
User Manual

Marine Watch LT Series

LT-ONE Alarm Panel
LT-ACE Annunciator Panel



auto MASKIN

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1 About this Manual

1.1 Intended Audience

This manual has been published primarily for professionals and qualified personnel. The user of this material is assumed to have basic knowledge in marine systems and must be able to carry out related electrical work.

Work on the low voltage circuit should only be carried out by qualified and experienced personnel. Installation or work on the shore power equipment *must only* be carried out by electricians authorized to work with such installations.

1.2 Responsibilities

It is the **sole responsibility of the installer** to ensure that the installation work is carried out in a satisfactory manner, that it is operationally in good order, that the approved material and accessories are used and that the installation meets all applicable rules and regulations.



Auto-Maskin continuously upgrades its products and reserves the right to make changes and improvements without prior notice.

All information in this manual is based upon information at the time of printing. For updated information, please contact your local distributor.



The crossed-out wheeled bin symbol indicates that the item should be disposed of separately. The item should be handed in for recycling in accordance with local environmental regulations for waste disposal.

By separating a marked item, you will help reduce the volume of waste sent to incinerators or land-fill and minimize any potential negative impact on human health and the environment.

1.3 Revisions

This User Manual is valid for the following firmware version of the Marine Watch LT Series, LT-ONE Alarm Panel and LT-ACE Annunciator Panel.

Edition	Firmware Version	Release
Release	3.10 P6	March 2022

User Manual revision: **7 March 2022**

2 Marine Watch LT Series

2.1 Introduction

The Marine Watch LT Series is a compact yet powerful alarm system. The front panel is a touch screen, and the main page typically displays a grid of maximum 20 rectangles. Each rectangle represents the status of an alarm (or warning) channel.

In the event of a warning or an alarm, the corresponding rectangle indicates clearly with a flashing behaviour, and the buzzer sounds. The event is also indicated in the standard Alarm List, where it can be acknowledged.

The panel can be configured to display up to 9 pages. Each page layout is based on a template, and each page can display any of the available templates.

All base I/O interfaces are built into the panel. See the datasheet for a complete overview. The panel can also read data from a J1939 CAN bus.

Optional I/O expansion for hardwired signals can be added, typically in the form of Auto-Maskin RIO units.

Multiple LT-ACE Annunciator Panels can be added in a standard Ethernet network.

2.2 Typical Installation

The typical Marine Watch LT installation consists of one LT-ONE Alarm Panel, and one or several LT ACE Annunciator Panels. Signals are connected to the Alarm Panel either hardwired, on the J1939 CAN bus or from one of the many supported RIO expansion I/O units.

Additional LT-ACE Annunciator Panels can easily be added in a standard Ethernet network at any time. Once connected, these Annunciator Panels configure themselves from the LT-ONE Alarm Panel.

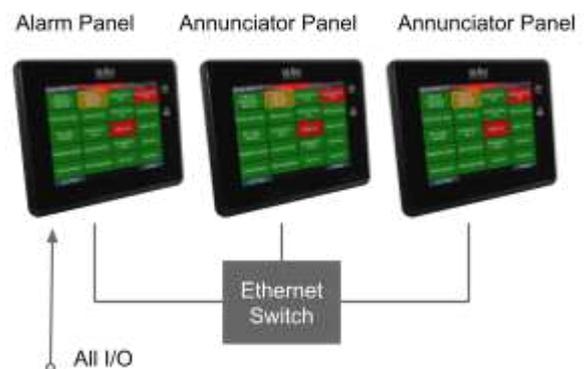
2.2.1 LT-ONE Alarm Panel

The Marine Watch LT-ONE Alarm Panel is connected to all I/O.

2.2.2 LT-ACE Annunciator Panel

Any number of Marine Watch LT-ACE Annunciator Panels can be connected in a network.

The Annunciator Panels require no manual configuration and are always in sync with the configuration of the LT-ONE Alarm Panel.



2.3 Web Server

The Marine Watch LT-ONE Alarm Panel configuration is performed with the built-in web server by logging in using the correct IP address. See the Configuration section for more information.

Note! Configuration changes for the LT-ONE Alarm Panel automatically applies to all networked and connected LT-ACE Annunciator Panels.

2.4 Hardware Connectivity and Sensors

The rear side of the Panel has the following interfaces.



Connectors C1 - C4

- All I/O shall be interfaced to the Deutsch™ DT connectors.

