
Configuration Manual

Marine Pro 400 Series / 200 Series

DCU 410E Engine Controller, P/N 1006445
DCU 408E Engine Controller, P/N 1006510
DCU 210E Engine Controller, P/N 1006475
DCU 208E Engine Controller, P/N 1006477

RP 410E Remote Panel, P/N 1006446
RP 206E Remote Panel, P/N 1006478
RP 210E Remote Panel, P/N 1006476
RP 220E Remote Panel, P/N 1006478
RP 420E Remote Panel, P/N 1006484
RP 480i Remote Panel, P/N 1500061

Marine Watch LT Series

LT-ONE Alarm Panel, P/N 1500074

LT-ACE Annunciator Panel, P/N 1500120



Auto MASKIN

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1 Preface

1.1 About this Manual

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 authorised 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.

1.3 Revisions

This Configuration Manual is valid for the following software version.

Edition	Software Version	Release
Release	3.11 P6	November, 2024
Release	3.11 P7	July, 2025
Release	3.11 P8	February, 2026

Configuration Manual revision: **February, 2026**

2 Configuration

This section explains the configuration concept of the DCU. All configuration except PIN code and network configuration is stored in a portable configuration file within the DCU.

The Marine Watch LT-ONE is configuration wise similar to a DCU 210E. The Marine Watch LT-ACE is configuration wise similar to a RP 210E.

2.1 Configuration Files

A Configuration File is a normal computer file that contains all definitions needed for a DCU to carry out an intended task. For example, a Configuration File provides instructions used by the DCU to start and stop an engine, which sensor data to monitor and display and how and when events should be raised and shown in the Alarm List.

The DCU and LT-ONE can contain many configuration files. Only one of these configuration files is active at any given time.

Important definitions:

- **Load Configuration File** - Instructs the DCU to discard its Current Configuration and instead use a previously uploaded file as input. Note, the DCU makes a copy of the specified file and any concurrent configurations changes made to the DCU will not affect the original "Uploaded File"
- **Current Configuration** - This is the set of configuration parameters currently used by the DCU.
- **Upload Configuration File** - Copying a file to the DCU making it available for loading. Note, this action does not affect the Current Configuration.
- **Save Current Configuration File** - Provides a copy of the Current Configuration. It is named "current_config.cfg".
- **Delete Configuration File** - Remove one of the previously uploaded files from the DCU. Note, this does not affect the current configuration used by the DCU
- **Configuration Changes** - When reconfiguring the DCU the Current Configuration is updated. Note, this does not make any changes to Uploaded Configuration files; it only manipulates the current config.

2.2 Access methods for administrator

There are three possible methods to administrate the DCU.

1. DCU Web Interface Configuration Interface
2. DCU User Interface Menu
3. USB Memory Interface

2.2.1 DCU Web Interface Configuration Interface

The DCU has a built-in web interface. From this interface configuration file manipulations, such as Uploading Configuration Files, can be performed. From here configuration changes can be made to the Current Configuration.

! This is the primary configuration interface.

2.2.2 DCU User Interface Menu

For quick and easy changes to the current configuration, there is a configuration entry point in the menu. It is also possible to load a configuration file from here.

! This manual will not describe the panel menu configuration interface in detail. Only the web server menu operation is covered. Also note, not all configuration options available in the web interface are available here.

2.2.3 USB Memory Interface

Insert a USB memory stick and follow the guidelines appearing on the DCU screen.

! The DCU 408E/208E does not have a screen interface and hence this method does not work on those units.



2.2.3.1 Configuration Files

If the USB memory stick contains configuration files, they will be listed here.

! The configuration filename can only contain the following characters:

- A-z
- A-Z

- 0-9
- “_” (underscore)
- “-“ (hyphen)

The DCU 408E/208E does not have a screen interface and hence this method does not work on that unit.

If other characters are being used, then the DCU will not “see” it. Rename the configuration file to solve the issue.

Copy Configuration File

1. When the USB memory is inserted, the DCU asks for the administration PIN.
2. The DCU then lists the configuration file(s) available on the USB memory.
3. Select file(s), then select COPY to copy these files into the User Files area in the DCU. Note that this does not activate the file; it is merely a copy of the file into the DCU.

Use Configuration File

Insert USB memory stick, select a file, and then select USE to copy and activate this configuration file.

2.2.3.2 Software Files

The USB memory can be used to copy a new software to the DCU and also any connected RP.



If updating both the DCU and the RP software, then make sure to update the RP software first!

2.2.3.3 Copy Configuration File or Event Log

This function copies the current configuration file and/or the event log to the USB memory stick. The configuration file will be named/labelled *current_config.cfg*.

2.3 Connecting to the DCU

It is possible to connect to the DCU either directly or through a LAN (Local Area Network) Ethernet network.



For use in an existing Ethernet, check the configuration of the LAN with the LAN manager.

The components in Marine Pro, including the DCU, use fixed (not dynamic) IP addresses, which must be set manually.

2.3.1 To Connect to the DCU

- Connect an Ethernet cable between your laptop and the DCU port COM 6 (Ethernet port).



The web interface on the unit may be disabled for security reasons. To temporarily or permanently enable the web interface see the Cyber Security chapter.

Either use the DCU Discover Tool, downloadable from Auto-Maskin web page, or follow the following steps.

