System Description and Operation

AutroSafe Maritime Gas Detection

116-P-BS420MG/XGB, Rev. E, 2019-12-10, Autronica Fire And Security AS

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1. Introduction

1.1 About the Handbook

This document provides a description of the AutroSafe Maritime Gas Detection System.

It provides a total overview of a such system, including:
- a general description of the system architecture
- system units
- requirements
- system functionality
- preinstallation and projecting guidelines
- use of the PowerLoop Calculator Tool
- troubleshooting

1.2 The Reader

This handbook is intended for engineers, projecting consultants, sales personnel and technical personnel responsible for the projecting, installation and commissioning of a Martime Gas Detection System.

1.3 Reference Documentation

The table below shows an overview of the *standard* technical marketing documentation for AutroSafe. Reference is made throughout this handbook to topics covered by this documentation (the name of the handbook and part number are explicitely stated where a reference is made).

Document Name	Part number	File name
Installation Handbook	116-P-ASAFE-INSTALL/DGB	asafeinstall_dgb
Commissioning Handbook	116-P-ASAFE-COMMISS/EGB	asafecommiss_egb
Wall Chart	116-P-ASAFE-GASWALLCHA/LGB	asafegaswallcha_lgb
Cable Specifications	116-P-ASIFGCABLESPEC/CGB	asafeifgcable_cgb

2. Terms, Abbreviations/Acronyms and Definitions

Term	Abbr/ Acron	Definition
AutroCom		The Autronica communication protocol between AutroSafe and AutroMaster or other third party systems.
AutroFieldBus	AFB	The Autronica serial interface and low level protocol for field devices (loop controllers and power units / AutroSafe).
AutroMaster ISEMS		The Autronica top-level graphical presentation system. ISEMS: Integrated Safety and Emergency Management System
AutroNet		The system's local area network.
Cause & Effect	C&E	Logic functions performed in the panel.
End of Line	EOL	Typically used for End of Line resistors for monitoring of inputs/outputs.
Fault Warning Routing Equipment	FWRE	Intermediate equipment which routes a fault warning signal from (B) to a fault warning signal receiving station.
Human Machine Interface	HMI	Graphical interface for the operator/user.
Fire Protection Equipment	FPE	Fire control or fighting equipment, e.g. extinguishing installation.
I/O	I/O	Input/Output
PowerLoop		The Autronica loop communication protocol for high power gas and flame detectors. 2-wire loop for both power and communication.
System Unit		A unit that is directly connected to AutroNet.
Software	SW	Software

Note:
Many terms and abbreviations in this handbook include the word "Fire" as they refer to EN 54 standards and regulations. Note that the standard menu structure for fire detection systems also applies to the Maritime Gas Panel.

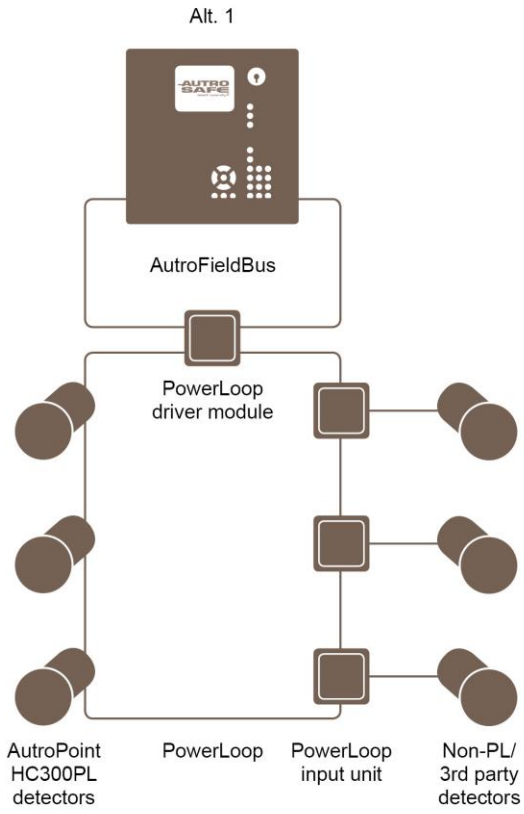
The AutroSafe Maritime Gas System only detects gas alarms. Therefore, disregard the word "Fire" in all contexts.

3. Brief Introduction

The AutroSafe Maritime Gas Detection System described in key words is as follows:

- All detectors are interactive addressable devices with intelligent communication. Non-addressable detectors can be connected via a 4-20mA interface.
- Field devices have a built-in calibrated self-test to verify and confirm their ability to perform correctly. This can be considered as supplemental to – and can be used instead of – manual testing and inspection routines.
- Gas Detectors can be connected to the AutroSafe Panel by using a 2-wire loop structure (PowerLoop). The PowerLoop provides both power to, as well as interactive communication with the detectors. Studies have shown that a Gas Detection Control System's cable requirement can be reduced with 30-60% by utilizing this concept as opposed to conventional systems.
- The system is a modular and distributed system providing maximum flexibility. The AutroNet communication facilitates the possibility to link cause and effect across panels within the same AutroNet. In other words, any gas detector connected to any panel can activate any output associated to any panel. Each panel can have up to 12 custom AutroSafe I/O modules. Within the limitations of the system, the system designer can freely select the type and number of modules to be used.
- There are a number of versatile communication options available:
  - Physical: Ethernet, RS-232, RS-422, RS-485, Al_Com loop, AutroFieldBus, PowerLoop and either hardwired or fibre-optic based AutroNet (Ethernet).
  - Protocols: Modbus RTU Slave or Master, Modbus TCP/IP Slave or Master, ESPA 4.4.4. and AutroCom (Autronica's proprietary protocol).

A typical AutroSafe Maritime Gas System is shown below:



- Fully integrated PowerLoop detectors are connected to the two-wire PowerLoop, no additional interfaces are required.
- Any 4-20mA devices can be connected to the system's PowerLoop by means of the BN-342 4-20mA interface.
- Automatic addressing of detectors – No switch settings required.

4. General Description

4.1 AutroSafe Maritime Gas Detection

Refer to illustration in Chapter 4.2.1; a typical topology for the AutroSafe Maritime Gas system.

Up to a maximum of 15 addressable Gas detectors can be connected to each PowerLoop, depending on power load and cable length/specifications. Each AutroSafe Maritime Gas Control Panel can support one AutroFieldBus ring, which is capable of handling up to 31 PowerLoop drivers.

Detectors with a 4-20mA signal transferral can be connected to the PowerLoop by means of the BN-342 interface unit.

4.2 Distributed System Topology

The system is distributed, meaning that panels can be situated in local equipment- or instrument rooms close to the detectors. The system is linked together by use of the AutroNet network.

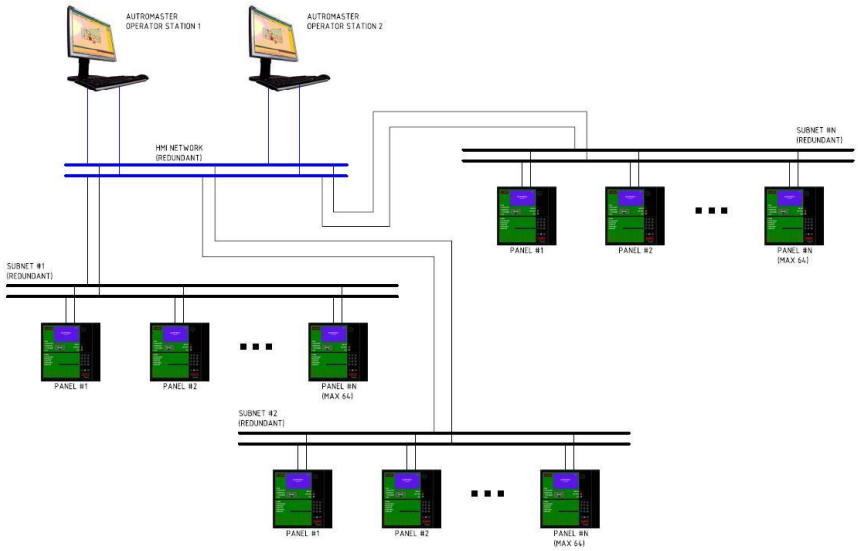
4.2.1 System Architecture

AutroSafe 4 operates on a high-speed and fully redundant Ethernet-based network solution; AutroNet, providing extremely fast data transmission. A maximum of 64 system units (panels, controllers) can connect to the AutroNet. The main circuit board in each single panel/cabinet provides two Ethernet ports, enabling redundancy.

The Maritime Gas Control Panels will be connected through a dedicated TCP/IP network. Exact topology to be finalized during detailed design. The network has the ability to share a common Cause and Effect (C&E), making us able to carry out logic operations across different areas. The Maritime Gas Panels are also able to share logic functions across networks by means of plant wide actions performed by a centralized operator station.

All detection and activation, Cause and Effect, can be done locally for each area, i.e. each area can be an independent self-contained system.

The figure below shows how AutroMaster operator stations are used to monitor the entire network.



Using AutroMaster operator stations to monitor different subnets

One or more AutroSafe Gas Alarm Control Panels are located in the designated area as applicable.

I/O are connected via I/O modules inside the panel or I/O units mounted on the field loops.

Example of I/O information:

- Cargo Pumps
- Valves
- Dampers
- Doors
- Audible & Visual alarms

The table below shows the key information for the AutroSafe system.

Maximum number of	**Standard System**
AutroSafe Maritime Gas panels per system (connected to the local area network; AutroNet) – BS-420MG/BC4xx	64
Modules per gas alarm control panel / controller	12
Loop units per Powerloop	15
AutroFieldBus units connected to AutroFieldBus	31
Ethernet ports per fire alarm control panel / controller	2
USB host ports per fire alarm control panel / controller	2

4.2.2 AutroNet

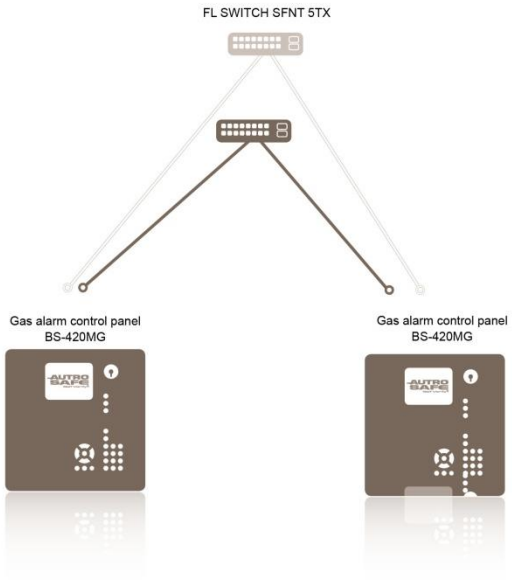
A network solution (AutroNet) with more than two panels requires the use of switches. Only Phoenix Ethernet switches are approved and supported by Autronica Fire and Security AS.

For approved switches refer to System Decription, Phoenix Ethernet Switches.

The switch type and the number of switches depend on the actual installation / network design (number of panels and the distances between the panels/switches).

AutroSafe uses a redundant network and for increased safety switches in the two networks should be powered from different sources.

The figure below shows a typical network system.



If the transmission length between two Ethernet switches exceeds 100 meters, a fibre optic cable can be used to achieve longer distances. An Ethernet switch equipped with a multi-mode or single-mode fiber optic port is required.

AutroNet networks are formed between panels for data exchanging throughout the system. This solution provides I/O status availability at any panel connected to the same network. The top-level DCS or HMI communication link can therefore be connected to any panel in an AutroNet, or to any switch in the network directly.

4.2.3 AutroFieldBus

AutroFieldBus is used to connect the BSD-321 protocol converter, power supplies and the BSD-340 Powerloop driver module to the AutroSafe Panel. An AutroFieldBus interface communicates with all these devices.

The BSD-321 module provides a way to remotely connect I/O modules to an AutroSafe panel.

Point Gas Detectors and 4-20mA interfaced gas detectors can be connected to the PowerLoop driver, BSD-340, via a 2-wire loop.

The BSD-340 PowerLoop module and the BSD-321 module can be powered locally. They can be located inside the cabinet or in the field, in close proximity to the gas detectors – thus further reducing cable requirements. Refer to PowerLoop description in Chapter 0.

4.3 Response Time

The system's response time for the first alarm entering the system is ≤ 2 seconds, for all type of gas detectors.

The maximum response time from first alarm entering the system until it is processed and reported via AutroCom is ≤ 2 seconds, refer to table below.

Signal	Hardware	Response time
Alarm	Output module	< 2 sec
Alarm	AutroCom	< 2 sec
Alarm	Panel display	< 1 sec
Analoge value	AutroCom	2 sec (0.5 Hz)

4.4 Configuration

Configuration files for AutroSafe are produced by means of the AutroSafe Configuration Tool. This is a special software package that runs on any modern PC with Windows. Refer to the AutroSafe Configuration Help System integrated into the AutroSafe Configuration Tool for details.

4.5 Communication to External Systems

4.5.1 Modbus Protocol Communication for C&E Data to Control System

AutroSafe can support single or dual Modbus RTU interfacing communication with Control Systems. AutroSafe can act as both Modbus Slave or Modbus Master and the options for connection are two-wire RS-232 and four wire RS-422 or two-wire RS485. Also Modbus TCP/IP can be used and allow for up to six instances for each AutroSafe panel. The Modbus interface provides status information from the Gas Detection Control System to other control- or presentation systems.

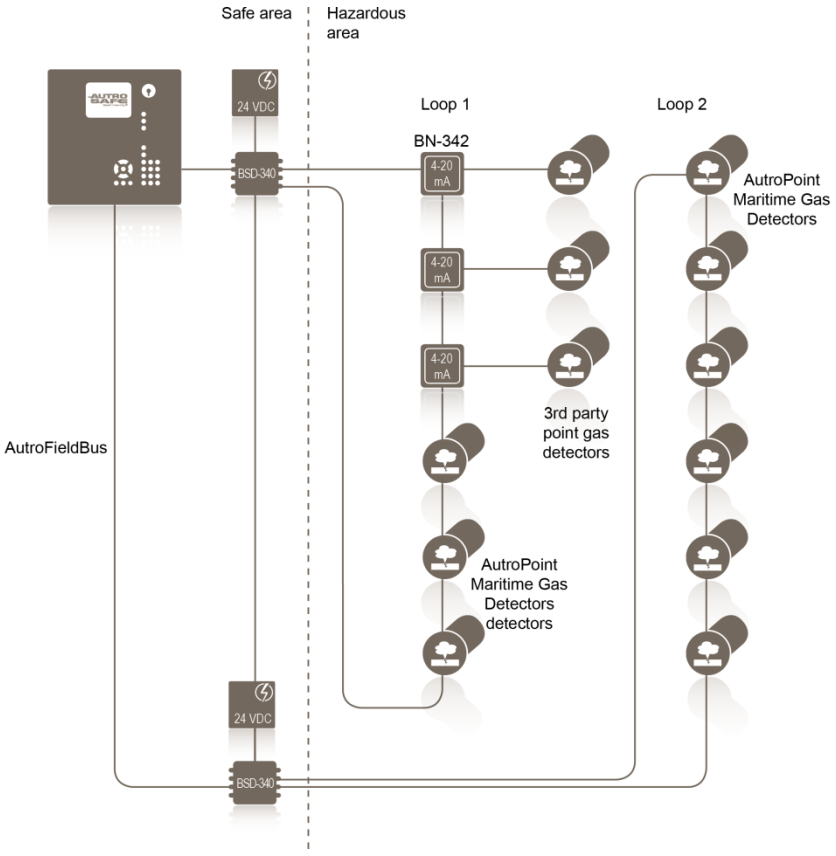
AutroSafe System status is also transferred. Available commands are Silence sounders, Reset, set digital output and set time and date. For further details, refer to the installation and commissioning handbook for the Modbus interface.