USB interface

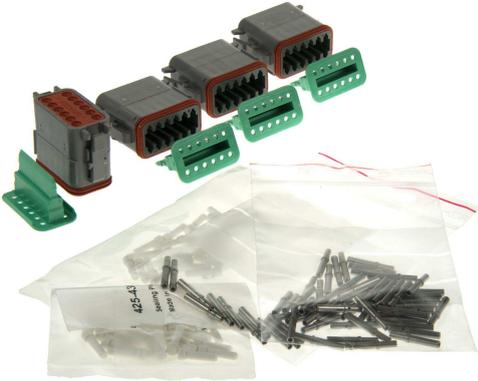
- Save and load configuration files
- Upload new firmware

RJ45 Ethernet

- Configure the Alarm Panel
- Communicate on Ethernet

2.5 Connector Kit

Note that the Marine Watch LT panels do not include the four mating Deutsch™ connectors and crimp pins. These are available in kits as follows.

LT-ONE Alarm Panel connector kit	LT-ACE Annunciator Panel connector kit
	
P/N 1006479	P/N 1006946

2.6 Connector Pin-reference

Each of the four Deutsch™ DT-connectors has 12 pins and are referenced in the table below.

Example: C1.11 = connector 1, pin 11

2.6.1 LT-ONE Alarm Panel

Power Supply	
C1.11	+12/24 VDC supply
C1.12	0 V supply
C1.3	Ground connection ¹
RIO Link Interface	
C1.5	Low
C1.6	High
J1939 CAN bus Interface	
C1.7	CAN 1 high
C1.8	CAN 1 low
C1.9	CAN shield
C2.10	CAN 2 high (I/O #20 ²)
C2.11	CAN 2 low (I/O #21 ³)
Common Alarm/Warning Relay⁴	
C2.1	NC
C2.2	Common
C2.3	NO
Relay #1	
C2.4	NC
C2.5	Common
C2.6	NO
Relay #2	

C2.7	NC
C2.8	Common
C2.9	NO
Magnetic Pickup	
C4.1	A
C4.2	B (I/O #18 ⁵)
Modbus RTU RS-485	
C4.3	Shield
C4.4	Low
C4.5	High
Thermistor	
C4.6	Thermistor #1 A
C4.7	Thermistor #1 B
C4.8	Thermistor #1 C
C4.9	Thermistor #2 A
C4.10	Thermistor #2 B
C4.11	Thermistor #2 C
Flexible I/O	
C1.1	I/O #1
C1.2	I/O #2 ⁶
C1.4	I/O #3
C1.10	I/O #4

¹ Connected internally to C1.9 and C4.3

² The alternative function is binary input

³ The alternative function is binary input

⁴ The relay is activated when no active event

⁵ Configurable as flexible I/O or as 0V reference

⁶ Configurable as flexible I/O or as 0V reference

C2.12	I/O #5 ⁷
C3.1	I/O #6 / sensor power ⁸
C3.2	I/O #7
C3.3	I/O #8
C3.4	I/O #9
C3.5	I/O #10
C3.6	I/O #11
C3.7	I/O #12
C3.8	I/O #13
C3.9	I/O #14
C3.10	I/O #15
C3.11	I/O #16
C3.12	I/O #17
C4.2	I/O #18 ⁹
C4.12	I/O #19

C1.4	Switch input #3
Common Alarm/Warning Relay¹⁰	
C2.1	NC
C2.2	Common
C2.3	NO

2.6.3 Crimp Tool

Use the correct crimp tool for the connector's pin- and wire assembly.

We recommend the Deutsch™ HDT-48-00.



2.6.2 LT-ACE Annunciator Panel

Power Supply	
C1.11	+12/24 VDC supply
C1.12	0 V supply
C1.3	Ground connection
Switch Input	
C1.1	Switch input #1
C1.2	Switch input #2

⁷ Configurable as flexible I/O or as 0V reference

⁸ Configurable as flexible I/O or as supply for 0-5 V sensor

⁹ Configurable as flexible I/O or as 0V reference

¹⁰ The relay is activated when no active event

2.7 Third-party Communication Interface

Third-party panels can interface to the LT-ONE Alarm Panel using the built-in Modbus TCP interface on Ethernet.

The I/O list and more information can be found here: <https://goo.gl/MP7EQM>

3 User Interface

3.1 Header Information

Marine Watch LT

The header consists of the following information.

- The Panel name **Marine Watch LT**. The name can be changed in the configuration.
- A common warning/alarm banner. The entire centre of the header is flashing for new and unacknowledged events. It is not flashing if all events are acknowledged.

A new Warning is indicated with a yellow flashing banner, and a new alarm is indicated with a red flashing banner. If there are warnings and alarms, then the alarm banner takes precedence.