1. In the DCU menu, select Version Information. Note the IP address. From the factory, the IP address is 192.168.0.101.
2. In your web browser, type the IP address, eg. http://192.168.0.101 in the address field.
3. Press Enter, and note the login screen.
4. In the login screen, type
 - Username = dcu
 - PIN = 1234 (from factory)



If the PIN is unknown or forgotten, then find the Reset Code (given when an incorrect pin is entered) and the serial number of the unit and send this to service@auto-maskin.com to obtain a password reset code.

- Logged In: Proceed to the Web Interface Configuration chapter.
- Not Logged In: Continue with connection settings as described below.

2.3.2 Further Connection Settings

2.3.2.1 Change the IP address of the DCU

If necessary, the IP address of the DCU can easily be changed.



The last two digits in the IP address forms the engine number.
Example: IP address 192.168.0.**104** becomes **Engine #4**

The DCU has a fixed IP address that is set during the first power-on set up. The IP address may also be changed later, in the DCU panel menu:

DCU 410E: Menu / Settings / Administration (locked/open) / Miscellaneous / Network

DCU 210E: Menu / Settings / Administration (locked/open) / Network Configuration

The Administration folder is protected by a PIN. It will remain open for 60 minutes after a valid PIN has been provided.

Use the up / down arrows to select each of the four groups of numbers and press edit to edit each group.

2.3.2.2 IP Address Convention

The factory default IP of the DCU is 192.168.0.101. The first three groups must be the same for all components in the LAN, for instance 192.168.0.X, where X is the other unit in the LAN.



The X-figure must be unique within the LAN. Also, the two last digits in X will represent the engine number.

Example: A DCU with the IP address 192.168.0.**104** will be named **Engine #4**

2.3.2.3 Connect the DCU to a Single PC

First, make sure that the PC's Ethernet network configuration is set to automatically receive an IP address (as most PCs are). Then in the DCU panel menu:

Menu / Settings / Connect a PC...

Press the down arrow and then Toggle. The DHCP-server will now be active for 10 min. Repeat if it takes longer than 10 min to ready the PC.

Connect the PC to the DCU with a CAT-5 Ethernet cable. The DCU's DHCP-server will now automatically set up the PC to communicate with the DCU. It may be necessary to use a network reset/repair function for the PC's Ethernet connection in order for the PC to receive the new IP address.

Alternatively, set the IP address of the PC manually to a free IP address in the same subnet as the DCU.

For instance, if the DCU's IP address is 192.168.0.101, the PC may use any IP address starting with 192.168.0 except 192.168.0.101.

2.3.2.4 To Connect the DCU to a LAN with a DHCP server

For use in a LAN with a DHCP server (Dynamic Host Configuration Protocol), the IP addresses to be used by Marine Pro components must be set outside the IP address range used by the DHCP server. Most DHCP servers are configured with an IP address range that leaves room for fixed addresses outside it.

If for instance the LAN's subnet is 192.168.230 and the DHCP's IP address range is set to 50 – 210, valid IP addresses of the DCU would be for instance 192.168.230.211, 192.168.230.7 or 192.168.230.231.

Do not use the DCU built-in DHCP-server (the Menu / Connect a PC... menu entry) in a LAN with its own DHCP server, since two DHCP servers in the same LAN may create conflicting IP addresses.

2.3.2.5 Connection to a LAN using Fixed IP Addresses

Set the IP address of the DCU to a free/available IP address within the LAN's subnet.

2.3.2.6 Factory Defaults for the DCU

Factory defaults are valid at initial startup only.

- IP address: 192.168.0.101
- Subnet Mask: 255.255.255.0
- Default Gateway: 192.168.0.1

For later resets, the current IP configuration will be kept even through the manual Factory reset operation.

DHCP IP address range: 101 – 199 within the subnet defined by the DCU's IP address.

2.3.2.7 IP Address Conflict

Two or more DCU or RP units with the same IP address should not be connected in the same network. The result will be unstable communication between components in the network.

Change the IP addresses until all units have a unique address.