4.5.2 AutroSafe AutroCom Protocol

AutroCom is an Autronica proprietary protocol for AutroSafe, which is designed to allow the AutroSafe Panel to communicate with external systems directly. The AutroCom protocol can be transferred on many physical layers, including RS-232, RS-422, RS-485 and Ethernet. The control system supplier must implement this protocol to be able to read it. An AutroCom implementation gives the most extensive functionality in communication performance between AutroSafe and other systems.

4.6 PowerLoop (BSD-340)

PowerLoop is a **two-wire** addressable loop used to interface point Gas Detectors to the Maritime Gas Panel via the AutroFieldBus. Up to 15 devices may be connected in one addressable loop, depending on the power consumption of the field devices and the cable topology.



PowerLoop can source a total of 100W (30VDC) to the devices attached to the loop. It is possible to connect up to 15 field devices to one PowerLoop: The number and placement of the detectors connected to each loop has to be calculated during the design phase as this depends on the power consumption of the connected units, loop length and dimensions of the cable.

The diagram shows a selection of direct interfaced detectors and 4-20mA interface units connected to the BSD-340 PowerLoop driver.

A maximum of 31 PowerLoop modules can be connected to one AutroSafe. A combination of BSD-340 modules can be connected in one AutroFieldBus ring to the Maritime Gas Panel.

4.7 Detectors and Field Devices

4.7.1 Gas Detectors

IR point Gas Detectors etc. connect to PowerLoop modules, type BSD-340, each of which are capable of handling up to a maximum of 15 detectors on each PowerLoop, depending on the power consumption of the field equipment and the loop topology. The two-wire PowerLoop provides intelligent communication and DC power to the detectors.

4.7.1.1 IR Point HC Gas Detectors

The AutroPoint Maritime Gas Detector is fully integrated by means of built-in intelligent interface featuring a self-test function. The detector can transmit analogue information and can also provide maintenance data.

4.7.1.2 Toxic Gas Detectors

AutroTox Gas Detectors are connected to the PowerLoop by means of a 4-20mA interface unit, type BN-342. Hot swapable sensor cells for various gas types.

4.7.1.3 Other 4-20 mA units

Any 4-20mA process transmitter unit can be connected to the AutroSafe PowerLoop via an BN-342 unit. Intelligent detectors with internal self-diagnostics are able to provide a general fault signal via the 4-20mA signal transferal in case of a malfunction.

4.8 PowerLoop Driver BSD-340

4.8.1 Description

The *PowerLoop Driver BSD-340* functions as a protocol converter between AutroFieldBus and PowerLoop. It consists of a PowerLoop interface for power and communication, and an AutroFieldBus interface towards an AutroFieldBus Driver (AutroSafe panel internal).

The PowerLoop is a two-wire bus capable of delivering 30VDC/ 100W connected in ring topology and is galvanically isolated from the rest of the system. The PowerLoop interfaces detectors and other loop units including a 4-20mA interface.

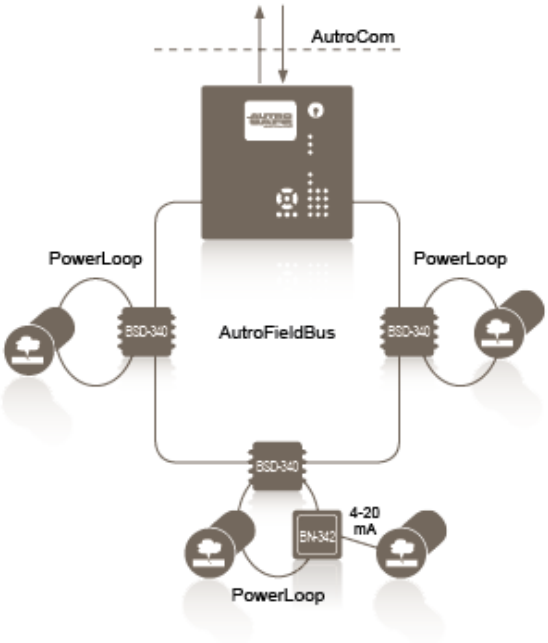
The BSD-340/1 provides a service port which is used for commissioning and maintenance.

The AutroFieldBus address is set by switches. The AutroFieldBus requires shielded and twisted-pair cables, category 4, 5 or 6. For more information, refer to Cable Specification, 116-P-ASIFGCABLESPEC/CGB (file: asifgcablespec_cgb).

There are three versions:
- BSD-340/1Rack mounted version
- BSD-340/2 Rail mounted version
- BSD-340/Ex Field mounted version

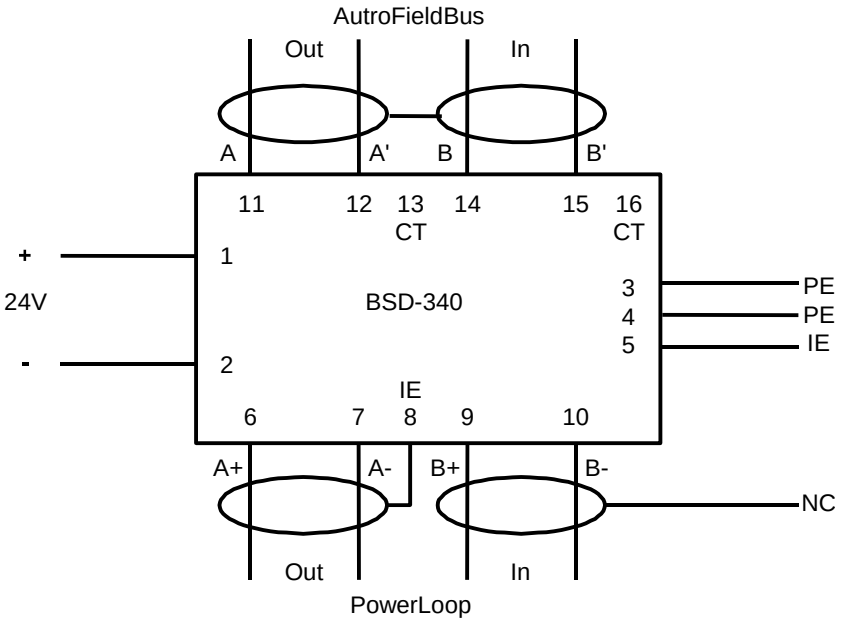
For further information, refer to data sheets.

4.8.2 Overview



4.8.3 Connections

Note:
AutroFieldBus is not polarity-dependent.
PowerLoop is polarity-dependent.



Note: "CT" is used as a reference in case segments of the AFB is left floating when Boosters or Fibre modems are used. This termination is normally left open. See "System Shielding and Earthing" in AutroSafe's System Description (116-P-ASAFE-SYSTEMD/EGB) for further directions.

4.8.4 Earthing and Shielding

Shielded cable is required for the AutroFieldBus and PowerLoop, and the shielding shall be connected to the instrument earth (IE) at one end of the loop. Any armouring shall be connected to the protective earth (PE) at multiple points. Refer to AutroSafe's Installation Handbook (116-P-ASAFE-INSTALL/DGB) for detailed description of shielding of cables.

4.8.5 Capacity / Limitations

Generally, the following applies:

- Maximum 15 detectors can be connected to each PowerLoop.
- May require forced cooling, dissipates up to 30W when fully loaded.
- No branches allowed on PowerLoop or AutroFieldBus.

The total power consumption to PowerLoop units, detectors and cable loss must be verified by the PowerLoop Calculator (part of the AutroSafe Configuration Tool).

- See also datasheet for BSD-340.

4.9 AutroPoint Maritime Gas Detectors

The AutroPoint HC300PL (PowerLoop version) and AutroPoint HC-200 are diffusion-based, infrared combustible gas detectors that provides continuous, fixed monitoring of flammable hydrocarbon gases from 0 to 100% Lower Explosive Limit. Standard device outputs include an electrically isolated 4-20 mA signal with HART communication protocol, and RS-485 serial communication. Serial communication protocols supported include MODBUS and ASCII. An optional relay output board with two programmable alarm relay outputs and one fault relay output is available.

For further information, refer to data sheet 116-P-HC300PL/CGB (file name hc300pl_cgb) and datasheet 116-P-HC200/CGB (file name hc200_cgb).

4.10 PowerLoop 4-20 mA Input Unit BN-342

4.10.1 Description

The *PowerLoop 4-20mA Input Unit BN-342* is a general purpose PowerLoop interface designed for third party detectors connected to the AutroSafe Maritime Gas System.

The PowerLoop is a two-wire power and signalling bus connected in ring topology and is galvanically isolated from the rest of the system.

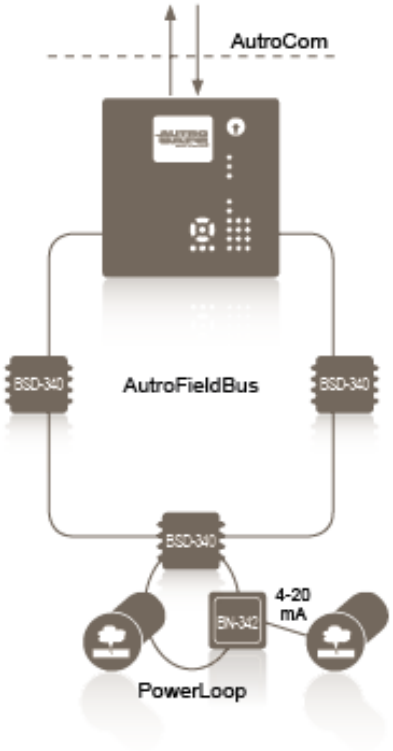
The unit communicates with AutroSafe using the PowerLoop protocol. The unit has a 4-20mA input galvanically isolated from the PowerLoop.

For further information, refer to data sheets.

4.10.2 Versions

- BN-342/EX: EEx me version including 9,5W DC/DC for external detector power supply
- BN-342/1: 19” 3U rack version, bare PCB with 19” rack front panel, no DC output
- BN-342/2: DIN rail version, bare PCB in a open DIN rail box, no DC output

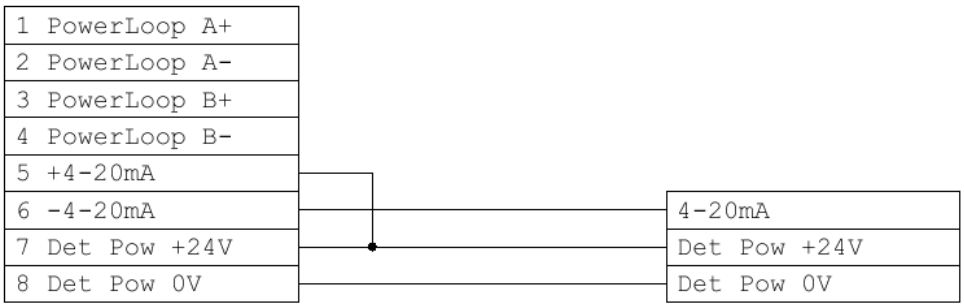
4.10.3 Overview



4.10.4 Connection – Current Source

1 PowerLoop A+		
2 PowerLoop A-		
3 PowerLoop B+		
4 PowerLoop B-		
5 +4-20mA	→	4-20mA
6 -4-20mA	→	Det Pow +24V
7 Det Pow +24V	→	Det Pow 0V
8 Det Pow 0V		

4.10.5 Connection – Current Sink



4.11 Outputs

4.11.1 Programmable Digital Outputs in Panel (BSJ-310 Module)

Discrete open collector outputs can be used for hardwired signals. BSJ-310 modules, which fit in any AutroSafe BS-420MG or Controller BC-420 panel, can be used for this purpose. In addition 24V DC relays can be supplied for each output, which will provide volt-free contacts if required. Each BSJ-310 module has eight open collector outputs. Any detector within an AutroNet network can control any output within the same network.

Delayed action and voting can be programmed for these outputs. For example such outputs can be used for digital signals to the Control System (inputs).

4.11.2 Programmable EOL Monitored 24VDC Outputs (BSB-310)

End-of-line resistor monitored 24V DC outputs can be used to drive horns, sirens, bells, beacon and strobes etc. The BSB-310 module provides four 1A automatic fused outputs. Maximum load per module is 3A in total. Any detector within an AutroNet network can control any output within the same network. The BSB-310 outputs are specially designed for sounders and bells, thus programming facilities include a variety of options like;

- SOLAS function (Safety Of Life At Sea)
- Delayed action
- Voting
- Digital output, monitored

4.12 Inputs

4.12.1 BSE-310

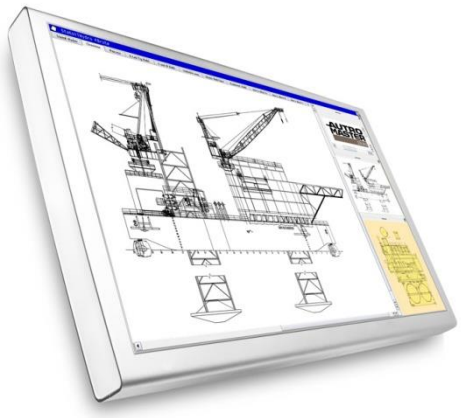
The input module BSE-310 provides four monitored inputs for digital input devices and other controlling inputs.

Typical applications are monitoring of switches, relays and contacts.

4.12.2 BSE-320

The Input module BSE-320 provides 8 non-monitored and galvanically isolated inputs for digital input devices and other controlling inputs.

4.13 AutroMaster Application/Description



AutroMaster is a *remote* monitoring and control system that enables full operation of the AutroSafe Maritime Gas Detection System. All alarms, faults, inhibits, overrides and outputs can be monitored and controlled from AutroMaster.

If the connection between the system and AutroMaster should go down, the AutroSafe system will operate as normal as it can function as a fully autonomous system.

The AutroMaster provides an intuitive graphical control and monitoring interface helping you to save time when every second counts.

The interface provides an overview of the monitored area (gas installations) in graphical form with the possibility to display and control a broad range of systems, in addition to the AutroSafe Maritime Gas Detection System.

Status information is displayed in real-time with easy-to-understand graphical representation. A trend facility is available to monitor the performance of Detectors.

AutroMaster dynamically presents values for gas density with different colours in the monitored area – making it easy to perform the necessary actions.

AutroMaster provides the possibility of customer specific information in the monitored area in information layers.

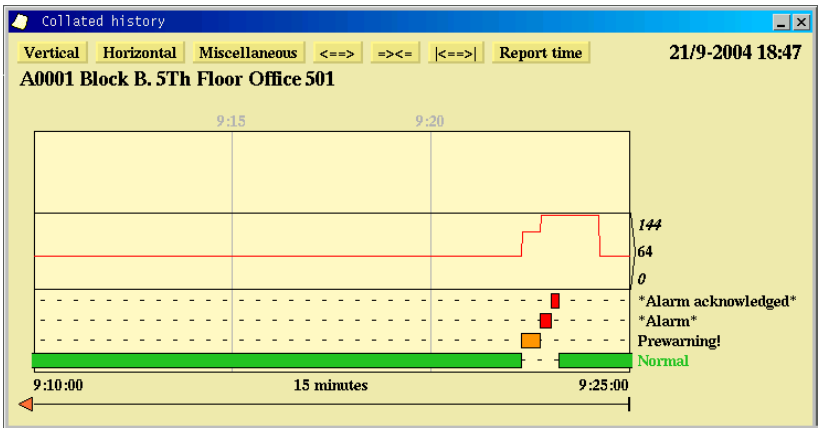
Navigation around the monitored area is easily done via the navigation pad and the use of the zoom function – giving possibility to display everything in great detail.