If the channels are acknowledged but still active, then the banner indicates without flashing.

Summarized:

	Warning only	Alarm only	Warning and Alarm
New and unacknowledged	Yellow banner, flashing	Red banner, flashing	Red banner, flashing
Acknowledged	Yellow banner, not flashing	Red banner, not flashing	Red banner, not flashing

3.1.1 Change the Panel Name

The default panel name is Marine Watch LT. It can be changed here.

[/ home](#) / [It-one](#) / [user interface](#)

Panel Name

Configuration

Pages

Flow Charts

Shortcuts

Language

Buzzer

Panel Name

Panel Name:

3.2 Operator Interface

The operator interface consists of

- Buttons
- Touch screen, and
- Buzzer

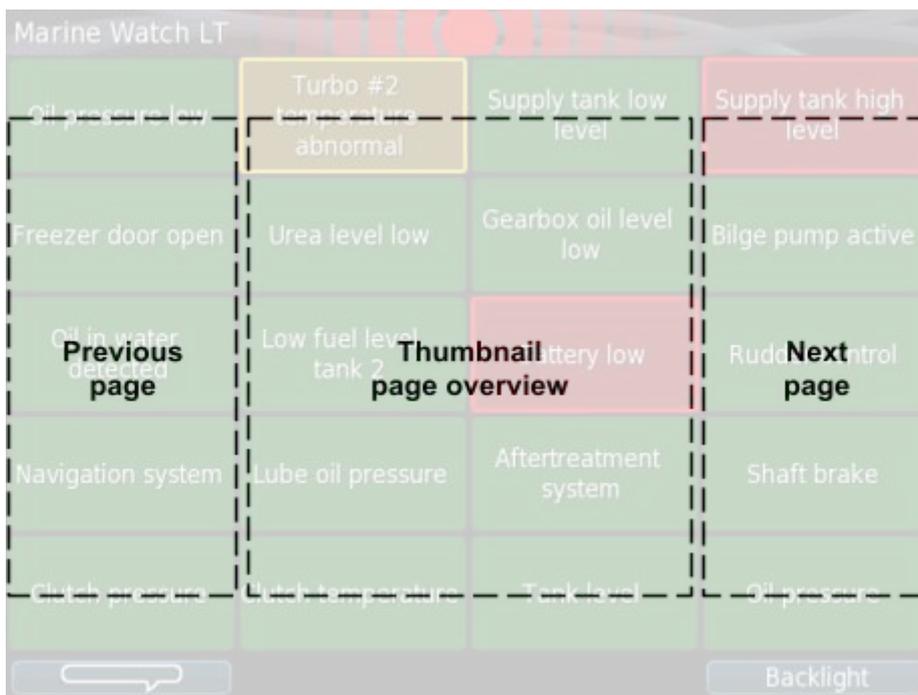
3.2.1 Buttons

There are two physical buttons on the Marine Watch LT panel.

Operator Interface		
	Home Button	Toggle the view between Alarm Pages and the Menu.
	Alarm Button	Silence buzzer and show the Alarm List.

3.2.2 Touch Screen

The touch screen is divided into three large touch navigation areas as follows.



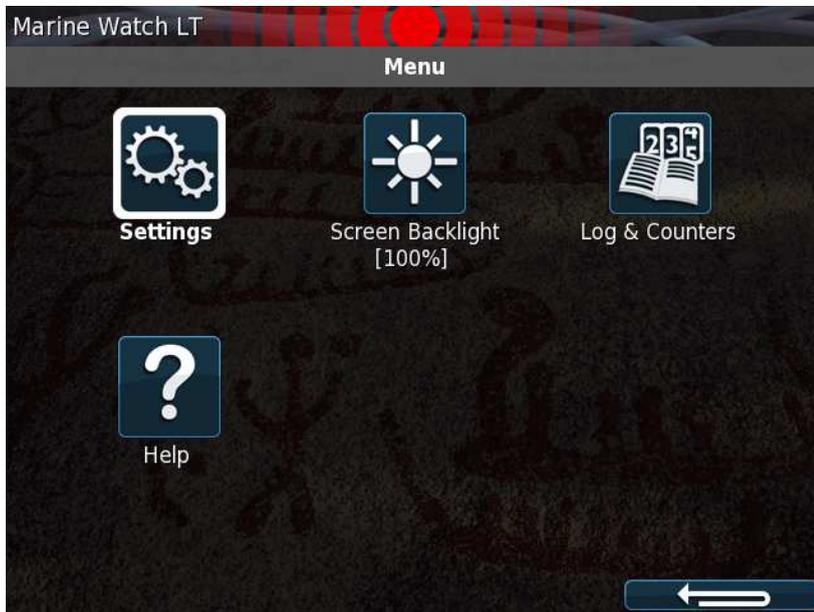
If there is one page only, then pressing the Previous and Next page areas will have no effect.