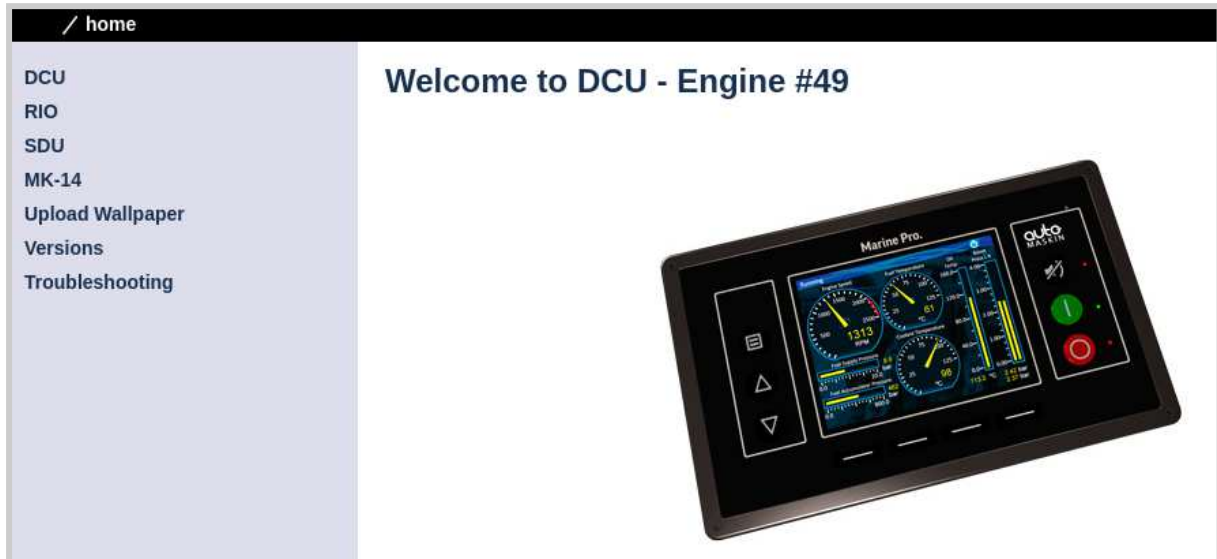
2.4 Web Interface Configuration

Once logged in, the DCU can be configured. The following are the Web Interface main menu items.



This chapter is not applicable for the RP products.

When logged in, the browser displays the following.



The Home screen lists the following menu items.

2.4.1 DCU

This is the top level menu for the entire DCU configuration.

All configuration performed, except PIN and network configuration, is stored in the portable configuration file within the DCU.

2.4.2 RIO

This is the top level menu for the optional expansion I/O modules, the RIO modules.

All configuration performed is stored in the portable configuration file within the DCU.

2.4.3 SDU

This is the menu top level for the SDU 404/410/420 safety shutdown unit configuration.

The SDU is mandatory in classed installation.

All configuration performed is stored in the portable configuration file within the DCU. If a SDU is attached the configuration is transferred to the SDU as well.

2.4.4 MK-14

The relays on the optional relay module MK-14 can be assigned a function here.

All configuration performed is stored in the portable configuration file within the DCU.

2.4.5 Upload Wallpaper

A user wallpaper can be uploaded, and can be used as background for instruments, popups and other dialogs.

2.4.6 Versions

This top level menu item lists the hardware and software version of the DCU, and the software version of the SDU.



If contacting Auto-Maskin for help or questions regarding your product, the data in the Versions page provide vital information that might help speed up the resolution to your inquiry.

2.4.7 Troubleshooting

The troubleshooting section makes it possible to troubleshoot I/O and communication on the DCU, and also the RIO units.

The following can be verified for the DCU:

- Supplies
- Switch inputs
- Loop Monitored Switch inputs
- 4-20 mA inputs
- PT100 inputs
- Voltage inputs
- Communication channels
- J1939 Nodes
- MK-14 outputs
- Outputs (functional 24V outputs and relays)
- Inputs (functional inputs)
- Run sources (engine running indications)
- RPM sources (which sources are in use) and their priority
- Logic Signals
- Diagnostics

If Marine Broadcast is enabled, the connection state of this service can also be inspected.



RIOs are only available for troubleshooting when they are connected to the DCU.

The following can be verified for the RIO:

- Versions
- Supplies
- Switch inputs
- Loop Monitored Switch inputs
- 4-20 mA inputs
- PT100 inputs
- TC
- 0-5V
- Outputs

In the troubleshooting section it is also possible to capture a J1939 log file of all data on the J1939 data links. This mechanism requires a USB flash drive to be inserted in the DCU. To

activate select the J1939 Capture icon, toggle which of the two available interfaces to use in the dialog, and select Start.

3 Main DCU Web Interface Menu



3.1 Access Control

The DCU configuration is protected with a PIN code.

Select this option to change the PIN code. First, type in the old PIN, and then the new PIN twice.

If the PIN is unknown or forgotten, then find the encrypted code and send this to service@auto-maskin.com to obtain the correct PIN.

3.1.1 Access Control Levels

If enabled, the DCU supports three levels of access control.

- Factory (highest priority)
- Dealer
- User

Each access control level can lock any configuration, making it impossible to change for lower priority access.



When access control is enabled, make sure to close your browser after use (when logging out) to prohibit any unauthorized access.

3.2 File

This section provides functions for management of configuration files and other file operations, such as updating of software and uploading of custom wallpapers.

3.2.1 Load Configuration File

To change the configuration of the DCU, load a new configuration file.



Note that configuration files saved from a component with the same or lower firmware version is supported. Loading a configuration that originates from another type of DCU or a DCU with higher firmware is not supported.



When a configuration file is selected, the panel will restart with the new configuration file.

3.2.1.1 Factory Default

From here, a predefined factory configuration file can be opened.



It is not possible to add or remove files from this section.

3.2.1.2 User Uploaded

This lists the files previously uploaded to this DCU. Pick a file to select a new configuration for the DCU.

Note! To get access to the configuration file, it needs to be uploaded to DCU first. See “Upload to DCU” for more information.

3.2.2 Delete Configuration File

Delete any number of configuration files on the DCU. It is only the user uploaded configuration files that can be deleted. The configuration files supplied from the factory will always be available and can not be deleted.

3.2.3 Configuration Printout

This gives a quick overview of the current configuration.

3.2.4 Save Current Configuration File

This saves the current configuration of the DCU into a file. The default file extension is .cfg.



Use this function to make a backup of the current configuration and in case you want to carry a configuration over to another DCU. Remember to rename the file to something appropriate.

3.2.5 Upload to DCU

Uploaded files are files transferred to the DCU.

The built-in software can be updated whenever there is a new software version available.

New configuration files can be added to the DCU panel.