Power/water supply networks, sprinkler systems, emergency lights, escape routes, fire doors or any other object which may be relevant in case of an emergency can be displayed. These layers can be toggled on/off in order to simplify overviews and present only the information of interest.

The AutroMaster offers comprehensive log functionality by allowing users to create reports and logs of various properties and information from the system. Operators can create historical logs for the system and/or individual units between specified dates, analogue values read from detectors, disablement data, configuration data, version information and fault/alarm information. The report generator provides the operator with a simple method of creating a cost-effective system log for maintenance and documentation purposes.

The following options are available for report creation:

- History
  - Reports of events from the system and connected subsystems (alarms, faults, disablements, etc.) during specified periods of time
- Analogue Values
  - Reports measured values from detectors within ranges and during given periods of time
- Disablements
  - Reports on all currently disabled groups or a given group
- Configurations
  - Reports a comparison of the current configuration implemented in AutroMaster with a backed-up configuration
- Versions
  - Reports comparisons of the present configured options (symbols, functions, etc.) with backed-up configurations
- Miscellaneous
  - Generates a report without any parameters regarding alarms and/or faults



Example of detector trending in AutroMaster.

AutroMaster provides users with information about system units in terms of recorded values and events, showing development over time. This to help to indicate problems and isolate faults/sources of (unwanted) alarms.

5. Gas Functionality

5.1 Inhibit Point

All loop input units can be inhibited. When one or several points are inhibited, the point(s) will not signal alarm to outputs. An inhibited point will however present low/high alarm on all panels and AutroCom as usual. This includes panel buzzer, panel LEDs and panel LCD display.

It is only possible to inhibit a unit from the panel menu or via AutroCom. An inhibited point will be inhibited until the unit is un-inhibited by a manual operation or by timeout. Inhibit status will be indicated by a panel LED.

5.2 Set Alarm Limits

By using the *Set Alarm Limits* (via the menu) is possible to change a gas detector's alarm limit for *Low Alarm* and *High Alarm* (password restricted).

5.3 Get Measurement Values

By using the *Get Measurement Values* (via the menu) it is possible to get analogue measurement values for a selected gas detector.

Analogue values can be monitored on the panel or on the AutroMaster.

5.4 Support for Common Trouble Output

The Common Trouble Output can be connected to a BSB-310, BN-310 or a BSJ-310 I/O module. The output is activated if any kind of fault occurs in the Operation Zone to which it is connected. In addition, any disablement or point inhibition within the Operation Zone will cause the unit to be activated.

5.5 Support for Gas Detectors (4-20 mA input)

The AutroSafe Gas Detection System supports the use of gas detectors that are to be connected to the PowerLoop via the PowerLoop 4-20mA Input Unit BN-342. This interface includes a user-configurable type that may be used to interface detectors with a 4-20 mA output signal.

5.6 Language

The panels prepared for the gas market are available in English only (no localized-language variants exist).

Note. In order for Maritime Gas functionality to be available, “Eng. Oil & Gas” must be selected in the language menu in the AutroSafe Configuration Tool (Select Language).

6. Panel Overview

6.1 Introduction

6.1.1 Panel Variants

The user interface and operation of the Maritime Gas Panel BS-420MG and the Operator Panel BS-430 are identical. The panel is therefore referred to as the *operator panel* throughout this handbook.

The Information Panel serves as an *indication device only.*
The LED indicators are identical to the ones on the upper section of the operator panel, but the panel provides different buttons.

6.1.2 Indication Devices

During normal operation when the power is ON, the Power indicator always displays a steady green light.

Apart from this, only indicators relevant to the actual condition are visible. For example, if a fault is present the fault indicator will have a yellow light.

6.2 Maritime Gas Panel

All alarm handling and system features can be configured, controlled and monitored from the panel.

Each panel is assigned to one *Operation Zone* (refer to «Zonal Definitions» in Appendix). Relative to its own zone, a panel is *local*, while it is *remote* to operation zones which are not encompassed by the local zone. All events and actions occurring in a particular operation zone must be handled from a *local* panel.

The panel displays information on events occurring in all operation zones. However, the type of events and the level of details of the given information depends on which operation zone the information is related to. Local panels will list all detection zones in alarm state. Remote operator panels will list remote alarms only, and function as «indication only» devices.

The panel consists of two main sections. The upper section, and the lower section which is the *Operator Part*.

6.3 Repeater Panel BU-BV-420

The Repeater Panel BU-BV-420 serves for both system mode (level 2 access) and an information mode

Settings on a dipswitch determines the type of panel. Each panel type is described in the following chapters.

6.3.1 System Mode

The Repeater Panel in system mode is intended to give information related to alarms in the relevant *Operation Zone* and allow technical personnel to operate alarms. The panel is identical to the *upper section* of the operator panel.

The panel is used to silence and resound sounders, and to reset alarms within a defined operation zone.

Each panel is assigned to one operation zone. Relative to its own zone, a panel is local while it is remote to all other operation zones. All events and actions occurring in a particular operation zone must be handled from a local panel.

The whole system can be reset from this panel, provided that the panel's relation to the operation zone is defined this way.

The panel displays information on alarms occurring in all operation zones. However, the level of details of the given information depends on which operation zone the information is related to.

6.3.2 Information Mode

The Repeater Panel in information mode is intended to give additional information related to the defined *Operation Zone(s).* The LED indicators are identical to the ones on the upper section of the operator panel, but the panel provides other buttons (Next Window and Lamp Test).

Panels are distributed throughout the system to give the general public information related to alarm situations. The panels serve as *indication devices only.*

The panel can display minimum information on alarms, warnings, faults, disablements and tests. No further details are available. Each of the conditions are presented in a separate condition window, in *one* mode only.

6.4 Loop Panels

6.4.1 System Loop Panel BU-110

From the System Loop Panel BU-110 it is possible to mute the panel's internal buzzer, silence/resound sounders/bells etc. and reset the system.

The panel can be configured (by means of the configuration tool) to show detection zones and point information in an alarm situation, or detection zones only.

Only points in alarm are shown in the display. Faults and disablements are indicated by LED indicators. The total number of detection zones in alarm will always be shown.

By operating the More Events Button, it is possible to scroll through and view detailed information of the first 64 alarms (or 32 first alarms, if the panel is configured to show both detection zones and points).

6.4.2 Information Loop Panel BV-110

The Information Loop Panel BV-110 serves as an indication device only. It provides information related to the defined operation zone(s).

The panel can be configured (by means of the configuration tool) to show detection zones and point information in an alarm situation, or detection zones only.

By operating the More Events Button, it is possible to scroll through and view detailed information of the first 64 alarms (or 32 first alarms, if the panel is configured to show both detection zones and points).

The panel can store up to 6 faults and 6 disablements. The total number of faults and disablements in the system will always be shown, but it is only possible to scroll through and view detalied information of the first 6 faults and disablements (using the More Events Button).

6.5 The Menu Display

During Normal Operation, the backlight in the menu display is always on. The menu display has 16 lines of 40 characters.The display is divided into several display windows showing different types of information.

6.6 Adjusting the Display Contrast

The display contrast can be adjusted (applies to BS—420MG).

- To increase the contrast, press and hold down the More Events button, while pressing the red Silence Alarms button (or Next Window button) .
- To decrease the contrast, press and hold down the More Events button, while pressing the green Reset System button.

More Events Button

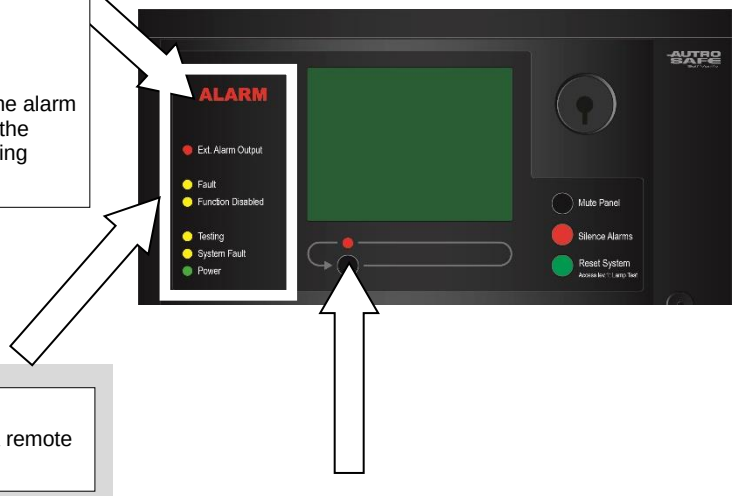
Front Push Buttons

6.7 Indication Devices

6.7.1 Upper Section

ALARM
The red alarm indicator shows that one or more detection zones within the operating zone of the Operator Panel are in alarm state.

- Blinking red light:
  In the event of an alarm.
- Steady red light:
  All audible and visual indicators activated by the alarm condition have been deactivated by operating the Silence Alarms button. The control and indicating equipment still remain in the alarm condition.



External Alarm Output
Steady red light when the message is sent to a remote device.

Fault
The yellow Fault Warning indicator shows the presence of a fault within the operation zone of the operator panel.

- Blinking light
  Unaccepted fault warnings exist.
- Steady light
  All fault warnings are accepted.

Function Disabled
Steady yellow light when one or more of the following components within the operation zone of the operator panel are in the disabled state:

- function delayed
- individual points
- detection zones
- alarm zones
- Audible and visual indicators, Fire Alarm Routing Equipment, Fire Protection Equipment and Fault Warning Routing Equipment.

Testing
Steady yellow light when one or more detection zones within the operation zone of the operator
panel have been manually set to the test state.

System Fault
Steady yellow light when a *system* fault within the operating zone of the operator panel is present.

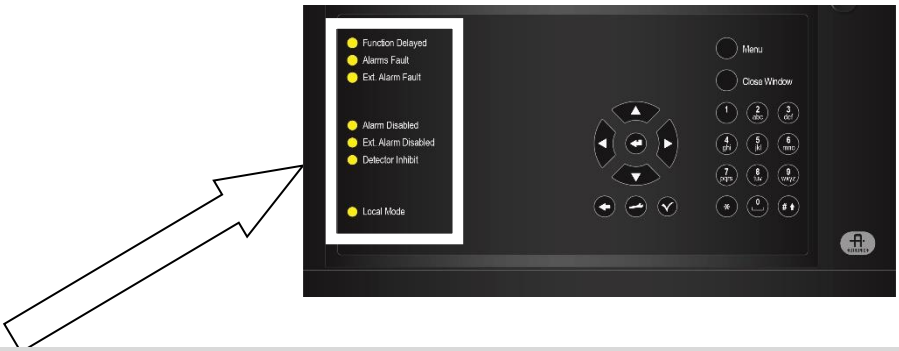
Power
Steady green light when power is ON.

More Events
In the event of more than one alarm.

The red More Events indicator shows that several detection zones within an operating zone are in the fire alarm state.

- Blinking red light:
  In the event of an alarm. The audible and visual indicators are still in active state.
- Steady red light:
  The Silence Alarms button has been pressed. All audible and visual indicators activated by the alarm are no longer active. The control and indicating equipment still remain in the alarm condition.

6.7.2 The Operator Section (lower left section)



Function Delayed
Steady yellow light indicates that *Immediate Output Actioning* has been disabled (manual operation in Menu Mode), i.e. a delay period is active for audible and visual indicators or Fire Alarm Routing Equipment (FARE). Configurable.

Alarms Fault
Yellow light when a fault is detected on one or more audible and visual indicators. The *Fault* indicator will also have a yellow light. Blinking (not accepted) / Steady (accepted).

External Alarm Fault
Yellow light when a fault is detected on Fire Alarm Routing Equipment (FARE). The *Fault* indicator will also have a yellow light. Blinking (not accepted) / Steady (accepted).

Alarm Disabled
Steady yellow light when one or more audible and visual indicators are disabled. The *Function Disabled* indicator has also a steady yellow light.

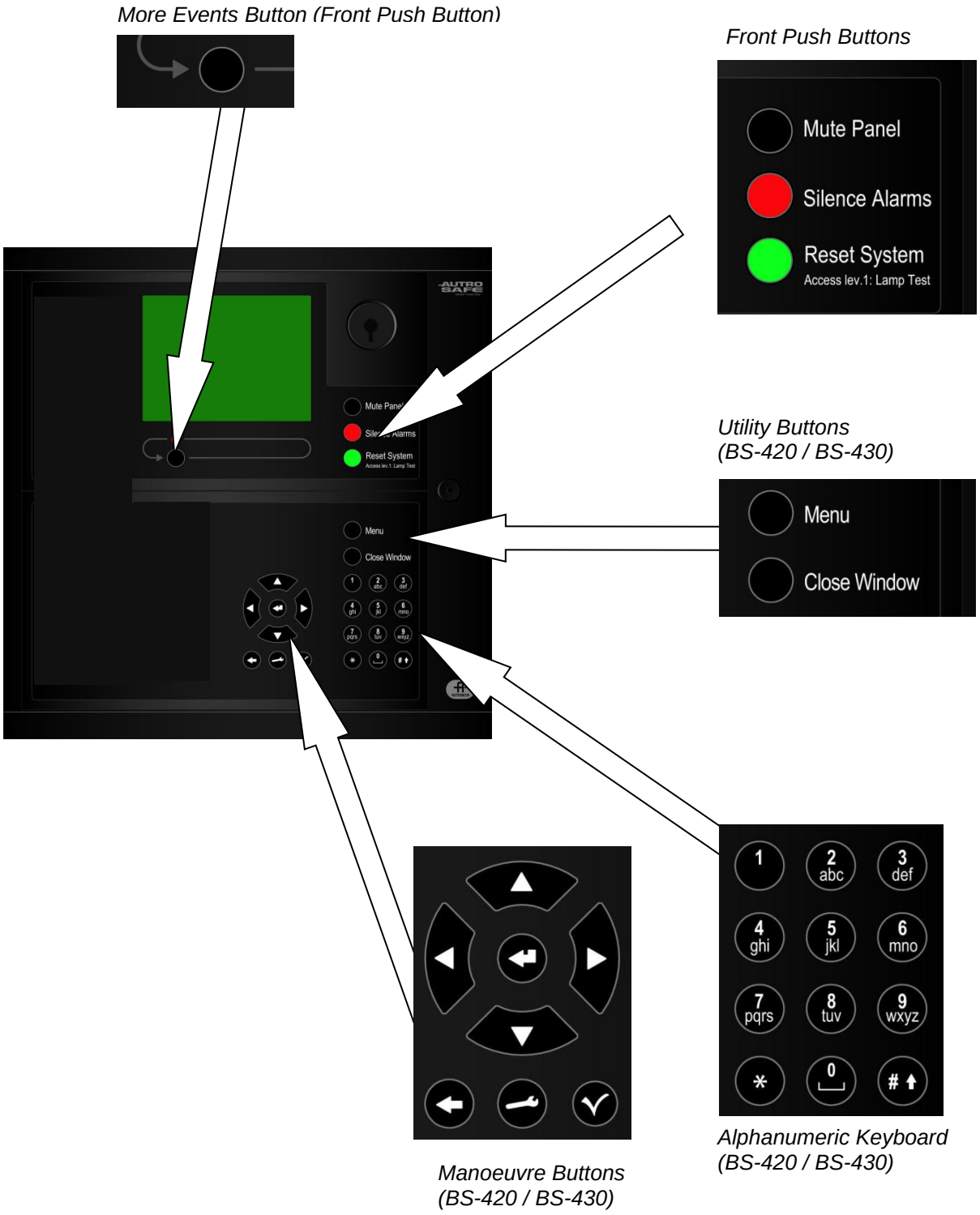
External Alarm Disabled
Steady yellow light when the signal to Fire Alarm Routing Equipment (FARE) has been disabled. The Function Disabled indicator has also a steady yellow light.