3.2.3 Buzzer

The buzzer sounds for any new event, and is silenced when pressing the Alarm button (see above).

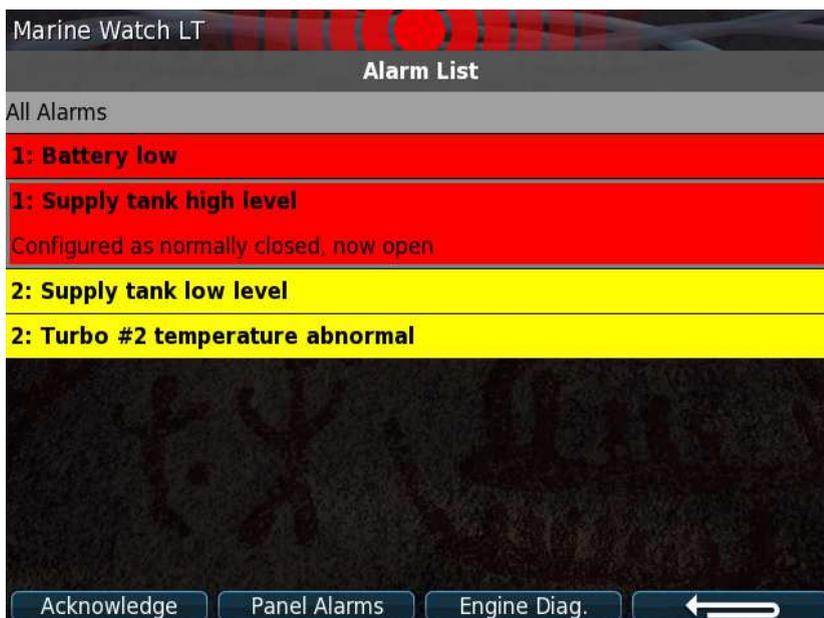
3.3 Menu

All operator settings, such as language selection, screen backlight, etc. is accomplished in the built-in menu structure of the Marine Watch LT.



3.4 Alarm List

For the LT-ONE Alarm Panel, the Alarm List will show all alarms available. The LT-ACE Annunciator Panel will show a combined Alarm List for all connected LT-ONE Alarm Panels.



Note! On the Marine Watch LT-ACE Annunciator Panels, the Alarm List will also show the

Alarm Panel source. In order to acknowledge an alarm, the alarm need to be selected by the operator and then acknowledged.

3.4.1 Alarm List Description

The events are colored differently depending on the status as below.

Alarm List	
1: New active Alarm	Bold text, red background
1: Acknowledged active Alarm	Red background
1: Unacknowledged inactive Alarm	Bold red text, grey background
2: New active Warning	Bold text, yellow background
2: Acknowledged active Warning	Yellow background
2: Unacknowledged inactive Warning	Bold yellow text, gray background

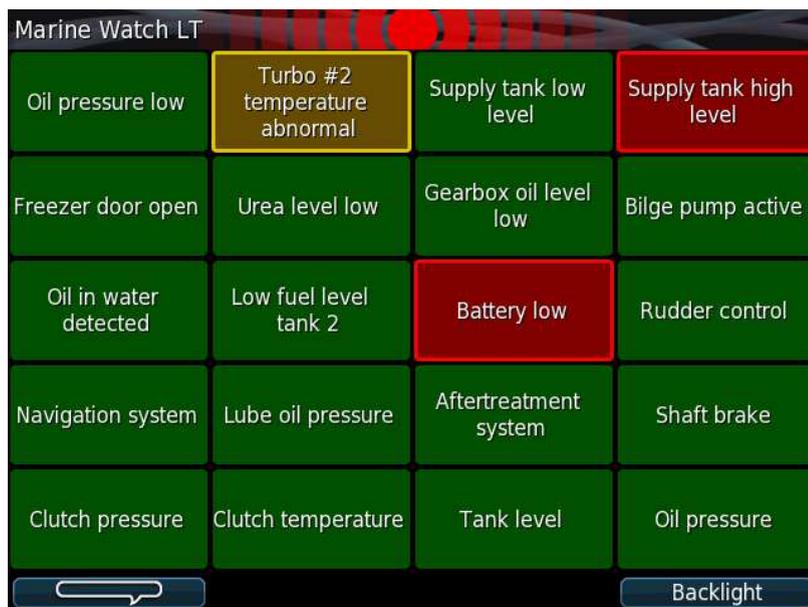
The number prior to the event describes the severity; 1 for alarm and 2 for warning.