3.2.5.1 Firmware



Firmware and Software are to be considered synonyms in the context of this manual. In future versions of software Auto-Maskin will no longer use the term Firmware and instead use the term Software.

Select the new DCU panel software to upload. The file name shall be **dcu410e_<release>.tar.gz** or **dcu210e_<release>.tar.gz**.

The latest software release can be obtained from the Auto-Maskin web site.



Before updating the DCU it is recommended to take a backup of the current configuration file, see “Save Current Configuration File” chapter.

When updating a DCU to a new software version it is recommended to also update any connected RPs to the latest available software as well.

If updating an RP it is similarly recommended to update related DCUs.

3.2.5.2 Wallpaper

Select a picture file for the DCU. The file must be of type .png. Only one user wallpaper may be uploaded. Uploading a new file will remove the old one.

3.2.5.3 Configuration File Upload

Select a user configuration file for the DCU. The file must be of type **<file_name>.cfg**.

When uploaded, the file is stored in the DCU, and is later available for use from the User Uploaded files section.

3.3 Engine Integration

Under this section the DCU is configured to perform specific tasks relating to “by-wire” integration over SAE J1939.

3.3.1 Common

This section contains engine integration settings that are common to both J1939 interfaces.

3.3.1.1 Energy Type

This option controls basic control behaviours of the DCU. Currently there are two choices available.

Energy Type	Description
Combustion	This is the default and classic setting. Use this setting for any combustion type engine.
Electric with Gear	This option should be used for pure electric propulsion applications with a gear box. Among other things this pre-configures and activates J1939 TSC1 and HSC1 broadcasts by the DCU.



If attempting to integrate to a Hybrid or EV driveline, contact Auto-Maskin for assistance.

3.3.2 J1939:1 and J1939:2

Configuration of the two J1939 interfaces are mostly the same, however there are a number of settings that are not available on J1939:2. For example SPN 695 - Engine Override Control Mode is only available on J1939:1.

J1939:1

Function Specific Integration

Engine Control

Distribute Start/Stop [SPN 3542]: ▼

Transmit Nominal Speed to Engines Desired Operating Speed [SPN 515]: ▼

TSC1 Control

TSC1 Destination [hex]:

Distribute Engine Control Mode [SPN 695]: ▼

Load Reduction / Load Reduction Override

Transmit Load Reduction [SPN 3644]: ▼

Load Reduction [%]:

Transmit Load Reduction Switch [SPN 971]: ▼

Transmit Load Reduction Override [SPN 9174]: ▼

Shutdown / Shutdown Override

Transmit Shutdown [SPN 1110]: ▼

Transmit Shutdown Override [SPN 1237]: ▼

OEM Specific Integration

ECM Configuration

ECM Type: ▼



home / dcu / engine integration / J1939:1

3.3.2.1 Function Specific Configuration

Engine Control

Distribute Start/Stop over SPN 3542 selects if the DCU should perform start/stop over J1939.

Transmit Nominal Speed to Engines Desired Operating Speed selects if the DCU should transmit nominal speed (as configured for Engine Speed in the I/O configuration section) over J1939.

TSC1 Control

TSC1 Destination [hex] When the DCU is sending the TSC1 PGN it will use this value as input for which node (J1939 Source Address) it should send the PGN to. If configured as 0xff it means the DCU will not target any specific node, but instead broadcast it for any interested node to receive.

Distribute Engine Control Mode selects if the DCU should transmit **Speed/Torque Limit Control**, **Speed Control** or be disabled.

Speed/Torque Limit Control

If selected, the Torque Limit can be configured as well.

Speed Control

This enables the DCU to request a RPM from the engine using SPN 898. Choosing this option allows for Speed Mode Application Type to be configured either as **Fixed** or **Variable**.

When Speed Mode Application Type is set to **Fixed**, the DCU will always request the configured Nominal Speed, making this option only practical for Generator type applications.

Distribute Engine Control Mode [SPN 695]:	Speed Control	▼
Speed Mode Application Type:	Fixed	▼
Fine Speed Adjust Source [SPN 898]:	RPM Adjust - 4-20mA #1	▼ Edit Signal

Fine speed adjust using signal [SPN 898]

An analog input of type “RPM” (typically with a symmetric sensor range, i.e. -25 to + 25 RPM) can be configured to offset the requested engine speed around the configured Nominal Speed. This is only available if Speed Control and **Fixed** Speed Mode Application type is used.

If Speed Mode Application Type is set to **Variable** the requested engine speed is fully controlled by any enabled input signal measuring RPM. The field Variable Speed Mode Source [SPN 898] is used to assign which input signal should serve as the source for the requested RPM values.

Distribute Engine Control Mode [SPN 695]:	Speed Control	▼
Speed Mode Application Type:	Variable	▼
Variable Speed Mode Source [SPN 898]:	RPM Source - 4-20mA #2	▼ Edit Signal



Distribute Engine Control Mode is only selectable for J1939:1.

Load Reduction / Load Reduction Override

Transmit Load Reduction selects whether the DCU should transmit the configurable Load Reduction value over J1939 in a load reduction situation.

Transmit Load Reduction Override Switch selects if the DCU should transmit load reduction override over J1939 in a load reduction override situation.

Transmit Load Reduction Override selects if the DCU should transmit load reduction override over J1939 in a load reduction override situation.

Shutdown Override

Transmit Shutdown selects if the DCU should transmit shutdown indication over J1939 when performing a shutdown or when in a blocked state.

