1.5 mm²
- Interconnecting cable-fibre**
Single mode 2x fibre using FOP100 interface
1x fibre using FOP200 interface
- VA300/TQ-88 connection to host VA300/CAGE**
1x 20 way data ribbon cable
1x 16 way audio ribbon cable



In this way the circuits that are required to carry power to loudspeaker devices (e.g. 100 Volts @250 Watts) are kept as short and as direct as possible thereby minimising volt drop, cable capacitance and eliminating costly large cross sectional area multi-core copper cables.

The amplifiers are controlled from the host central rack by either telephone cable pairs or fibre optic cable depending on application/project requirements. The central rack is now the master panel and the remote sector equipment are slave(s).

Where copper cable pairs are utilised for central/remote inter-connection then the requirement is for a minimum of 3x 0.5 mm² CSA twisted pairs with overall screen.

This cable assignment supports PAGA program broadcast to the remote sector, supervision and amplifier management.

The remote rack(s) derive secure main power supply locally to obviate volt drop.

In the event of fibre optic cable connectivity between control rack and remote sector rack, a single mode fibre is specified.

Depending on project requirement the fibre interface can either be:

- Separate receive/transmit fibre
i.e. two fibres
- Or a single duplex fibre connection
i.e. one fibre

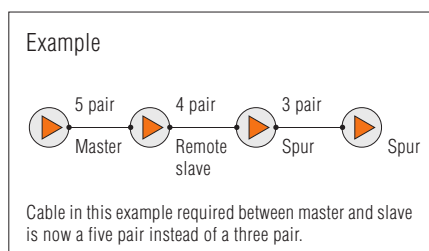
The system architecture for a TQ/VX based PAGA package is based on a radial/star wired topology where each slave sector is directly routed to the central master rack

Where spurs are taken from remote sector panels then the spurs are equipped with onboard resources in exactly the same way as the directly connected slaves.

However, a fault report at the TQ-88 central master position will display a common fault condition for any of the conditions for each remote slave panel (including the spur connected panels).

An additional cable pair is required in the cable to each spur to enable retrieval of individual fault report data.

It should be noted that the spurs are not reliant on correct operation of the associated remote slave or any other spur on the same circuit. As long as the connectivity remains intact then mains power supply isolation or equipment breakdown



will have no impact on operation of remaining remote stations.

The distributed system topology of the slave sector panels interconnected by twisted copper cable pairs cannot be replicated in fibre optic cable since interface equipment needed at each remote panel location would make such networks dependant on the correct operation of equipment downstream of the cable.

Catastrophic failure of the remote slave panel (e.g. main supply failure) would also means loss of communication to/from the spur PAGA slave racks.

Hardware execution is as follows: Central master rack – TQ-88 controller slave/spur rack – TQ/VX port.

Central master PAGA rack is fitted with a TQ-88 which enables connection for up to eight remote sector “slave” PAGA racks.

The TQ-88 is a 1 unit high 19 inch rack mount module which carries integral LED status display and IDC ribbon cable plug in/out connectivity.

The TQ-88 communicates with the local VX/AT switch (and also derives power supply from the host system).

TQ/VX port is fitted in the remote slave PAGA rack and this module is supplied with a 1 unit high 19 inch rack mount push button panel (TQ/VX allows supervision of the target amplifier and visual alerts e.g flashing beacons) which are arranged to activate upon initiation of an alarm tone broadcast from the central rack.

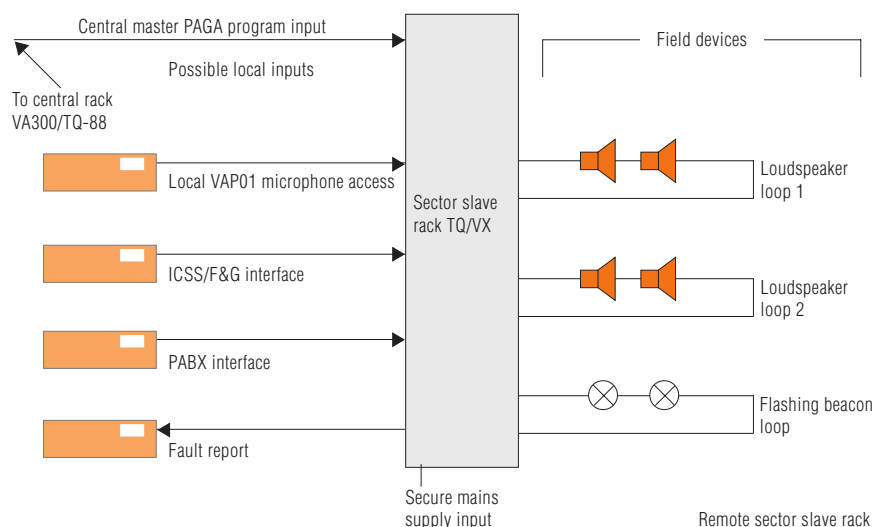
The remote sector TQ/VX port not only provides interface to receive PAGA from the central master rack but also carries on board resource to support the host slave and possible local access panel(s).