3.5 Alarm Pages

Depending on the configuration, the Marine Watch LT panel displays one or several (up to 9) pages.

3.5.1 The Alarm Grid Page

Each rectangle represents the status of a binary/switch input channel, an analogue channel or a J1939 CAN bus¹¹ signal.



Each Alarm Grid page can display signal status for up to 20 channels. The rectangle can hold up to three lines of text.

¹¹ J1939 CAN bus configuration is not described in this manual

Alarm Grid Description

The rectangles in the Alarm Grid Page can take the following forms.

Normal	Active, unacknowledged Flashing border	Active, acknowledged	Inactive, unacknowledged Flashing border

4 Firmware Upgrade

A firmware upgrade can be accomplished using a USB memory stick or using the built-in web server of the unit.

The latest released firmware can be downloaded from the Auto-Maskin web site.

The screenshot shows the AutoMaskin web interface. At the top, there is a navigation bar with the logo 'auto MASKIN 1969 2019 5G' and a breadcrumb trail: '/ home / lt-one / file / upload to lt-one'. On the left side, there is a menu with 'Firmware' selected, and other options like 'Wallpaper' and 'Configuration'. The main content area is titled 'Firmware' and contains the instruction: 'Select a firmware package file (.tar.gz) for upgrade.' Below this is a file selection button labeled 'Choose File' and a status indicator 'No file chosen'. A 'Note!' section follows, stating: 'LT-ONE will reboot once complete! Do not turn off LT-ONE while upgrading!' and includes an 'Upgrade' button. A final instruction reads: 'Please wait, upload process may take several minutes.'

5 LT-ONE Alarm Panel Configuration

The configuration is solely required for the Marine Watch LT-ONE Alarm Panel. Configuration changes are automatically applied to all networked LT-ACE Annunciator Panels.

5.1 Introduction

This section covers the basic configuration of the binary/switch and analogue I/O-channels of the Marine Watch LT-ONE Alarm Panel.

Note! The panel has sophisticated configuration options that far exceeds the use of the panel as a basic alarm panel. This extended configuration is not typically used nor necessary, and consequently is not covered in this manual.

For a complete configuration overview, see the [200E Series Configuration Manual](#) on the Auto-Maskin website.

5.2 Load and Save Configuration

The Marine Watch LT-ONE Alarm Panel can hold up to 50 configuration files.

The current configuration can be exported to either a USB memory stick or exported using the web interface.

Likewise, any configuration can be uploaded to the Marine Watch LT-ONE Alarm Panel using USB memory stick or the web interface.

Note! In order to apply a new configuration, the configuration need to be explicitly loaded.

5.3 Configuration Steps

There are two main steps in the configuration.

- Channel configuration
- Assigning the configured channel to a slot in a template

5.3.1 Channel Configuration

All channels – switches or analogue – shall be given a text description, a time delay, etc.

The Marine Watch LT supports flexible I/O, all I/O must be configured to the correct use; the default use case is as Switch Input for all flexible I/O.

5.3.2 Assigning the Channel in a Template

The configured channel shall be assigned to a slot (a “location”) in a given template. See the **Template selection** chapter.

5.4 Login to the Panel

Before any configuration can be done one must log in to the webserver of the panel.

5.4.1 Connection and Login

Connect an Ethernet cable between a PC and the panel. In the URL-field of a web browser, type the IP-address of the panel. The default IP address is **192.168.0.151**.

Type the username and password as follows

- Username: **lt**
- Default password: **1234**

Note! All units in a network must have a unique IP address. The IP address of the panel can be changed using either the built-in web interface or using the panel menu.

5.5 Flexible I/O Configuration

The Marine Watch LT supports flexible I/O. A flexible I/O means the channel can be configured to accept one of many different signal types.

Flexible I/O	Description
Switch Input	Regular switch input (0 / 24 V)
User Config Output	Configurable switch output (0 / 24 V)
4-20 mA Input	4 - 20 mA current input
Voltage Sensor Input ¹²	0 - 32 V voltage input

To configure the channel, select **home / lt-one / i/o configuration / flexible i/o / configure**.

The image below is then displayed.