Transmit Shutdown Override selects if the DCU should transmit shutdown override over J1939 in a shutdown override situation.

3.3.2.2 OEM Specific Configuration



This section is only available on the J1939:1 interface.

J1939:1 OEM Specific Configuration

ECM Configuration

ECM Type:

Disabled

Submit



home / dcu / engine integration / j1939:1

ECM Configuration

ECM Type selects the ECM type which the DCU is compatible with. Depending on choice additional choices are made available. Currently there are four ECM types to choose from:

- Volvo EMS2.3 Compliant** Allows start and stop commands and throttle values to be sent to the engine using the proprietary PGN VP70.
- MAN D2676/D2862** Enabled various for setting up a genset system including a DCU generated rev up rpm to Nominal speed after the engine has started. There are also options to perform fine speed adjustments using analog inputs as source.
 Note: If using this option, make sure to enabled “Speed Control” under the Function Specific Configuration section.
- Scania S6/S8 Compliant** Allows start and stop commands and throttle values to be sent to the engine using the proprietary PGN DLN1. Currently, only propulsion applications are supported.
 If the DCU is configured to request Speed Control and with a Variable Speed Mode Application type, it is possible to enable a special mode called Enable Dual Control Method. This choice adds an operator option in the Controls menu form that allows the operator to choose whether to control the engine using DLN1 Throttle or TSC1 Engine Speed.
- Scania e-Machine** With this selection the DCU assumes the application is a BEV Scania e-machine installation with a gear box. The DCU automatically broadcasts HSC1 commands (for example SPN 7888 - Operator Vehicle Mode Request) to the e-machine and will also send RPM requests to it. Make sure SPN 695 is configured as Speed Control and that a suitable throttle input has been provided.

3.4 I/O Configuration

Described in a separate chapter.

3.5 User Interface

Described in a separate chapter.

3.6 Start/Stop/Prelube

Described in a separate chapter.

3.7 Engine Model

Engine Model


Engine Name:

Engine Manufacturer:

 home / dcu / engine model

The default name is “Engine”.

Name the engine better, for example “Auxiliary” or “Doris”.

 The last two digits in the DCU IP address becomes the engine number. If the IP address is 192.168.0.110, then the engine in this example is named “Auxiliary #10”.

3.8 Service Interval

Inspect and configure regular service intervals.

[/ home / dcu / service interval](#)

View Service Status Configure	<h2 style="margin: 0; color: #333;">Service Interval</h2>
--	---

 home / dcu / service interval

3.8.1 View Service Status

This will list the number of hours until the next service is due.

3.8.2 Configure

Up to four different timers can be configured to indicate it is time for engine service.

The default text “Service 1” can be changed by selecting the “assign custom name” link.

Configure

Service 1 - assign custom name

Service Enabled: No ▼

Next Service At [hours]:

Then Every [hours]:

Pre-Warning Enabled: Yes ▼

Service 2 - assign custom name

Service Enabled: No ▼

Next Service At [hours]:

Then Every [hours]:

Pre-Warning Enabled: Yes ▼

Service 3 - assign custom name

Service Enabled: No ▼

Next Service At [hours]:

Then Every [hours]:

Pre-Warning Enabled: Yes ▼

Service 4 - assign custom name

Service Enabled: No ▼

Next Service At [hours]:

Then Every [hours]:

Pre-Warning Enabled: Yes ▼



home / dcu / service interval / configure

Service Enabled selects whether the service interval timer is active or not.

Next Service At selects the hour counter value in the DCU for the first service. Note that this happens only one time. This is useful if the first service should have a shorter interval than the regular service interval.

Then Every selects the service interval in hours. The DCU will indicate every time this number of hours has elapsed.

Example

Current DCU hour counter is 123 hours.

- Next Service At: 150 hours
- Then every: 250 hours

The first service notification will appear in 27 hours, then every 250 hours. All hours are engine running hours.

Pre-Warning Enabled enables an information popup whenever the service is within 10 % of the service interval.

3.9 Communication

Described in a separate chapter.

3.10 Miscellaneous

Described in a separate chapter.

3.11 Language

This is described in the User Interface chapter.

4 I/O Configuration

The I/O section holds menu items for input and output channels. Input channels are sensors going in to the DCU (eg. Switch Input, 4-20 mA Input) and output channels are sensors being controlled by the DCU (eg. 24 V Output, J1939 Output).

Certain input channels are not directly connected to a physical sensor connected to the DCU, but are instead configured to use other input channels as input. Differential and Logic Signals are examples of this type of input channel.



Always remember to press the **Submit** button after each change on the configuration pages.

No changes are saved until this button is pressed.

4.1 Common I/O Configuration

Much of the configuration is common for all channels. This section describes the common configuration.

Naming

Each channel can be configured with a custom name for all supported languages. The naming of the channel in the panel is determined using the following prioritization.

1. Use channel custom name in the language selected by the operator, if any.
2. Use channel custom name in English, if any.
3. Use channel default name in selected language.

Channel Use

Each channel can be individually configured for display on DCU, RP or both. In addition, each channel can be individually configured for event.

Channel Use: DCU+RP ▼

The channel use configuration defines how the channel is configured according to the following table.