Detector Inhibit
Steady yellow light if any points are inhibited.

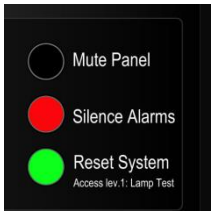
Local Mode
Blinking yellow light if contact to the presentation system is lost. The Fault indicator will also blink and a fault message will be shown.
Both indicators will have a steady yellow light if the fault message is accepted. If a connection has been lost and is repaired again, a fault message is shown and the fault message and both indicators will blink until the fault is accepted, on which both indicators will be turned off and the fault will disappear.

6.8 Operating Buttons

6.8.1 Operator Panels (upper and lower section) / Repeater Panel (upper section)



6.8.1.1 Front Push Buttons



Front Push Buttons			
Button		**Designation**	**Access Level**
	Mute Panel (black)	Used to mute the panel. Timeout. (/Mute Int. Buzzer). The Backlight Brightness can be toggled between high and low by holding the Silence Buzzer button for 5 seconds until audible beep (access level 1).	1
	Silence Alarms (red)	Used to silence Fire Alarm Devices (audible and visual indicators) and cause lamps to go steady. Timeout.	2
	Reset System (green)	Used to reset the system. In addition, a lamp test can be performed by pressing and holding the Reset button for at least 5 seconds. The lamp test is performed in access level 1 (no use of key).	2
	More Events (black)	Used to scroll downwards among events in currently active window (scroll page by page). Possible only if there are more alarms than possible to display in the window.	2

6.8.1.2 Utility Buttons

Applies to the BS-420 / BS-430.

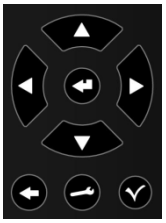
Utility Buttons		
Button		**Designation**
	Menu (black)	Used to toggle between Operation Mode and Menu Mode. Operation Mode (operate button) >> Menu Mode (operate button or time-out) >> Operation Mode.
	Close Window (black)	Used to move back one level / show previous picture if the display is not showing information on the top level.

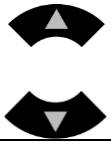
6.8.1.3 Alphanumeric Keyboard

The alphanumeric keyboard includes the numbers 1 to 9, the letters a to z and other feature keys (see table below).

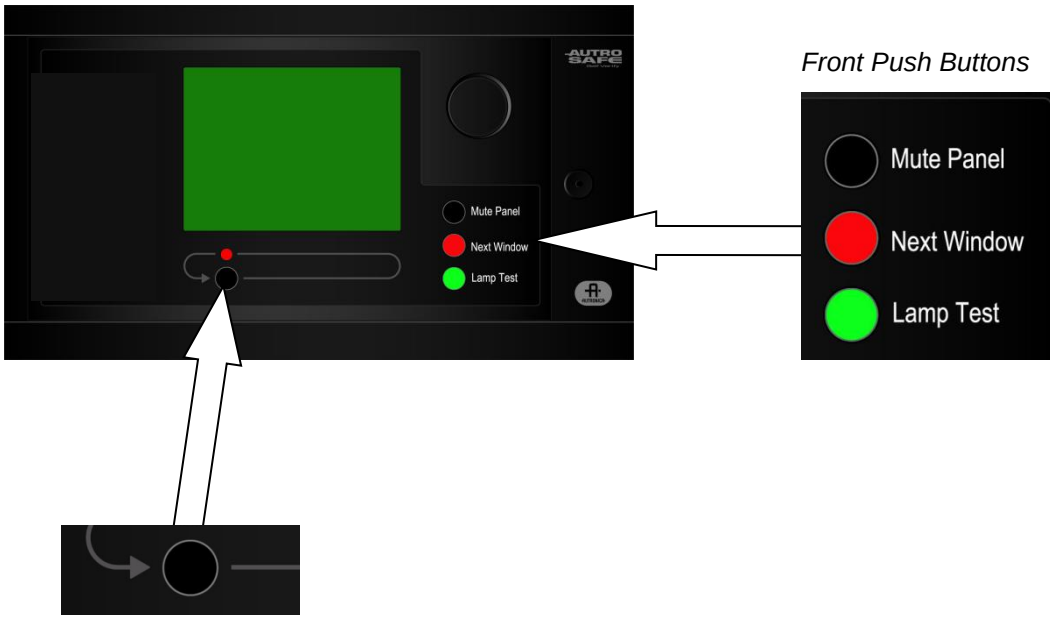
Alphanumeric Keyboard		
Button		**Designation**
	0 Space key	The number 0. Used to enter a space between words.

6.8.1.4 Manoeuvre Buttons



Manoeuvre Buttons		
Button	**When accessible (mode)**	**Description**
Enter	When the cursor is on a list item.	The properties of a selected unit is shown. The selected menu page on the display is shown if the item is a submenu. Accepts the selected function if the item is a function.
	When the cursor is on an item in a single select list.	Used to select/approve a selection (parameter) or return.
 Up/down arrow buttons		Used to scroll lines up or down. Used to change numerical values.
Back / Cancel		Used to cancel an input character (backspace).

6.8.2 Information Panel



Front Push Buttons			
Button		**Designation**	**Access Level**
	Mute Panel (black)	Used to mute the panel, i.e. silence the internal buzzer. Timeout. (Information Loop Panel: The Mute Panel button is named Silence Buzzer. The Backlight Brightness can be toggled between high and low by holding the Silence Buzzer button for 5 seconds until audible beep (access level 1).	1
	Next Window (red)	Used to step to the next condition window (only windows with active information are displayed). After all windows have been shown, the first window is displayed. When a timeout on no operation has been ended, the highest prioritized window is displayed.	1
	Lamp Test (green)	Used for testing the LED indicators. All indicators are lit for 5 seconds, and the LCD (display) will show a pattern to verify all pixels (will turn all white, then all black).	1
	More Events (black)	Used to scroll pages of information related to the selected condition window, if there are more events than the display can show.	1

6.9 Internal Buzzer

All panels provide a buzzer which is activated differently depending on the panel in question. See the following chapters for information on the buzzer behaviour for the different panels.

Generally, each condition may have its own *sound pattern*. If more than one condition is present simultaneously, the buzzer will reflect the condition which has the highest priority.

The buzzer can be silenced by pressing the *Mute Panel* button.

If the reason for the buzzer signal still exists, the buzzer will resound after a predefined time.

6.9.1 Maritime Gas Panel BS-420MG

The internal buzzer is activated in the cases of:
- System Fault
- Faults
- Alarm
- Prealarm
- Early Warning

6.9.2 Repeater Panel BU-BV-420 (system/information mode)

The internal buzzer on the BU-BV-420 panel is activated in the cases of:
- System Fault
- Alarm

6.9.3 System Loop Panel BU-110

The internal buzzer on the BU-100 panel is activated in the cases of:
- Alarm
- Internal System Fault
- Communication Fault

6.9.4 Information Loop Panel BV-110

The internal buzzer on the BU-100 panel is activated in the cases of:
- Alarm
- Fault
- Internal System Fault
- Communication Fault

7. Operation Mode

7.1 Introduction

The operator panel can be in either *Operation Mode* or *Menu Mode.*

When no one is operating the panel and no button has been pressed, the panel will always be in *Operation Mode*.

The display may look as follows in the panel's idle state.

Note that an alarm, a disablement, test or fault will *always* be indicated on the display when such events occur.

NOTE:
All events that may occur are presented in Operation Mode. All handling of events, i.e*. Silence Alarms, Accept and System Reset* takes place in Operation Mode.

It is possible to enter *Operation Mode* in two different ways.

- initial mode (start up) - idle state
- when pressing the menu button in Menu Mode, which will leave menu mode from all menu levels

7.2 Conditions in Operation Mode

In Operation Mode, the system can be in *quiescent* condition (lowest priority), or the system can be in one or any combination of the following *conditions*:

- alarm condition (highest priority)
- warning condition (*including* prealarm and early warning)
- fault warning condition
- disablement condition
- test condition

7.3 Alarm Levels

A detector may signal different levels of alarm, indicating the amount of gas currently present. These are;

- Alarm Level (the highest level)
- Warning, *including*:
  - Prealarm Level
  - Early Warning

Whenever a detector detects a transition from one alarm level to another, this event is reported to the system as an Early Warning, Prealarm or Alarm signal, which in turn will initiate the appropriate actions.

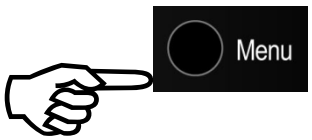
7.4 Access Levels

All user interface controls are classified as belonging to one of the four different access levels described below:

Access Level	Access Remedy	Description
1	No key or password required.	Freely accessible. All mandatory indications are visible at access level 1 without prior manual intervention.
2	Access by key.	Accessible by persons having a specified responsibility for safety.
3	Password restricted.	Accessible by persons trained and authorized to do reconfiguration of site specific data and maintenance according to the manufacturer's published instruction.
4	Mechanical tool.	Accessible by persons doing repair work and changing firmware.

8. Menu Mode

8.1 How to Enter Menu Mode



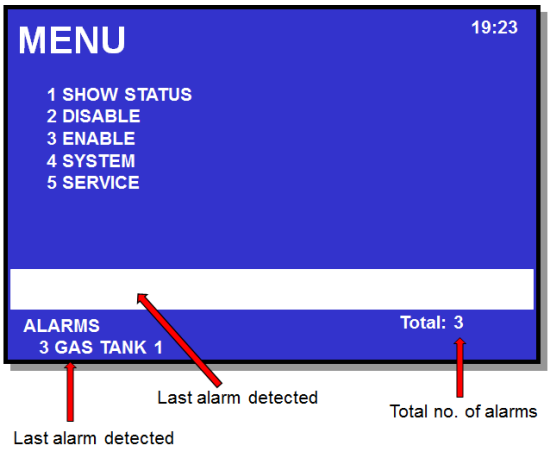
To enter the *Menu Mode* from operation mode or the panel's idle state, the Menu button must be pressed. The menu has 5 different menu selections, including SHOW STATUS, DISABLE, ENABLE, SYSTEM and SERVICE.

NOTE:
If an alarm condition occurs when you are in Menu Mode, you have to press the Menu button to re-enter Operation Mode *in order to activate the Silence Alarms button and the Reset button.*

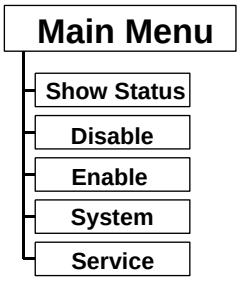
8.2 The Menu Mode Display

In Menu Mode the display only needs one window showing the selected part of the system menu. The *information field* at the lower part of the display is reserved to give the operator information on the different actions that can be performed from the alphanumeric keyboard (*Action Digits*), or short fault messages. This field is always *highlighted*.

If there is an alarm condition, the *last alarm detected* and the *total number of present alarms* will be shown below the information field.



Main Menu Structure



8.3 Buttons Used to Operate the Menu

In addition to the Menu button, the following buttons are used during operation (refer to chapter 6.8):

- the alphanumeric key pad (digits 0 to 9)
- the ENTER button
- the up/down arrow buttons
- the Close Window button used to move back one level / show previous picture (if the display is not showing information on the top level)
- the Back/Cancel button used to cancel an input character (backspace).

If no button is operated within a preconfigured timeout (operation mode / menu mode 25 seconds) or the menu button is operated, the menu will be terminated and the operator panel will re-enter operation mode.

8.4 Action Digits in Menu Mode

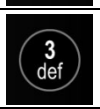
8.4.1 Introduction

When operating in Menu Mode, special Action Digits will appear in the highlighted information field at the lower part of the display. These digits show which action the operator may perform.

Digits 1 to 4 on the alphanumeric keyboard are dedicated for the different actions (Action Digits).

8.4.2 Action Digits Table

The *Action Digits* in Menu Mode are listed in the table below.

Action Digits			
Action	**Digit**	**When action is available**	**Used to…..**
ENABLE		Available in the Show Disablement Menu.	• enable the selected disabled component.
PRINT DATA		Optional. Available in the Show Status Menu (optional).	• print the selected data.
READ FORWARD		Available in the Log Menu.	• read the selected events forward page by page (if more than one page).
READ BACKWARDS		Available in the Log Menu.	• read the selected events backwards page by page (if more than one page).

8.5 How to Operate in Menu Mode

All menu selections represent a digit. To enter a menu selection, you simply have to press the corresponding digit. Then you can either;

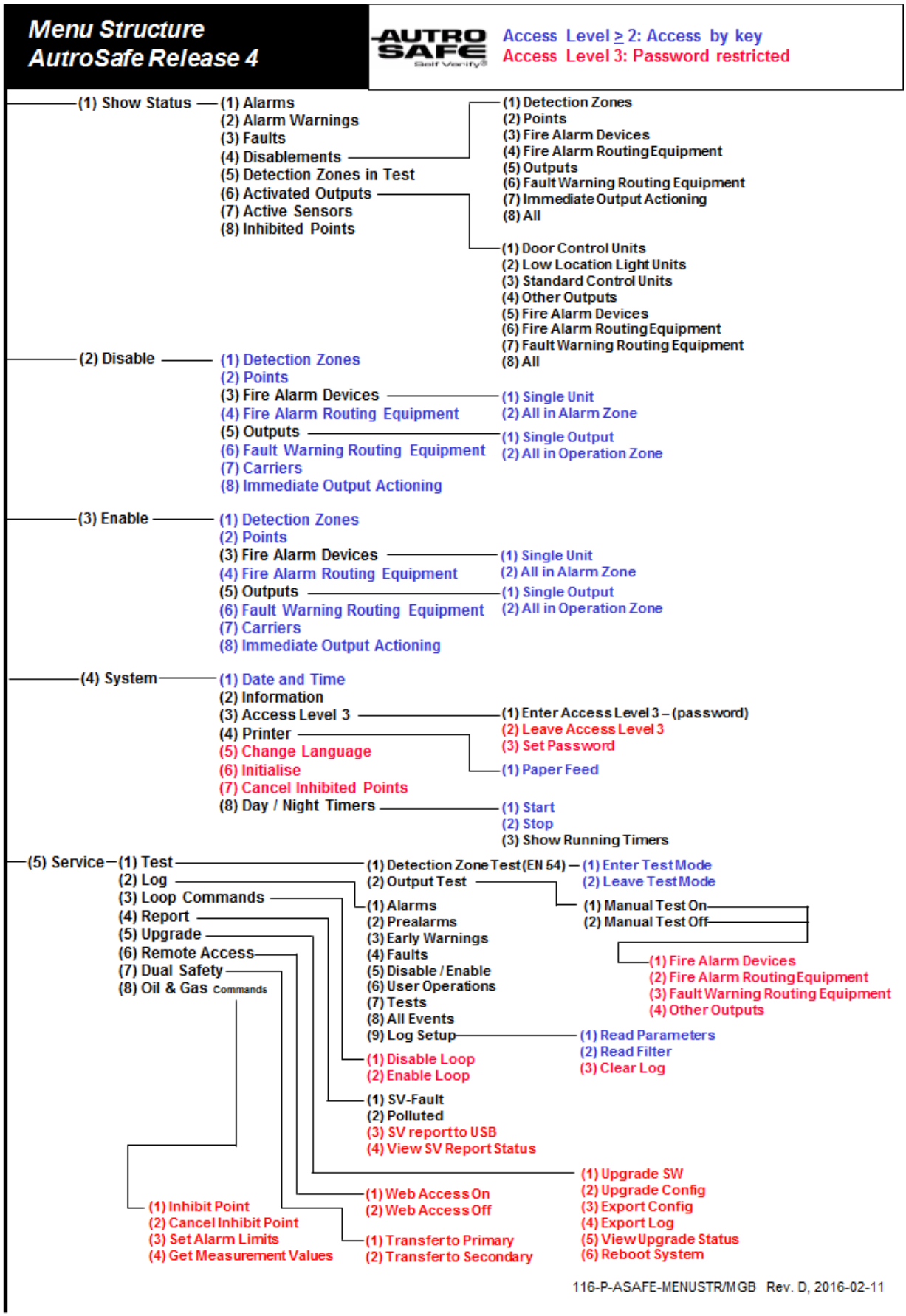
- use the keyboard to enter text into an input field
  or
- press the ENTER button and use the up/down arrows to move the cursor to the desired selection.