¹² Prefer the 0V reference at pin C1.12

[home](#) / [It-one](#) / [i/o configuration](#)

Flexible I/O
 Configure
Config Inputs
 Input Voltage
 Engine Speed
 Individual Speed Sensors
 Engine Load
 Switch
 4-20mA
 Temperature Sensor
 Voltage Sensor
 J1939
 J1939 #2
 Differential
 Average
 Analog Modbus
 Digital Modbus
 Constants
 Logic Signal
Config Outputs
 12/24V Output Functions
 Relay Functions
 DM1 Functions

Flexible I/O

Warning!
 Making changes to the flexible I/O configuration may result in damage to sensors connected to the panel. It is recommended to disconnect all sensors from the panel before making a change.

Flexible I/O	Function
Flexible I/O #1 (C1.1):	Switch Input #1 ▼
Flexible I/O #2 (C1.2):	Switch Input #2 ▼
Flexible I/O #3 (C1.4):	Switch Input #3 ▼
Flexible I/O #4 (C1.10):	Switch Input #4 ▼
Flexible I/O #5 (C2.12):	Switch Input #5 ▼
Flexible I/O #6 (C3.1):	Switch Input #6 ▼
Flexible I/O #7 (C3.2):	Switch Input #7 ▼
Flexible I/O #8 (C3.3):	Switch Input #8 ▼
Flexible I/O #9 (C3.4):	Switch Input #9 ▼
Flexible I/O #10 (C3.5):	Switch Input #10 ▼
Flexible I/O #11 (C3.6):	Switch Input #11 ▼
Flexible I/O #12 (C3.7):	Switch Input #12 ▼
Flexible I/O #13 (C3.8):	Switch Input #13 ▼
Flexible I/O #14 (C3.9):	Switch Input #14 ▼
Flexible I/O #15 (C3.10):	Switch Input #15 ▼
Flexible I/O #16 (C3.11):	Switch Input #16 ▼
Flexible I/O #17 (C3.12):	Switch Input #17 ▼
Flexible I/O #18 (C4.2):	Switch Input #18 ▼
Flexible I/O #19 (C4.12):	Switch Input #19 ▼
Flexible I/O #20/#21 (C2.10/C2.11):	Switch Input #20/#21 ▼

Note that the physical connector and pin reference (i.e. C1.4) for each I/O is given for each channel.

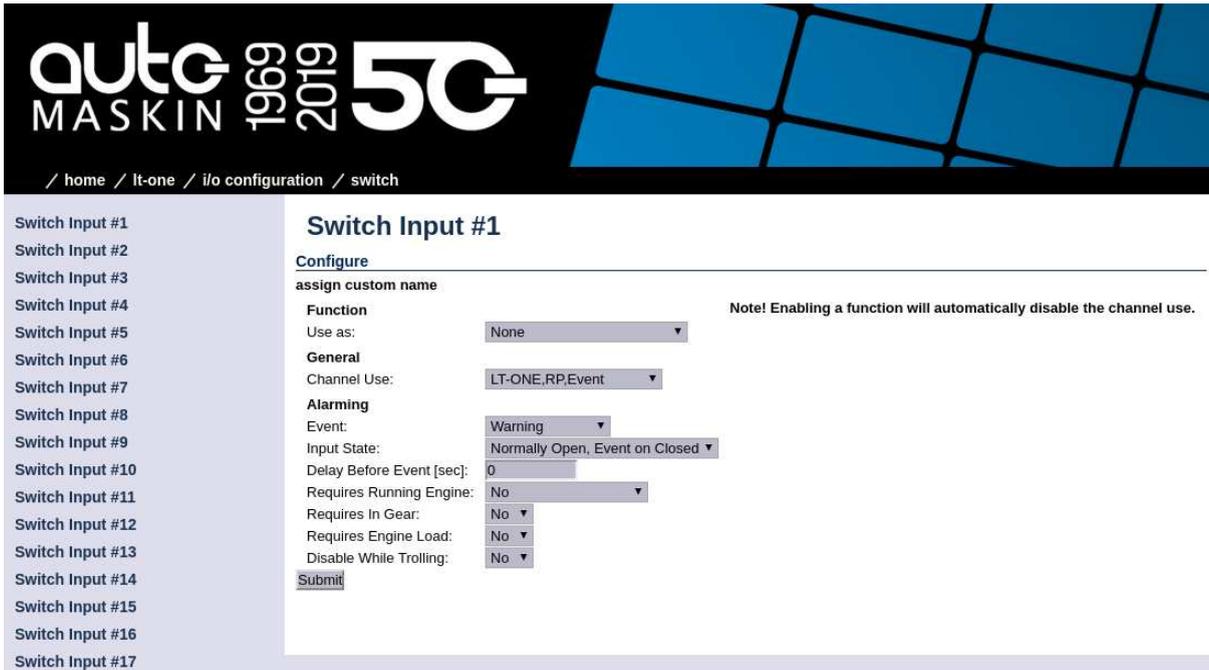
Remember to press **Submit** to store the configuration.