Channel Use	DCU		RP	
	Display	Event	Display	Event
Not in use				

Event		X		X
DCU	X			
DCU + Event	X	X		X
RP			X	
RP + Event		X	X	X
DCU + RP	X		X	
DCU + RP + Event	X	X	X	X
Silent Event				
DCU + Silent Event	X			
RP + Silent Event			X	
DCU + RP + Silent Event	X		X	
Sea Trial Only ¹				

Select **Not in use** if the channel shall be disabled.

Select **Event** if the channel shall make any form of event. An event can be a warning, an alarm, a load reduction or an engine shutdown.

Select **Silent Event** for an active channel, but no panel alarms. This makes it possible to use the diagnostic state to drive outputs or as input to a logic signal without being reported on the alarm list.

Select **DCU** and/or **RP** if the channel is to be displayed on a page.

The **Sea Trial Only** option is used to tag a channel for use in Sea Trial Mode only. This is only applicable for a DCU that will provide data logging during a sea trial. Choosing this option makes the channel active for viewing and data logging only when Sea Trial Mode is active on the DCU.



Normally, and in most cases, the selection should be “DCU + RP + Event”, as **highlighted** in the table above. This makes sure the channel is displayed in the DCU and in the RP, if – or when – the RP is installed.

¹ Can be displayed when Sea Trial mode is active.

4.1.1 Common Configuration for Switch Channels

Switch Input #3

Copy

Copy configuration from: None Copy

Configure

assign custom name

Function **Note! Enabling a function will automatically disable the channel use.**

Use as: None

General

Channel Use: Not in use

Submit

Any switch input channel can be configured to either be used as a configurable input function, or as an ordinary channel.



If a function is configured, the DCU will automatically disable the ordinary channel use.

Function

Whenever a function is configured, that function will be assigned to the switch channel. The following functions are available for the switch channels. The **highlighted** functions are the most typically being used.

The function is activated when the input is connected to 24V. The function is deactivated when the input is left open, or connected to 0V.

Function Name	Description
None	The channel is being used as an (ordinary) engine sensor switch input.
Local Mode	Sets the panel to local mode, meaning all external commands are blocked.
Remote Mode	Sets the panel to remote mode, meaning all local commands are blocked.
Backlight 100%	Force backlight to 100%
Prelube Override	The configured prelube sequence is aborted.
Prelube Complete	Signal shall come from the prelube system, notifying the panel that the prelube sequence is completed. The panel will leave the prelube phase and commence start.
Start Disabled	Start is disabled.
Automatic Mode	210E only. The panel accepts automatic start/stop signals.

Automatic Start	210E only. Panel will commence the start sequence. Requires Automatic mode.
Automatic Stop	210E only. Panel will commence the stop sequence. Requires Automatic mode.
Automatic Start/Stop	Panel will commence start when active, and commence stop when inactive. Requires Automatic mode.
Remote Start	210E only. Same as the local start button. Disabled if panel in local mode.
Remote Stop	210E only. Same as the local stop button. Disabled if panel in local mode.
Local Start	Local Start button
Local Stop	Local Stop button
Local Acknowledge	Used to acknowledge all events in the alarm list.
Local/Remote Acknowledge	Used to acknowledge all events in the alarm list
Remote Acknowledge	Used to acknowledge all events in the alarm list
Silence Buzzer	Silences the buzzer. Edge triggered.
Load Reduction Override	Puts the DCU in load reduction override mode.
Shutdown Override	210E only. Makes all the configured shutdown channels into alarm channels, so engine will not shut down automatically. Engine overspeed shutdown is however always enabled.
In Gear	210E only. From gearbox on prop. Engines. Disables start attempts.
In Neutral	Neutral gear indication. Overrides any other In Gear signal if configured.
In Gear (Ahead)	From gearbox on prop. Engines to indicate Ahead gear.
In Gear (Astern)	From gearbox on prop. Engines to indicate Astern gear.
Toggle Crank Mode	Toggle between crank modes.
Power On	Toggle Sleep mode.

Use As configures the function used. Select **None** if the channel is to be used as an ordinary switch input channel.

Input State makes it possible to invert the behavior of the function.

Alarming

The Alarming section configures how the switch channel will generate events.

Alarming	
Event:	Warning ▼
Input State:	Normally Closed, Event on Open ▼
Delay Before Event [sec]:	0
Requires Running Engine:	No ▼
Requires In Gear:	No ▼
Requires Engine Load:	No ▼
Disable While Trolling:	No ▼
Use As Additional Run:	No ▼

Note! Run = Normal State

Event can either be **Warning**, **Alarm**, **Load Reduction** or **Shutdown**. If any type of event (Event or Silent Event) was selected under Channel Use, then select the event severity here. If **None** is selected, then the channel is active but no events are created.

Input State can be configured to **Normally Closed, Event on Open**, or **Normally Open, Event on Closed**. Normally Open means the contact must close to make the event, whereas Normally Closed means the contact must open to make the event.

Delay Before Event is the desired persistence time before the channel activates the event.

Typical values:

Engine Oil Pressure Low: 2 seconds.

Engine Coolant Temp. High: 5-10 seconds.

Requires Running Engine is configured if the event requires a running engine. Several RPM setpoints are available.

Requires In Gear is configured if the event requires the engine to be in gear.

Requires Engine Load is configured if event shall only be monitored at a certain engine load.

Whenever Requires Engine Load is used, Engine Load Threshold is shown. Engine Load Threshold configures the required load in order for event to be monitored.

Whenever a Requires condition is used, the Initial Delay is shown. Initial Delay defines the time before event monitoring starts, once all Requires conditions are fulfilled.