9. Menu Structure

Note:

The menus in the following chapters are based on the standard menu structure for AutroSafe fire detection and gas applications, therefore, they include fire and gas functionality.

Please note that Fire Alarm Devices (FAD) relate to audible and visual indicators.


Menu Structure
AutroSafe Release 4
AUTRO SAFE Self Verify
Access Level ≥ 2: Access by key
Access Level 3: Password restricted
(1) Show Status
(1) Alarms
(2) Alarm Warnings
(3) Faults
(4) Disablements
(5) Detection Zones in Test
(6) Activated Outputs
(7) Active Sensors
(8) Inhibited Points
(1) Detection Zones
(2) Points
(3) Fire Alarm Devices
(4) Fire Alarm Routing Equipment
(5) Outputs
(6) Fault Warning Routing Equipment
(7) Immediate Output Actioning
(8) All
(1) Door Control Units
(2) Low Location Light Units
(3) Standard Control Units
(4) Other Outputs
(5) Fire Alarm Devices
(6) Fire Alarm Routing Equipment
(7) Fault Warning Routing Equipment
(8) All
(2) Disable
(1) Detection Zones
(2) Points
(3) Fire Alarm Devices
(4) Fire Alarm Routing Equipment
(5) Outputs
(6) Fault Warning Routing Equipment
(7) Carriers
(8) Immediate Output Actioning
(1) Single Unit
(2) All in Alarm Zone
(1) Single Output
(2) All in Operation Zone
(3) Enable
(1) Detection Zones
(2) Points
(3) Fire Alarm Devices
(4) Fire Alarm Routing Equipment
(5) Outputs
(6) Fault Warning Routing Equipment
(7) Carriers
(8) Immediate Output Actioning
(1) Single Unit
(2) All in Alarm Zone
(1) Single Output
(2) All in Operation Zone
(4) System
(1) Date and Time
(2) Information
(3) Access Level 3
(4) Printer
(5) Change Language
(6) Initialise
(7) Cancel Inhibited Points
(8) Day / Night Timers
(1) Enter Access Level 3 – (password)
(2) Leave Access Level 3
(3) Set Password
(1) Paper Feed
(1) Start
(2) Stop
(3) Show Running Timers
(5) Service
(1) Test
(2) Log
(3) Loop Commands
(4) Report
(5) Upgrade
(6) Remote Access
(7) Dual Safety
(8) Oil & Gas Commands
(1) Detection Zone Test (EN 54)
(2) Output Test
(1) Enter Test Mode
(2) Leave Test Mode
(1) Manual Test On
(2) Manual Test Off
(1) Fire Alarm Devices
(2) Fire Alarm Routing Equipment
(3) Fault Warning Routing Equipment
(4) Other Outputs
(1) Alarms
(2) Prealarms
(3) Early Warnings
(4) Faults
(5) Disable / Enable
(6) User Operations
(7) Tests
(8) All Events
(9) Log Setup
(1) Read Parameters
(2) Read Filter
(3) Clear Log
(1) Disable Loop
(2) Enable Loop
(1) SV-Fault
(2) Polluted
(3) SV report to USB
(4) View SV Report Status
(1) Upgrade SW
(2) Upgrade Config
(3) Export Config
(4) Export Log
(5) View Upgrade Status
(6) Reboot System
(1) Web Access On
(2) Web Access Off
(1) Inhibit Point
(2) Cancel Inhibit Point
(3) Set Alarm Limits
(4) Get Measurement Values
(1) Transfer to Primary
(2) Transfer to Secondary
116-P-ASAFE-MENUSTR/MGB Rev. D, 2016-02-11

10. Show Status

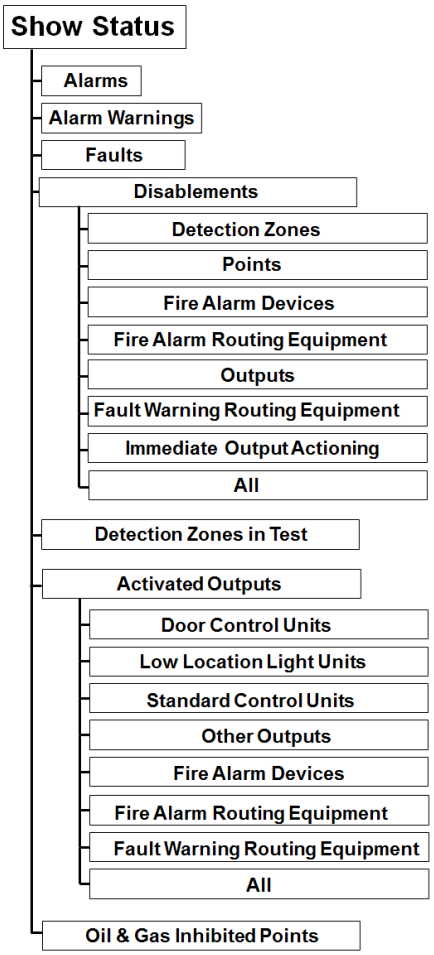
10.1 Introduction

The Show Status menu is accessed from the main menu *in Menu Mode*.

The menu gives the current status of the following conditions:

- Alarms
- Alarm Warnings
- Faults
- Disablements
- Detection Zones in Test
- Activated Outputs
- Active Sensors
- Inhibited Points

10.2 Show Status Menu



10.3 Show Status - Alarms

This menu gives detailed information on the current status of fire alarms in the system. It provides the following information:

- the location
- the exact time of activation
- an identification of the detectors (address)
- the type of detectors (gas detectors)
- all detectors in alarm
- all activated outputs

10.4 Show Status – Alarm Warnings

This menu gives detailed information on the current status of Alarm Warnings (Prealarms / Early Warnings) in the system. It provides the following information:

- the location
- the exact time of activation
- an identification of the detectors (address)
- the type of detectors (gas detectors)
- all detectors in Alarm Warning

10.5 Show Status - Faults

This menu gives detailed information on the current status of faults in the system. It provides the following information:

- the location
- an identification of the address
- the nature of the fault
- a detailed text

10.6 Show Status - Disablements

This menu gives detailed information on the current status of the disablements in the system. It provides detailed information on the disablement of the following:

- Detection Zones
- Points (gas detectors)
- Fire Alarm Devices (audible and visual indicators)
- Fire Alarm Routing Equipment (FARE)
- Outputs (FPE)
- Fault Warning Routing Equipment (FWRE)
- Immediate Output Actioning
- All

10.7 Show Status - Detection Zones in Test

This menu gives detailed information on the zones in test mode.

10.8 Show Status – Activated Outputs

This menu gives detailed information on activated outputs.

10.9 Show Status - Active Sensors

Not applicable for Maritime Gas.

10.10 Show Status - Inhibited Points

This menus gives detailed information on inhibited points.

11. Disabling

11.1 General

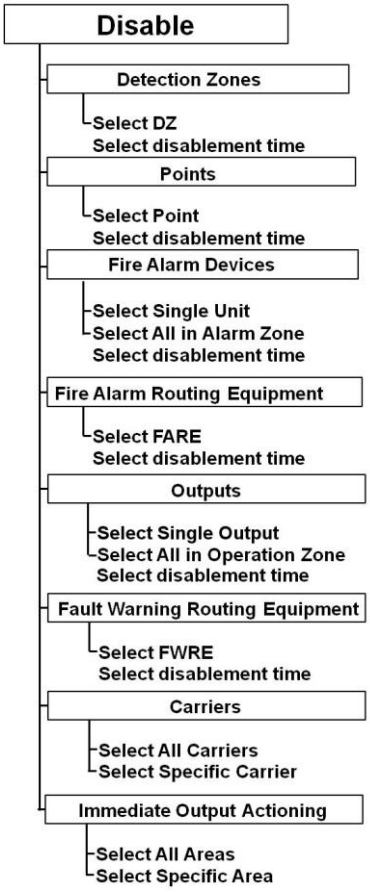
From the Disable menu you can disable the following:

- Detection Zones
- Points (gas detectors)
- Fire Alarm Devices (audible and visual indicators)
- Fire Alarm Routing Equipment (FARE)
- Outputs
- Fault Warning Routing Equipment (FWRE)
- Carriers
- Immediate Output Actioning

When disabling components, a *disablement time* is given. The disablement time can be increased for already disabled components by entering the disable menu.

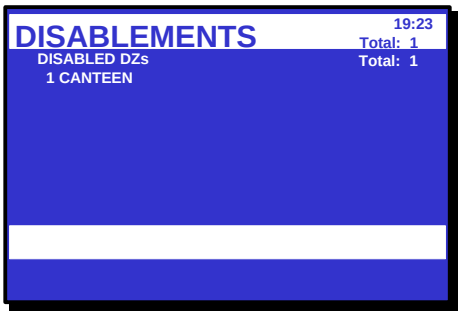
For information on *Disablement Sources*, refer to chapter **Error! Reference source not found.**.

11.2 Disable Menu



11.3 Indications on the Operator Panel

When one or several disablements exist, the *Function Disabled indicator* on the Operator Panel will show a yellow steady light. The panel's display will indicate that a disablement exists (as shown in the example below).



11.4 Disabling Activated / Deactivated Components

When you disable an *active* component, for example, a sounder issuing an alarm signal, the component will immediately switch to the OFF state without any user notification and/or confirmation cause.

A disablement of a *deactivated* component, for example, a sounder not issuing an alarm signal, will have no immediate effect on system operation.

Both activated and deactivated disabled components will remain switched off until enabled.

11.5 Disabling Detection Zones

When you disable a *Detection Zone* - *all* points within the specified detection zone will be disabled. A detection zone will not be indicated as disabled unless *all* points within the zone have been disabled.

A *disablement time* can be set. When the disablement time expires, the detection zone will automatically be enabled. The detection zone can also be enabled manually from the Enable Menu.

11.6 Disabling Points

When you disable a *Point* (gas detectors), no alarm signal or fault signal from this point will be sent in the event of an alarm / fault.

A *disablement time* can be set. When the disablement time expires, the point(s) will automatically be enabled. The point(s) can also be enabled manually from the Enable Menu.

If *all* points in a detection zone are disabled, the detection zone will be indicated as disabled. If at least one point within this detection zone is

enabled *manually*, the detection zone will be indicated as enabled. If the points are given different disablement times, the detection zone will be *automatically* indicated as enabled when the *first* point is enabled (i.e. when the point with the shortest disablement time is enabled).

11.7 Disabling Fire Alarm Devices

When you disable a *Fire Alarm Device* (audible or visual indicator), the output which controls the FAD will be disabled. The FAD will thus give no audible indication.

You can disable a single unit (audible or visual indicator) / alarm circuit, or all units (FADs) in a selected Alarm Zone.

A *disablement time* can be set. When the disablement time expires, the FAD(s) will automatically be enabled. The single FAD or all FADs in a selected Alarm Zone can also be enabled manually from the Enable Menu.

11.8 Disabling Fire Alarm Routing Equipment

When you disable *Fire Alarm Routing Equipment* (FARE), the output which controls such equipment will be disabled. In the event of an alarm, no fire alarm signals / fault signals will be sent to the fire brigade.

A *disablement time* can be set. When the disablement time expires, the Fire Alarm Routing Equipment will automatically be enabled. The equipment can also be enabled manually from the Enable Menu.

11.9 Disabling Outputs

When you disable outputs which control Fire Protection Equipment (FPE), in the event of an alarm / fault, no signals will be sent to trigger the equipment. You can disable a single output, or all outputs in the Operation Zone.

A *disablement time* can be set. When the disablement time expires, the outputs which control Fire Protection Equipment will automatically be enabled. The outputs can also be enabled manually from the Enable Menu.

11.10 Disabling Fault Warning Routing Equipment

When you disable *Fault Warning Routing Equipment* (FWRE), the output which controls such equipment will be disabled. In the event of a fault, no fault warning signals will be sent to, for example, the security firm.

A *disablement time* can be set. When the disablement time expires, the Fault Warning Routing Equipment will automatically be enabled. The equipment can also be enabled manually from the Enable Menu.

11.11 Disabling Carriers

A Carrier is a loop unit hosting one or several subunits.

When you disable a *Carrier,* the Carrier itself and all its subunits (functions) will be disabled. It is also possible to select and disable one or several subunits belonging to a Carrier.

Enablement can be performed manually from the Enable Menu, or will occur automatically when a defined *disablement time* expires.

When the Enable command is executed or the disablement time expires, the Carrier and all its subunits (functions) will be enabled - with the exception of subunits that have been disabled from other disablement sources, for example, by means of a disable input device. The subunits that have been disabled from other sources must also be enabled by means of the same sources.

11.12 Disabling Immediate Output Actioning

In an alarm situation, the actioning of outputs in a Delayed Action detection zone can be delayed. To achieve a delay, *Immediate Output Actioning* must be disabled.

It is possible to disable immediate output actioning for *all Day / Night areas* or for *selected Day / Night areas.*

Note: A Day / Night area encompasses one or more detection zones within the same operation zone.

The delay affects the actioning of outputs to Fire Alarm Devices (audible and visual indicators), Fire Alarm Routing Equipment (FARE) and/or Fire Protection Equipment (FPE).

Note that an alarm from a *manual call-point* will normally (point delay OFF) give immediate ouput actioning even though the immediate output actioning has been disabled.

The function is useful in situations where you want to *disable immediate output actioning* at special periods to avoid causing any unnecessary disturbance.