TQ/VX allows local connection of ICSS/fire and gas detection auto alarm initiate inputs, local VAP operator microphone access unit input as well as interface to other telecom related systems e.g. SCADA fault reporting supervisory.

Here follows a simple block diagram showing possible connectivity at the remote sector location.

Note that standard BARTEC VODEC access panel expansion ports can be used with TQ/VX port enabling multiple safe/hazardous area VAP microphone access and complex ICSS/ fire and gas interface.

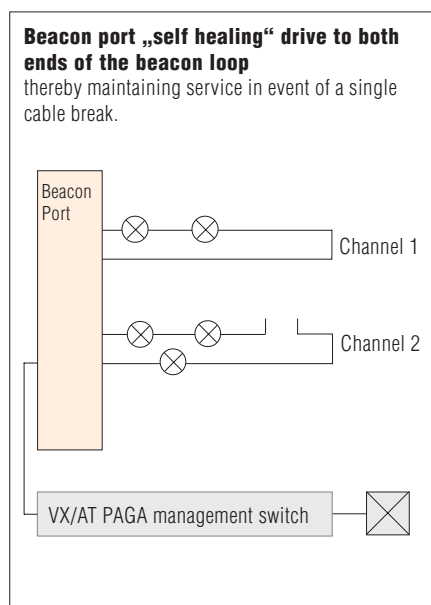
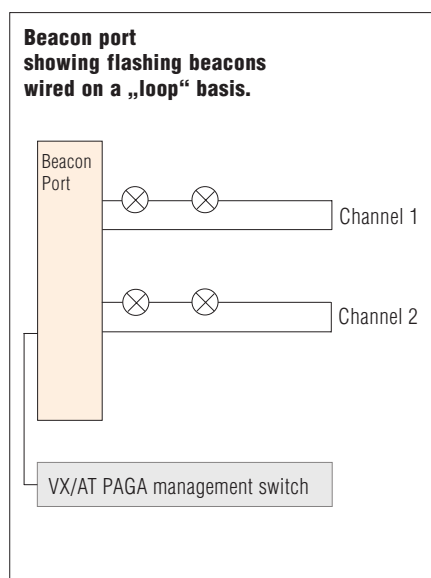
Connection diagram



Beacon Control Port

Features

- Modular design eliminates wiring looms
- Fully protected on board fusing
- Fully monitored critical path
- On board configuration switches
- Highly reliable, simple service
- Fast charge out/service, minimal down time
- Maximum safety, simple servicing
- Suitable for high integrity broadcast systems



Description

The beacon control port comprises of a compact DIN rail mount snap on/off assembly which houses a single glass fibre printed circuit card.

Mains power supply is terminated on to 10 mm² cable conductors. Each Beacon control outlet is discretely fuse protected on board by industry standard cartridge fuse links.

Connection to the host management switch is via a plug in/out flat (ribbon insulation displacement) cable. This cable carries control signal initiation for each port outlet, both for supervisory checks and operation during an alarm or emergency broadcast it also facilitates beacon line monitor "trouble" status hand shake back to the host system management.

Supervision is by momentary application of mains supply to the beacon cable networks initiated by the management switch, correct "end of line" voltage is sensed by optically coupled devices with resulting go/no go status returned to host management switch. A supervisory cycle is initiated automatically by the switch for 0.25 seconds at 600-second intervals.

Two banks of switches are fitted to the port to enable the commissioning/service engineer to:

- Declare which broadcast condition will initiate which beacon port outlet
- A second switch bank enables the engineer to route the beacon port fault report output to the next available supervisory input on the host VX/AT management switch A VX/AT switch can manage up to four beacon ports without recourse to additional expansion hardware. Control and supervisory connectivity is by loop in/out 10 way five ribbon cable which interconnect each port and the host switch.

➤ Technical Data

Mains supply

DC 48 V, AC 110/120 V, AC 220/240 V

Maximum load per outlet

2 kVA (non-inductive)

Number of outlets per port

2

Fuse rating each outlet

15 A Anti-surge

Dimensions

111 mm wide
222 mm length
60 mm high

Weight

approx. 0.5 kg

Temperature Range

-20 °C to +50 °C

Connections

10 way ribbon header
for host communications

10 mm connection capability
for mains supply input

2.5 mm connection capability
for each beacon control outlet