Disable While Trolling is used to disable event monitoring when trolling.

Use As Additional Run is used to let this channel act as a run indication. If the DCU has only one pickup source, it is recommended to add an engine oil pressure switch as an engine running indication.



Do not use any other pressure sensors – or any other signals – as the engine running indication!

Normal denotes a running engine with no alarm.

If two or more engine speed (pickup) sources² are in use, then it is recommended leaving this off for all switches. Set to No.

With one engine speed source only, locate the engine oil pressure switch and use this as the Additional Run signal. Set to Yes.

² An engine speed source can be the magnetic pickup connected to the DCU, the J1939 CAN bus signal connected to the DCU, or the speed signal coming from the connected SDU 404/410/420 safety shutdown unit.

4.1.2 Common Configuration for Analog Channels

Active Sensor Range

The active sensor range section is only available for 4-20 mA inputs and voltage sensor inputs.

Active Sensor Range	
Sensor Range Min [milliAmpere]:	4.00
Sensor Range Max [milliAmpere]:	20.00

Sensor Range Min and Sensor Range Max select the high and low limits for the sensor, meaning values outside the value sensor range will be determined as out of range.

Sensor

The sensor section configures the sensor capabilities.

Sensor		
Sensor Unit:	Percent	Note! Submit to apply new unit. Corresponds to active sensor range min. Corresponds to active sensor range max.
Sensor Range Min:	4.00	
Sensor Range Max:	20.00	

Sensor Unit selects the sensor unit for the sensor, as printed on the sensor. An oil pressure sensor might for instance be in Bar or psi. If the channel has a predefined sensor unit such as thermistor or J1939 inputs, the sensor unit can not be changed.

Sensor Range Min and Sensor Range Max select the sensor range values for minimum and maximum values, as printed on the sensor.



Channels with a predefined sensor range can not be modified, for example J1939 SPNs.

The sensor range min and max correspond to the active sensor range min and max, if any.

Display

Configures how the channel is presented in gauges or bar graphs in the panels.

Display	US	Metric
Display Unit:	RPM	RPM
Display Range Min:	0.00	0.00
Display Range Max:	2000.00	2000.00
Display Major Divider:	500.00	500.00
Display Minor Divider:	250.00	250.00
Display Multiplier:	1	1
	Update Metric	Update US
Mirrored View:	No	

The channel can be configured to different views depending on what unit is selected. This is seen in the US and Metric column.

Display Unit selects the desired displayed unit for US and Metric values. The display unit must be convertible from the Sensor Unit.

Display Range Min and Display Range Max select the desired minimum and maximum values displayed in the instrument, for US and Metric values.



The number of decimals shown is dependent on the configured display range.

- Range 0 to 9: Display 2 decimals (8.43)
- Range 10 to 99: Display 1 decimal (8.4)
- Range larger than 99: Display no decimals (8)

Display Major Divider selects the desired major divisions in the instrument, for US and Metric values. The major divider number is displayed at each major divider.

Display Minor Divider selects the desired minor divisions in the instrument, for US and Metric values.



It is recommended to assign the major divider to a value which can be divided with the total display range.

It is recommended to assign the minor divider to a value which can be divided with the major divider.

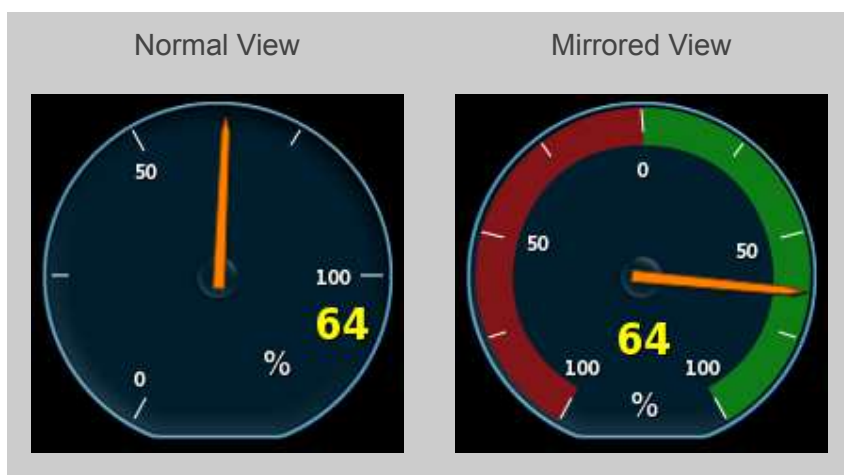
Display Multiplier selects the multiplication factor as necessary. An instrument with displayed range 0-10,000 would display as 0-1,000 with a multiplication factor of 10. The multiplication factor is displayed in the instrument (round gauges only).

Update Metric and Update US can be used to copy and convert display configuration to Metric or US units.



When using Update Metric or Update US, the application does not round off values. It is highly recommended to adjust the calculated values by hand, and set sensible round figure values.

Mirrored View configures the gauges to have the minimum display range set to the maximum together with a colored indication. This is typically used for rudder angle display.



Alarming

Settings for how the events are configured for the channel. This section is always completed in the currently selected system unit. To switch units, simply change units using the DCU panel.