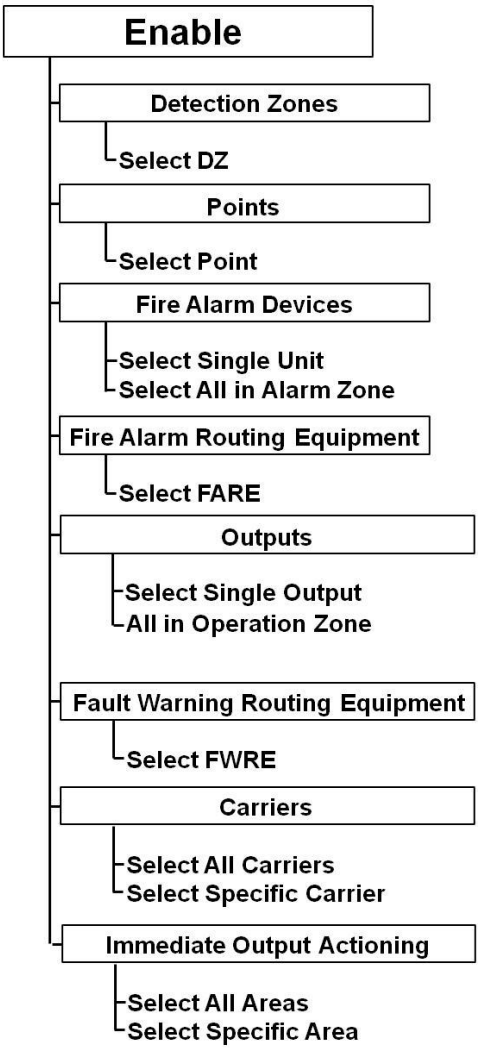
12. Enabling

12.1 General

From the Enable menu you can enable the following:

- Detection Zones
- Points (fire detectors, manual call points)
- Fire Alarm Devices (audible and visual indicators)
- Fire Alarm Routing Equipment (FARE)
- Outputs
- Fault Warning Routing Equipment (FWRE)
- Carriers
- Immediate Output Actioning

12.2 Enable Menu



12.3 Enabling Activated / Deactivated Components

Setting the arm state of a disabled *deactivated* component to ENABLED will have no immediate effect on system operation. The component will remain deactivated until its activation state is set to an active state (on alarm or on command).

12.4 Enabling Detection Zones

When you enable a *Detection Zone* - all points within the specified detection zone will be enabled - except for those that are individually disabled as described in the subsequent chapter. A detection zone will not be indicated as enabled unless *at least one point* within the zone is enabled.

12.5 Enabling Points

When a *Point* (gas detectors) is enabled (manually or when the disablement time expires), alarm signals will be sent from this point in the event of an alarm.

If *all* points in a detection zone are disabled, the detection zone will be indicated as disabled. If at least one point within this detection zone is enabled, the detection zone will be indicated as enabled. If the points are given different disablement times, the detection zone will be *automatically* indicated as enabled when the *first* point is enabled (i.e. when the point with the shortest disablement time is enabled).

12.6 Enabling Fire Alarm Devices

When you enable a *Fire Alarm Device (audible or visual indicator)*, the output which controls the *audible or visual indicator* will be enabled. The FAD will now give an audible indication.

You can enable a single unit (*audible or visual indicator*) / alarm circuit, or all units (FADs) in a selected Alarm Zone.

12.7 Enabling Fire Alarm Routing Equipment

When you enable *Fire Alarm Routing Equipment* (FARE), the output which controls such equipment will be enabled. In the event of an alarm, fire alarm signals may be sent to the fire brigade (configurable).

12.8 Enabling Outputs

When you enable outputs which control *Fire Protection Equipment* (FPE), in the event of an alarm, signals will be sent to trigger the equipment. You can enable a single output, or all outputs in the Operation Zone.

12.9 Enabling Fault Warning Routing Equipment

When you enable *Fault Warning Routing Equipment* (FWRE), the output which controls such equipment will be enabled. In the event of a fault, fault warning signals will be sent to, for example, the security firm.

12.10 Enabling Carriers

A Carrier is a loop unit hosting one or several subunits.

When you enable a *Carrier* manually or when a disablement time has been set and expires, the Carrier itself and all its subunits (functions) will be enabled - with the exception of subunits (functions) that have been disabled from other disablement sources, for example, by means of a disable input device. The subunits that have been disabled from other sources must also be enabled by means of the same sources.

12.11 Enabling Immediate Output Actioning

When enabling *Immediate Output Actioning*, there will be no delay on the actioning of outputs to Fire Alarm Devices (audible and visual indicators) and/or Fire Alarm Routing Equipment (FARE) in zones configured as *Delayed Action Detection Zones*, *Delayed Coincidence Detection Zones* or *SOLAS Detection Zones.*

It is possible to enable immediate output actioning for *all Day / Night areas* or for *selected Day / Night areas.*

13. System Menu

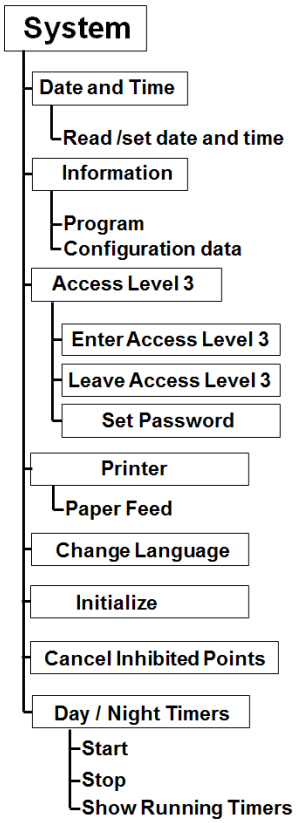
13.1 Introduction

The System Menu allows authorized personnel to:

- set/change date and time
- view the current program version and project information (identification, customer name, version of site configuration data and configuration tool)
- enter or leave access *level 3* (to reconfigure or maintain site specific data), set/change password
- printer; feed paper
- change language (toggle between English / local language)
- manually initialize the system
- cancel inhibited points
- start / stop automatic Day / Night Operation, show timers Not applicable.

Only users with access level 2 (key), 3 (password restricted) or a higher access level are allowed to do changes in the system menu.

13.2 System Menu



13.3 How to Enter Access Level 3 / Set Password

13.3.1 Introduction

This menu describes how to enter/leave Access Level 3 and to set a new password (requires Access Level 3). All user interface controls are classified as belonging to one of the four different access levels described below:

Access Level	Access Remedy	Description
1	No key or password required.	Freely accessible. All mandatory indications are visible at access level 1 without prior manual intervention.
2	Access by key.	Accessible by persons having a specified responsibility for safety.
3	Password restricted.	Accessible by persons trained and authorized to do reconfiguration of site specific data and maintenance according to the manufacturer's published instruction.
4	Mechanical tool.	Accessible by persons doing repair work and changing firmware.

13.4 How to Change Language

This menu allows you to determine the language which is to be used (English / local language) for a panel. A change in language has to be done locally on each panel.

13.5 How to Initialize the System

The AutroSafe system is automatically initialized when the panel is turned on. However, in certain cases it may be necessary to *manually* initialize the panel.

13.6 Cancel Inhibited Points

In an alarm situation, an inhibited point will not signal alarms to outputs, but only present alarms, prealarms and early warnings on all panels and AutroCom as usual (see Service Menu, Inhibit Point, chapter 15.1.1).

This menu allows you to globally cancel all inhibited points (global override function), meaning that all outputs that are configured to be activated in an alarm situation will be activated.

13.7 Day / Night Timers

13.7.1 Starting / Stopping Automatic Day / Night Operation from the Control Panel

From the Control Panel, it is possible to Start or Stop the automatic day / night operation in the System Menu. After activation (Start) of the automatic day/night operation, the affected Operation Zones will be set to their correct state (Disabled or Enabled Immediate Output Actioning) according to the specified schedules.

After deactivation (Stop) of the automatic day/night operation, the affected Operation Zones will be left in its current state in respect to Disabled/Enabled Immediate Output Actioning

13.7.2 Overriding Automatic Day / Night Operation from the Control Panel

It is possible to override the automatic day / night operation from the control panel by stopping the Day / Night Timers, and then issuing Enable / Disable Immediate Output Actioning commands manually.

14. Service Commands

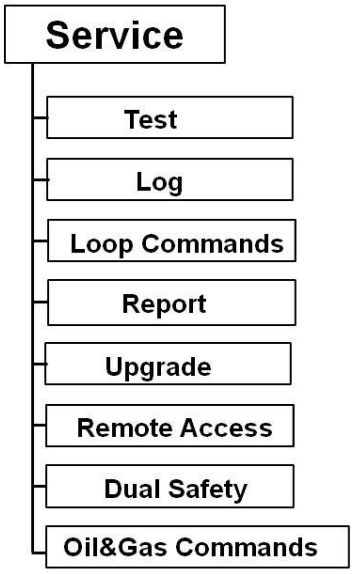
14.1 Introduction

From the operator panel you can perform service commands. To use the Service Commands, access level 3 is required.

Access Level	Access Remedy	Description
3	Password restricted.	Accessible by persons trained and authorized to do reconfiguration of site specific data and maintenance according to the manufacturer's published instruction.
4	Mechanical tool.	Accessible by persons doing repair work and changing firmware.

14.2 Service Menu

The Service Menu includes the following submenus:



NOTE:

The menu is called "Oil and Gas Commands" but these commands are also intended for maritime Gas systems.

Dual Safety commands do not apply to Maritime Gas.

14.3 Testing

The Test Menu allows you to test Detection Zones (detectors and manual call-points) and Outputs.

14.3.1 Testing Detection Zones

14.3.1.1 Indications on the Operator Panel

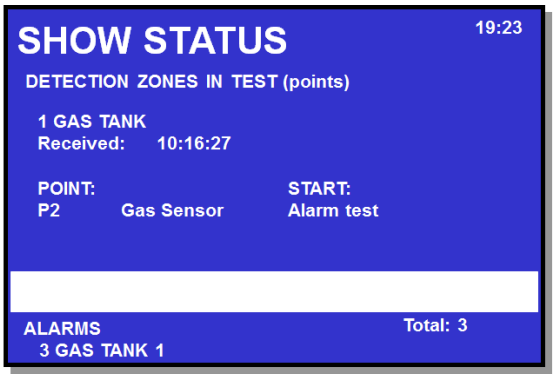
During testing, the *Testing indicator* on the Operator Panel will show a yellow steady light. The panel's display will always indicate that a test is being performed. The zones in test mode are also shown.

14.3.1.2 Entering Test Mode

To be able to manually test points (detectors or manual call-points) without automatic actioning of Fire Protection Equipment (FPE), Fire Alarm Routing Equipment (FARE) or Fire Alarm Devices (audible and visual indicators), *detection zones* can be set in *test mode* (ENTER TEST MODE). If a detection zone has been set to test mode, *any* point connected to this zone can be tested (with, for example, test gas) without automatic actioning (i..e. audible indication) from sounders, bells, etc.

In the SHOW STATUS menu (main menu selection 1), you can now verify that a point you have tested (for example, a detector you have tested with test gas) operates properly - without audible indication.

As shown on the example below, a message on a status line will appear (Alarm test), indicating that the alarm signal has been sent from the tested point (in this example, P2, optical detector).



The zones in test mode will always appear on the display. From here, you can also enter the SHOW STATUS menu directly.

In test mode, the automatic timeout (default 25 seconds in operation mode / menu mode) is 20 times the default timeout (i.e. up to 500 seconds) provided that no alarms occur within the timeout period.

14.3.1.3 Leaving Test Mode

The procedure below describes how to leave test mode for a selected zone (LEAVE TEST MODE).

NOTE:

To ensure that all selected detection zones leave Test Mode after carrying out this procedure, press the reset button on the front panel.

14.3.2 Testing Outputs

14.3.2.1 Manual Test ON

The subsequent chapters describe how to test;

- Fire Alarm Devices (audible and visual indicators)
- Fire Alarm Routing Equipment (FARE)
- Fault Warning Routing Equipment (FWRE)
- Other Outputs

Outputs activated by “Manual Test ON” will be kept active, i.e. reset will not deactivate. An ongoing test can be terminated by use of the Manual Test OFF menu.

14.3.2.2 Manual Test ON- Fire Alarm Devices (audible and visual indicators)

This chapter describes how to test *Fire Alarm Devices*. The test requires Access Level 3 (password restricted).

When the test is initiated, a test signal will be sent to all Fire Alarm Devices within the selected *Alarm Zone*. The duration of the signal and the interval between each signal are configurable (normally 1 second ON and 30 seconds OFF).

The test signal is given the lowest priority. In the event of an alarm, the alarm signal will thus override the test signal.

14.3.2.3 Manual Test ON- Fire Alarm Routing Equipment (FARE)

The test is similar to the test for Fire Alarm Devices (audible and visual indicators) and it requires Access Level 3 (password restricted). For detailed description, refer to 14.3.2.2.

When the test is initiated, a test signal will be sent to all Fire Alarm Routing Equipment (FARE) within the *Operation Zone* (if there are several Operation Zones, the signal will be sent to FARE in all Operation Zones). The duration of the signal and the interval between each signal are configurable (normally 1 second ON and 30 seconds OFF).

The test signal is given the lowest priority. In the event of an alarm, the alarm signal will thus override the test signal.

14.3.2.4 Manual Test ON- Fault Warning Routing Equipment (FWRE)

The test is similar to the test for Fire Alarm Devices (audible and visual indicators) and it requires Access Level 3 (password restricted). For detailed description, refer to 14.3.2.2.

When the test is initiated, a test signal will be sent to all Fault Warning Routing Equipment (FWRE) within the *Operation Zone* (if there are several Operation Zones, the signal will be sent to FARE in all Operation Zones). The duration of the signal and the interval between each signal are configurable (normally 1 second ON and 30 seconds OFF).

The test signal is given the lowest priority. In the event of an alarm, the alarm signal will thus override the test signal.

14.3.2.5 Manual Test ON - Other Outputs

This chapter describes how to test other outputs. The test requires Access Level 3 (password restricted).

When the test is initiated, a test signal will be sent.

NOTE:
Before this test is performed, make sure that all extinguishers (or other similar equipment) that are to be tested are *disconnected*. During the test, use a measuring instrument to measure the output on the Fire Protection Equipment that is to be tested.