5.6 Switch Channel Configuration

Select the menu item **home / It-one / i/o configuration / switch**

The left margin lists 21 Switch Input channels. Select **Switch Input #1**.

The page should look similar to this:

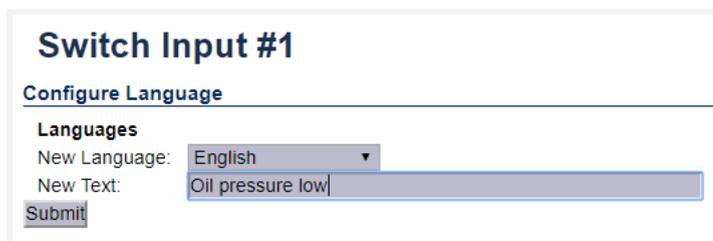


5.6.1 Configure an Alarm Channel

In this example, we are configuring **Switch Channel #1** as an alarm channel. When the event trigger, it will indicate in red.

In the **Configure** section from the above image, consider the following:

- **assign custom name:** This is where the channel is given a descriptive text.
 - Choose a language, then type the channel description. Finally, click the **Submit** button.



- In the left margin, select **Switch Channel #1** item to return to the channel configuration.
- **Function:** This shall be **None**. If any other function is selected here, then the channel will not be used as an alarm channel.
- **General:** Channel Use shall be set to **LT-ONE,RP,Event**
- **Alarming:**
 - The Event shall be **Alarm** in this example.
 - The Input State shall normally be **Normally Closed** (alarming when the switch opens, or a wire breaks).

- The Delay Before Event [sec] is the time delay after the switch changes state until the alarm activates. Typically a few seconds.
- Finally, click the **Submit** button. The channel configuration is now stored in the panel.

5.6.2 Configure a Warning Channel

In this example, we are configuring Switch Channel #2 as a warning channel. When the event trigger, it will indicate in yellow.

In the **Configure** section from the above image, consider the following:

- **assign custom name:** This is where the channel is given a descriptive text.
 - Choose a language, then type the channel description. Finally, click the **Submit** button.
 - In the left margin, select **Switch Channel #2** item to return to the channel configuration.
- **Function:** This shall be **None**. If any other function is selected here, then the channel will not be used as a warning channel.
- **General:** Channel Use shall be set to **LT-ONE,RP,Event**
- **Alarming:**
 - The Event shall be **Warning** in this example.
 - The Input State shall normally be **Normally Closed** (warning when the switch opens, or a wire breaks).
 - The Delay Before Event [sec] is the time delay after the switch changes state until the warning activates. Typically a few seconds.
- Finally, click the **Submit** button. The channel configuration is now stored in the panel.

5.7 Analog Channel Configuration

In this example, we are configuring **Voltage Sensor #10** as a warning channel with a high threshold limit of 50 %. When the event threshold is met, a yellow event will be raised.

Select the menu item **home / It-one / i/o configuration / voltage sensor**

The left margin lists 19 Voltage Sensor Input channels. Select **Voltage Sensor #10**.

The page should now look similar to this:

In this example, we are configuring the **Voltage Sensor #10** as a warning channel with a high threshold limit of 50 %. When the event threshold is met, a yellow event will be raised.

In the **Configure** section from the above image, consider the following:

- **assign custom name:** This is where the channel is given a descriptive text.
 - Choose a language, then type the channel description. Finally, click the **Submit** button.
 - In the left margin, select the **Voltage Sensor #10** item to return to the channel configuration.
- **General:** Channel Use shall be set to **LT-ONE,RP,Event**
- **Active Sensor Range:** The sensor range
- **Sensor:**
 - Sensor Unit: Select the unit of the sensor
 - Sensor Range Min / Max: Select the minimum and maximum range of the sensor
- **Display:** This defines how the channel will be graphically represented
- **Alarming:**

- The Event shall be **Warning** in this example.
 - Warning Threshold set to High and 50 %.
 - The Delay Before Event [sec] is the time delay after the switch changes state until the warning activates. Typically a few seconds.
- Finally, click the **Submit** button. The channel configuration is now stored in the panel.

5.8 Pages and Templates

This section describes how to select a template page, and how to assign a configured channel to a slot in the chosen template.

5.8.1 Choose a Template Page

Select the menu item **home / It-one / user interface**.