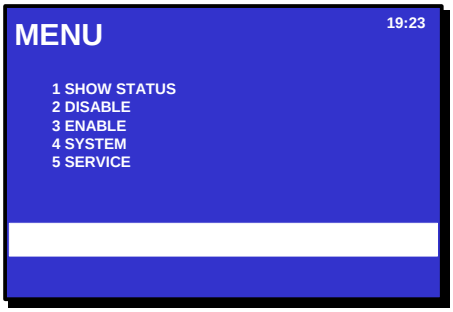
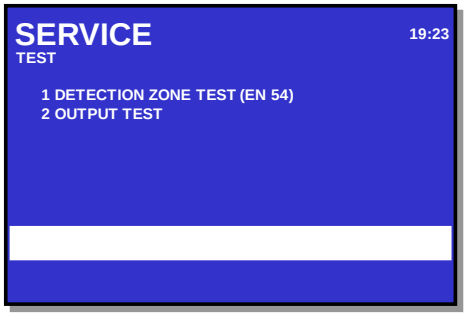
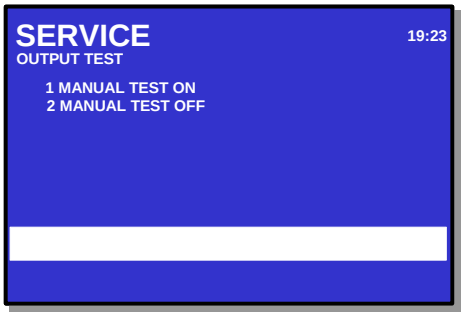
14.3.2.6 Manual Test OFF

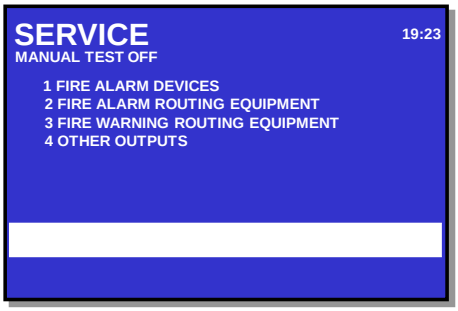
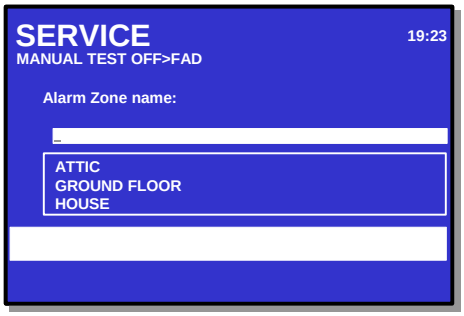
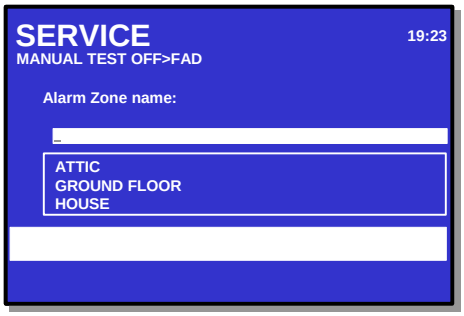
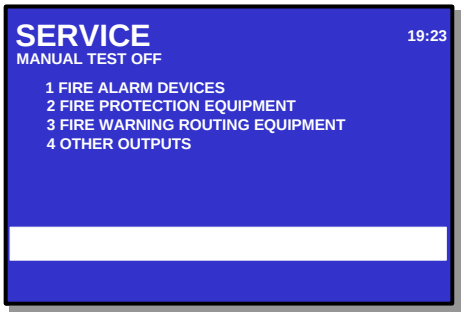
The subsequent chapters describe how to terminate an ongoing test for

- Fire Alarm Devices (audible and visual indicators)
- Fire Alarm Routing Equipment (FARE)
- Fault Warning Routing Equipment (FWRE)
- Other Outputs

14.3.2.7 Manual Test OFF- Fire Alarm Devices (audible and visual indicators)

This chapter describes how to terminate an ongoing test for *Fire Alarm Devices.*

Step	Actions to be taken	Display Indication
1	To enter the Main Menu, press the Menu button	
2	To select SERVICE, press 5.	
3	To select TEST, press 1.	
4	To select OUTPUT TEST, press 2.	

Step	Actions to be taken	Display Indication
5	To select MANUAL TEST OFF, press 2.	
6	To select FIRE ALARM DEVICES, press 1.	
7	Use the keyboard to enter text into the input box - *OR* ,- as shown in this example: To select the Alarm Zone Name, press then scroll downwards or upwards by pressing	
8	To accept the selected Alarm Zone and terminate the test, press	

14.3.2.8 Manual Test OFF - Fire Alarm Routing Equipment (FARE)

The procedure to terminate an ongoing test for *Fire Alarm Routing Equipment* is similar to the procedure for Fire Alarm Devices.

14.3.2.9 Manual Test OFF - Fault Warning Routing Equipment (FWRE)

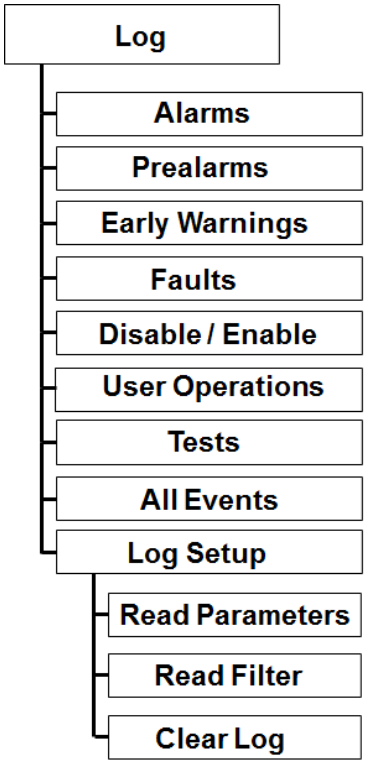
The procedure to terminate an ongoing test for *Fault Warning Routing Equipment* is similar to the procedure for Fire Alarm Devices.

14.3.2.10 Manual Test OFF – Other Outputs

The procedure to terminate an ongoing test for *other outputs* is similar to the procedure for Fire Alarm Devices.

NOTE: When the test is terminated, make sure that all extinguishers or other similar equipment are properly connected.

14.4 Event Recording – Log Menu



14.4.1.1 Events

To be able to analyse system behaviour for service and maintenance purposes, a number of events are recorded.

The table below gives an overview of these events and the detailed information that can be shown on the panel's display, or on a printout.

Event	Detailed Information
Alarms	• Date, time and identity of detection zones entering the Alarm state.
Prealarms	• Date, time and identity of detection zones entering the Prealarm state.
Early Warnings	• Date, time and identity of detection zones entering the Early Warning state.
Faults	• Date, time and identity of subject (individual component, group, zone) issuing a fault warning signal.
Enable/Disable	• Date, time and identity of subject (individual component, group, zone) entering the disabled state. • Date, time and identity of subject (individual component, group, zone) exiting the disabled state.
User Operations	• The date, time and operation zone identity of the operation of push buttons; RESET and SILENCE ALARMS. • The date, time and operation zone identity of the operation of; ALARM_DISABLE, REACTIVATE, RESOUND, INIT, ACTIVATE_ALARM, ENABLE IMM_ACT, DISABLE_IMM ACT, SET_TIME. • The date, time and event id (detection zone identity, fault identity etc) of all operations of ACCEPT.
Tests	• Date, time and identity of all manually initiated tests.
All Events	• All events
Log Setup	• Read parameters, read filter, clear log.

14.4.2 The Log Setup Menu

The submenu Log Setup includes the menu selections Read Parameter, Read Filter and Clear Log.

In this menu you can determine how the information is to be presented when you enter menu selections 1-8 in the LOG menu. You can, *for example*, setup the LOG menu so that only alarms from a specific date/time will be shown when you enter LOG ALARMS (menu selection 1 in the LOG menu).

Read Parameters
This menu selection allows you to determine the read parameters:

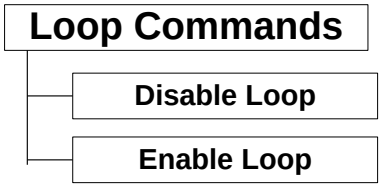
- Read mode, *including*; Most recent, Continue, From time
- From Date and Time
- Read Direction (forward/backwards)
- Number of Entries

Read Filter
This menu selection allows you to determine the *units* that are to be logged (for example, Points, audible and visual indicators, Loop units etc.).

Note that when leaving the Control Menu, *Read Parameters* and *Read Filter* are reset to default values.

Clear Log
This menu selection allows you to clear the entire Log Menu for all events previously recorded.

14.5 Loop Commands



14.5.1 Disable Loop

This menu allows you to disable one loop at a time without interrupting the system. This can be useful during maintenance, when detectors are changed on the loop etc.

Note that only points "remember" their original Enable / Disable state.

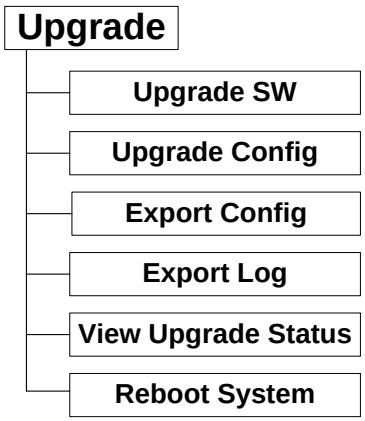
14.5.2 Enable Loop

This menu allows you to enable one loop (a selected loop) at a time without interrupting the system.

14.6 Report

Not applicable for Maritime Gas.

14.7 Upgrade



NOTE:
When upgrading the system by means of a USB memory stick, do not remove the USB stick from the USB port until you are sure that the upgrade procedure is completed.

Enter the menu "View Upgrade Status" to follow the progress and verify that the procedure is completed.

For detailed information on Upgrading procedures, refer to Commissioning Handbook.

14.7.1 Upgrade SW

This menu allows you to upgrade the system software version.

Note that before executing this command, the USB memory stick with the correct and valid system software file must be inserted into one of the USB ports. After the stick is inserted, wait at least 5 seconds before executing the command. To view the upgrade status, the View Upgrade Status command can be used.

The Reboot System command has to be run after an upgrade of the system.

14.7.2 Upgrade Config

This menu allows you to upgrade the configuration.

Note that before executing this command, the USB memory stick with the correct and valid configuration file must be inserted into one of the USB ports. After the stick is inserted, wait at least 5 seconds before executing the command. To view the upgrade status, the View Upgrade Status command can be used.

The Reboot System command has to be run after an upgrade of the system.

14.7.3 Export Config

This menu allows you to export the configuration from the system panel to the USB memory stick (exported files).

Note that before executing this command, the USB memory stick must be inserted into one of the USB ports. After the stick is inserted, wait at least 5 seconds before executing the command. To view the upgrade status, the View Upgrade Status command can be used.

14.7.4 Export Log

This menu allows you to export the log from the system panel to the USB memory stick (exported files).

Note that before executing this command, the USB memory stick must be inserted into one of the USB ports. After the stick is inserted, wait at least 5 seconds before executing the command. To view the upgrade status, the View Upgrade Status command can be used.

14.7.5 View Upgrade Status

This menu allows you to view the status of any of the above commands, including; Upgrade SW, Upgrade Config, Export Config and Export Log.

NOTE:

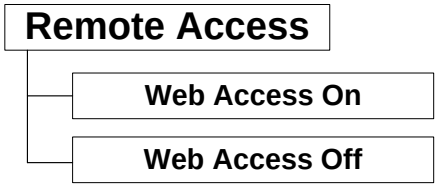
Always enter the menu "View Upgrade Status" to follow the progress and verify that the procedure is completed.

14.7.6 Reboot System

This menu allows you to reboot all panels in the entire system. This command has to be run after an upgrade of the system.

Note that in Dual Safety systems, only panels belonging to either the Primary or Secondary system will be rebooted, depending on which system the panel in question belongs to.

14.8 Remote Access



This command allows you to access a web site where you can perform system service functions from a computer via the Ethernet connections.

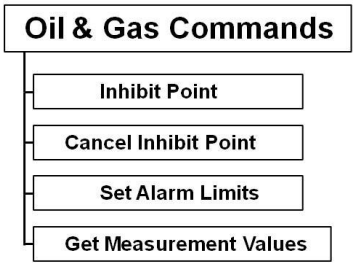
When the necessary connections are done, you can turn web access ON and OFF by means of this command. Note that each time remote access is turned ON, it will automatically be turned OFF after a period of 12 hours (12 hours timeout).

14.9 Dual Safety

Not applicable for Maritime Gas.

15. Gas Commands

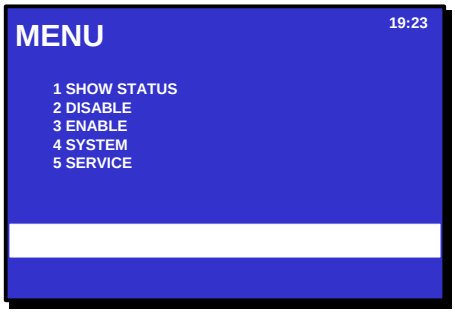
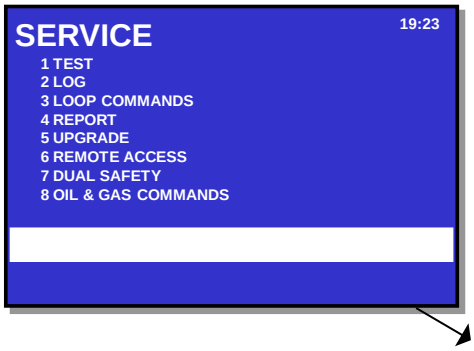
NOTE:
The menu is called “Oil and Gas Commands”, but the commands are also intended for maritime gas systems.

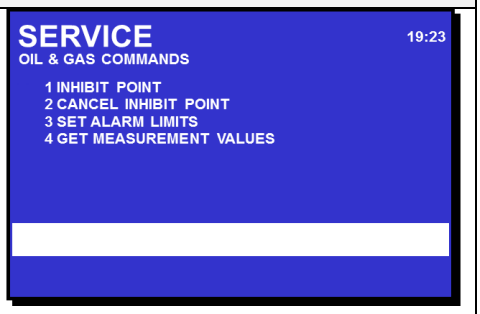
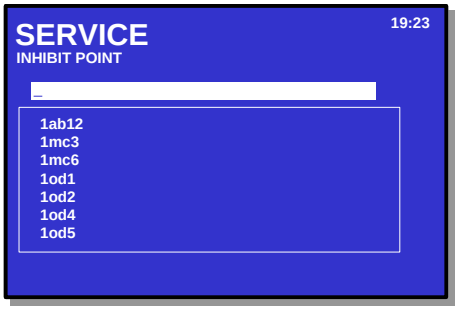
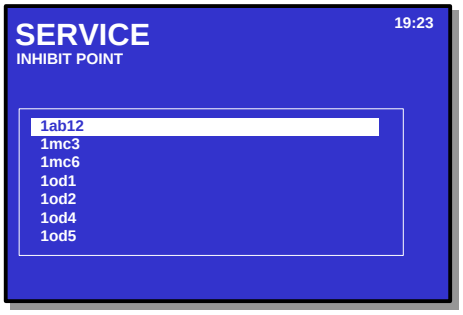


15.1.1 Inhibit Point

This menu allows you to inhibit points. When one or several points are inhibited, the point(s) will not signal alarm to outputs. An inhibited point will however present an alarm, prealarm and early warning on all panels and AutroCom as usual. This includes panel buzzer, panel LEDs and panel LCD display.

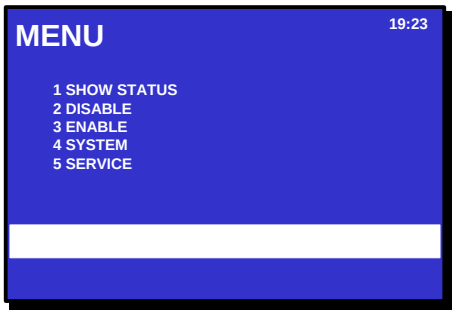
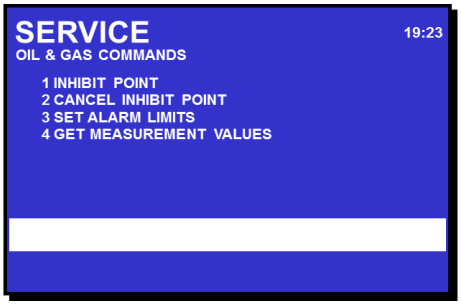
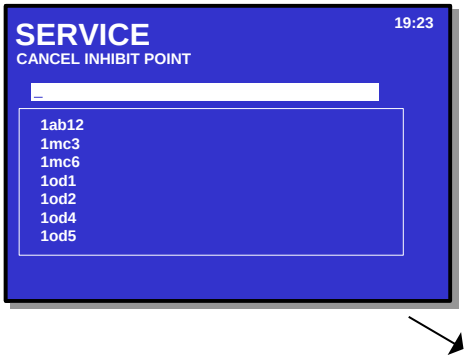
It is only possible to inhibit a unit from the panel menu or via AutroCom.

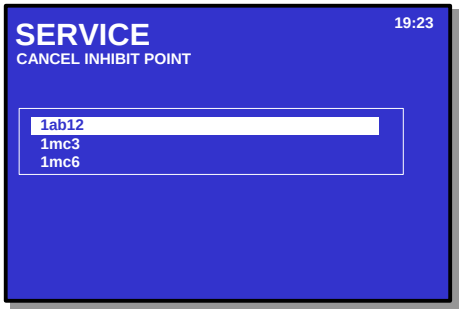
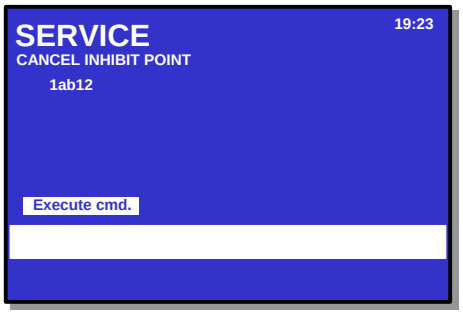
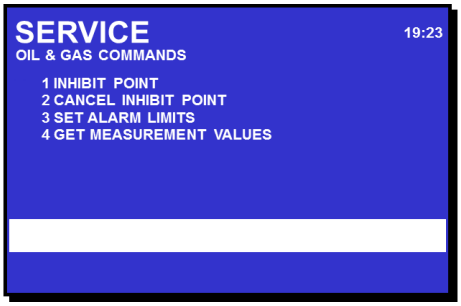
Step	Actions to be taken	Display Indication
1	To enter the Main Menu, press the Menu button	
2	To select SERVICE, press 5.	
3	To select OIL & GAS COMMANDS, press 8.	

Step	Actions to be taken	Display Indication
		
4	To select INHIBIT POINT, press 1.	
5	Use the keyboard to enter text into the input box - *OR* ,- as shown in this example: To select a point, press then scroll downwards or upwards by pressing 	
6	To accept the selected point, press 	
7	Enter hours, then press Enter minutes, then press To execute the command (accept the inhibit time), press once more	

15.1.2 Cancel Inhibit Point

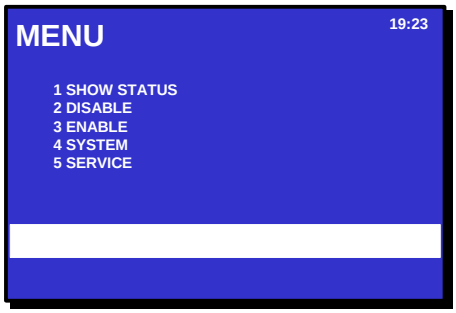
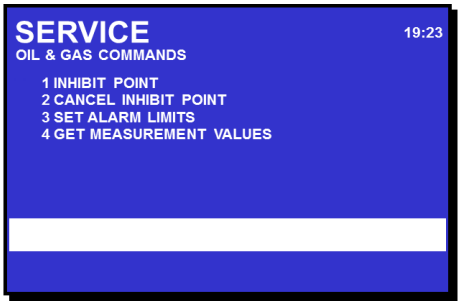
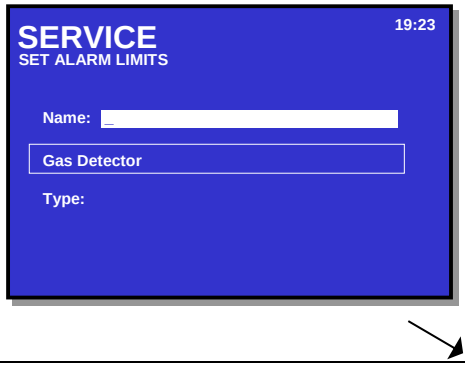
This menu allows you to cancel all or selected inhibited points.

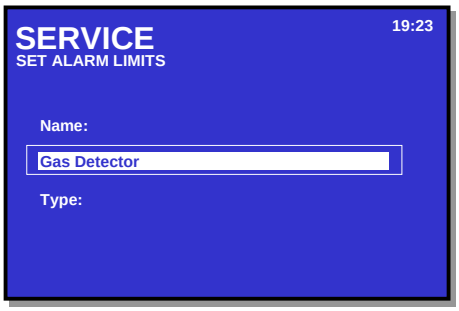
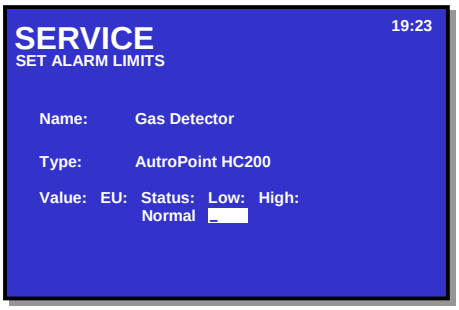
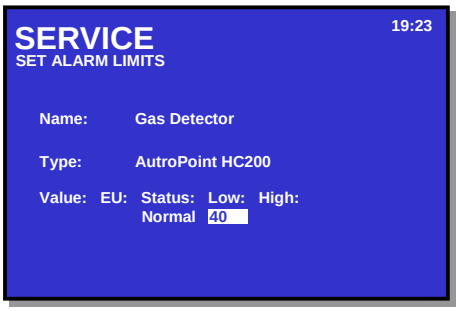
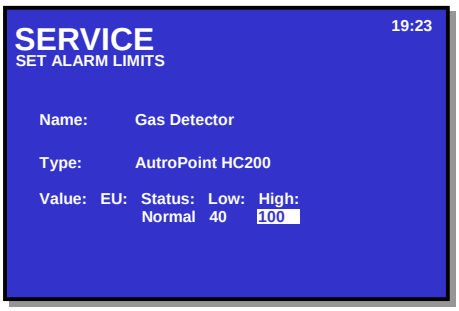
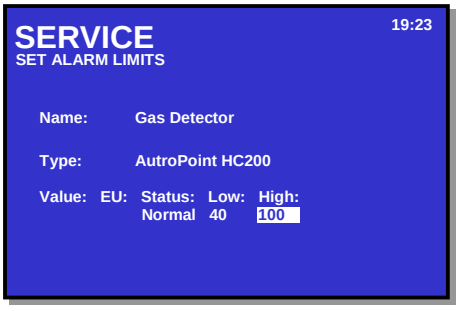
Step	Actions to be taken	Display Indication
1	To enter the Main Menu, press the Menu button	
2	To select SERVICE, press 5.	
3	To select OIL & GAS COMMANDS, press 8.	
4	To select CANCEL INHIBIT POINT, press 2.	

Step	Actions to be taken	Display Indication
5	Use the keyboard to enter text into the input box - *OR* ,- as shown in this example: To select a point, press then scroll downwards or upwards by pressing 	
6	To accept the selected point, press 	
7	To execute the command, press 	

15.1.3 Set Alarm Limits

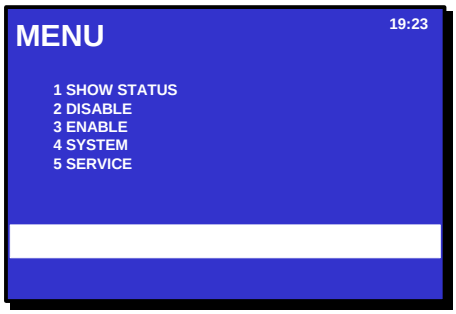
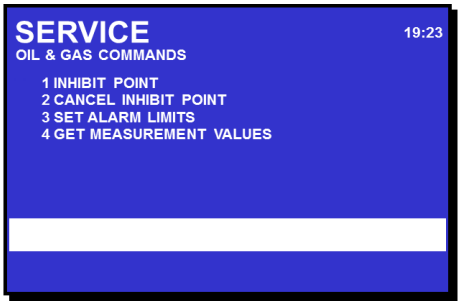
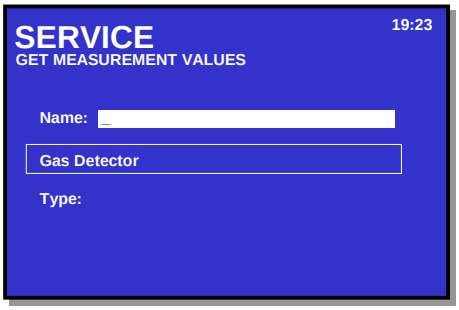
The *Set Alarm Limits* command allows you to change a gas detector's alarm limit for *Low Alarm* and *High Alarm*.

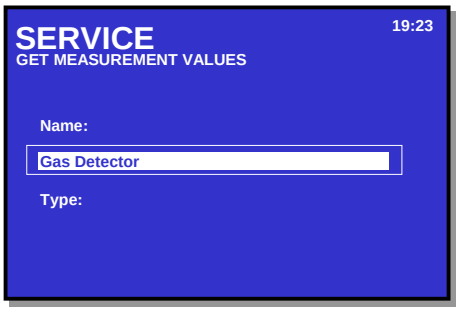
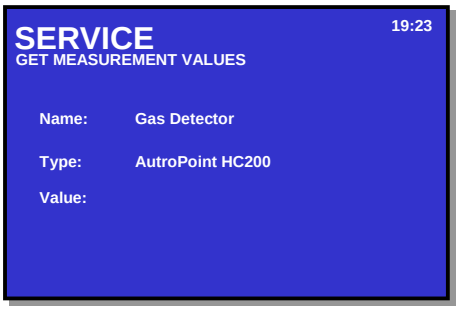
Step	Actions to be taken	Display Indication
1	To enter the Main Menu, press the Menu button	
2	To select SERVICE, press 5.	
3	To select OIL & GAS COMMANDS, press 8.	
4	To select SET ALARM LIMITS, press 3.	

Step	Actions to be taken	Display Indication
5	Use the keyboard to enter text into the input box - *OR* ,- as shown in this example: To select a point, press then scroll downwards or upwards by pressing	
6	To accept the selected point, press	
7	Use keyboard to enter low value, press	
8	Use keyboard to enter high value, press	
9	To execute the command (accept the high-low values for the point), press	

15.1.4 Get Measurement Values

This menu allows you to get measurement values from gas detectors.

Step	Actions to be taken	Display Indication
1	To enter the Main Menu, press the Menu button	
2	To select SERVICE, press 5.	
3	To select OIL & GAS COMMANDS, press 8.	
4	To select GET MEASUREMENT VALUES, press 4.	

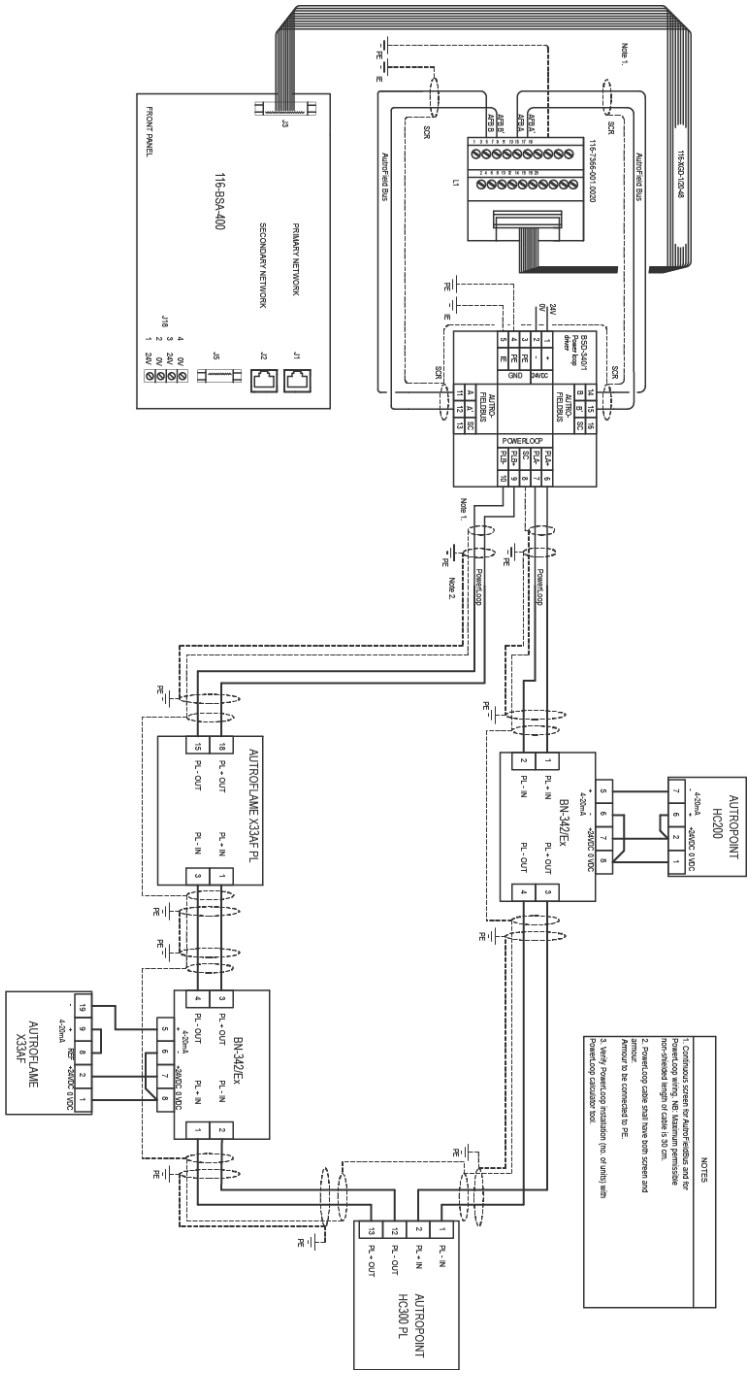
Step	Actions to be taken	Display Indication
5	Use the keyboard to enter text into the input box - *OR* ,- as shown in this example: To select a point, press then scroll downwards or upwards by pressing 	
6	To accept the selected point, press 	
7	Use keyboard, press 	
8	Use keyboard, press 	
9	To execute the command (accept the measurements for the point), press 	

16. Troubleshooting

16.1.1 Examples of Fault Messages

POINT FAULTS	
Fault reason	**BN-342**
Low temp shut down	X
Low temp warning	X
High temp warning	X
High temp shut down	X
Low voltage shut down	X
Low voltage warning	X
High voltage warning	X
High voltage shut down	X
CPU supply voltage monitor	X
4-20mA current underrange	X
4-20mA currnet overrange	X
Memory fault	X
General fault	X
Beam blocked	
Dirty optics	
Overrange	
General warning	
Maintenance	
Oi fault	
Low voltage fault	
Temperature out of range	
High energy detected	
High energy fault	
Non-ratio mode fault	
Oi calibration fault	
No Oi Hi Energy Fault	
General fault	
EE checksum error	
Clock fault	
Flash checksum error	
ROM/EEPROM Mismatch	
RAM error	
A-D Overflow	
SPI fault	
A-D fault	
Low voltage reset fault	
WDT fault	
Early clean optics	
Clean optics	
Sensor failure	
User defined 1	
Used defined x	
User defined 15	

17. Appendix

17.1.1 PowerLoop, BSD-340, Gas Detection Loop

Typical connection diagram - PowerLoop.