- From the left margin, choose **Pages**.
- Under Select Page, Select **Page 1**.
- From the selection of possible templates, choose **Template 28**, which is the Alarm Grid template.

It should look similar to this.

The screenshot shows the user interface for configuring pages and templates. At the top, there is a navigation breadcrumb: **/ home / It-one / user interface**. On the left side, there is a vertical menu with the following items: **Panel Name**, **Configuration**, **Pages** (highlighted), **Flow Charts**, **Shortcuts**, **Language**, and **Buzzer**. The main content area is titled **Pages** and contains the following sections:

- Page Manipulation**: Includes buttons for **Insert Page**, **Before** (dropdown), and **Page 1** (dropdown).
- Select Page**: Shows **Page 1** selected.
- Page 1**: A section header for the selected page.
- Template 28**: A 5x4 grid of slots numbered 1 to 20. Slot 6 is highlighted in red, and slot 15 is highlighted in yellow.
- Populate Slots**: A table with 4 slots, each containing a signal name and an **Edit Signal** button.

Slot 1:	Oil Pressure Low	Edit Signal
Slot 2:	Turbo #2 Temperature Abnormal	Edit Signal
Slot 3:	Supply Tank Low Level	Edit Signal
Slot 4:	Supply Tank High Level	Edit Signal

5.8.2 Assign Channels in the Template Page

In the template above there are 20 available slots. Each slot can be assigned a configured channel.

From the drop-down list for each slot, choose the channel that shall be represented in that slot. Continue until all channels are assigned to a slot.

Click the **Submit** button to save the configuration.

6 LT-ACE Annunciator Panel Configuration

The Marine Watch LT-ACE Annunciator Panel can show alarms from one or two LT-ONE Alarm Panels. The Annunciator Panels are always in sync with the Alarm Panels.

6.1 Connect to LT-ONE Alarm Panel

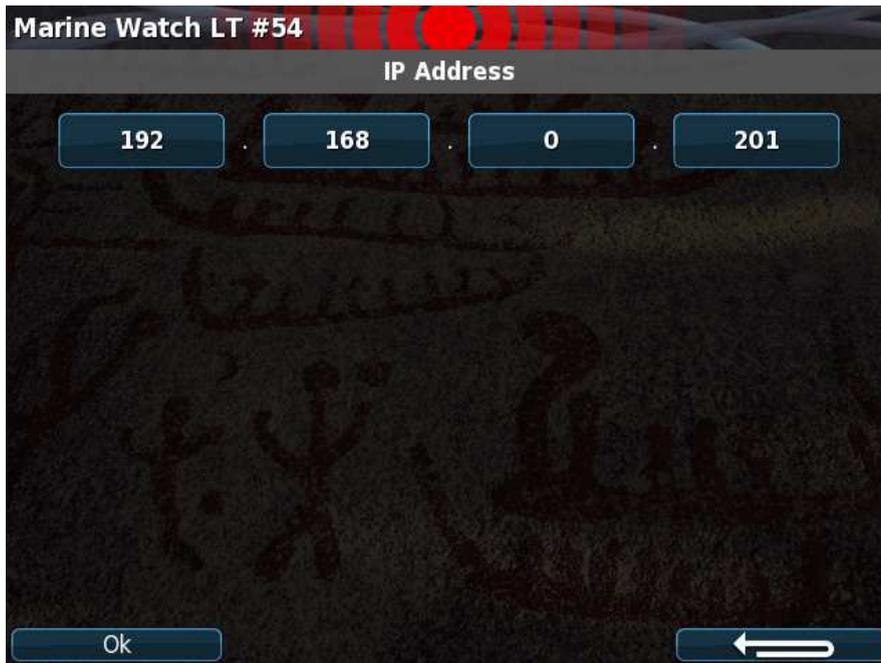
The LT-ACE Remote Panel must be configured to identify which LT-ONE Alarm Panel to connect to. This is accomplished using the panel menu under Menu > Settings > Administration > Alarm Panel Connections.



Note! The LT-ONE Alarm Panels are identified using the LT-ONE Alarm Panel name and IP address, e.g. “Marine Watch LT #54”, where “Marine Watch LT” is the panel name and #54 are the last digits in the IP address (192.168.1.54).

6.2 Network Address

The default LT-ACE Annunciator Panel IP address is **192.168.0.201**. The IP address can be changed using the panel menu (under Menu > Settings > Administration > IP Address).



6.3 Web Interface

Connect an Ethernet cable between a PC and the panel. In the URL-field of a web browser, type the IP-address of the panel.

Type the username and password as follows

- Username: **lt**
- Default password: **1234**