Alarming (in Metric Units)	
Event:	Warning & Alarm ▼
Warning Threshold [Percent]:	0.00
Alarm Threshold [Percent]:	0.00
Delay After Crossing Warning Threshold [sec]:	0
Delay After Crossing Alarm Threshold [sec]:	0
Threshold Type:	Low ▼
Requires Running Engine:	No ▼
Requires In Gear:	No ▼
Requires Engine Load:	No ▼
Disable While Trolling:	No ▼
Use As Additional Run:	No ▼ Note! Run = No Alarm

Event selects the desired combination of warning, alarm and shutdown. Select “RPM dependent” for a setpoint that varies with RPM, and complete the boxes.

The event threshold (Warning Threshold, Alarm Threshold etc) settings contain the event threshold value, in the correct units.

Delay After Crossing Alarm Threshold sets the persistence time before the event. Value is in seconds.

Threshold Type sets the event to appear on a rising (higher) or falling (lower) signal. A temperature fail is normally “too high”, and a pressure fail is normally “too low”. In addition, a high and low threshold setpoint can be configured.

Requires Running Engine is configured if the event requires a running engine. Several RPM setpoints are available.

Requires In Gear is configured if the event requires the engine to be in gear.

Requires Engine Load is configured if the event shall only be monitored at a certain engine load.

Whenever Requires Engine Load is used, Engine Load Threshold is shown. Engine Load Threshold configures the required load in order for event to be monitored.

Whenever a Requires condition is used, the Initial Delay is shown. Initial Delay defines the time before event monitoring starts, once all Requires conditions are fulfilled.

Disable While Trolling is used to disable event monitoring when trolling.

Use As Additional Run is used to let this channel act as a run indication. If the DCU has only one pickup source, it is recommended to add an engine oil pressure sensor channel as an engine running indication.



Do not use any other pressure sensors – or any other signals – as the engine running indication!

4.2 Flexible I/O

This is where the Flexible I/O channels are configured.



This is only applicable for DCU 210E/208E.

Each channel can be used for a variety of input and output functions, such as:

- 24VDC Supply
- 0VDC
- Switch Input
- Configurable Output
- 4-20mA sensor
- Voltage sensor
- 5V (#6)
- J1939#2 (#20 and #21)



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 changes.

After a flexible I/O channel has been defined it will appear in the respective menu as enabled.

Eg. Terminal C1.1 has been defined as a “4-20mA” channel in the Flexible I/O section. It will now be available in DCU Config Inputs 4-20mA.

4.3 Config Inputs

This is where the I/O input channels are configured, such as 4-20 mA, PT100 and switch inputs.

4.3.1 Engine Speed

This is where engine speed sensors are configured, and the overspeed setpoint is set. The majority of the configuration is synchronized with SDU.



This section is central to any installation. It provides the DCU with data required to form an exact and reliable reading of the engine speed.

Engine Speed

assign custom name

Source

RPM Primary Source:	Engine Speed (DCU) ▼	Edit Signal
RPM Secondary Source:	None ▼	
RPM Third Source:	None ▼	
RPM Fourth Source:	None ▼	
RPM Fifth Source:	None ▼	

Local Pickup

DCU Pickup Pulses Per Revolution: 150

General Configuration

RPM Rounding [RPM]:	10 ▼	
Run Setpoint / RPM Setpoint 1 [RPM]:	400	Valid range: 80 - 800 RPM
RPM Setpoint 2 [RPM]:	0	
RPM Setpoint 3 [RPM]:	0	
RPM Setpoint 4 [RPM]:	0	
RPM Setpoint 5 [RPM]:	0	
RPM Ready To Take Load [RPM]:	1410	
RPM Nominal Speed [RPM]:	1500	Valid range: 200 - 3000 RPM

General

Channel Use: DCU+RP ▼

Display

Display Range Min [RPM]:	0.00
Display Range Max [RPM]:	2000.00
Display Major Divider [RPM]:	500.00
Display Minor Divider [RPM]:	100.00
Display Multiplier:	1 ▼

Overspeed

RPM Overspeed [RPM]:	1725
RPM Overspeed Delay [milliseconds]:	100 ▼
RPM Overspeed Shutdown Enabled:	Yes ▼

Submit



home / dcu / i/o configuration / engine speed

Source

The Engine Speed is constructed by reading data from up to five sources simultaneously. These sources are prioritized by the DCU. As long as the RPM Primary Source is functional, it is used to form the actual Engine Speed.

Should the RPM Primary Source fail, the DCU uses the RPM Secondary Source if available. Likewise, the RPM Third Source is used only when both Primary and Secondary fails.

Each of the RPM Sources can be configured to receive data from a number of possible sensors.

Source	DCU 410E/408E	DCU 210E/208E
J1939 #1	J1939 CAN bus connected to terminals 49-51 (COM 4)	J1939 CANbus connected to terminals C1.7-8.
J1939 #2	J1939 CAN bus connected to terminals 47-48 (COM5)	J1939 CANbus #2 connected to Flexible I/O #20-#21.
DCU	Magnetic pickup locally connected to DCU, terminal 44 and 45	Magnetic pickup locally connected to DCU, terminals C4.1 and Flexible I/O#18.
SDU 404	Magnetic pickup locally connected to SDU 404.	
SDU 410	One of the two pickups connected to the SDU 410 Safety Shutdown Unit. The SDU 410 has a scheme for selecting from its two connected pickups.	
SDU 420	Magnetic pickup locally connected to SDU 420.	

Local Pickup

DCU Pickup Pulses Per Revolution

If there is a pickup connected to the DCU, or “DCU” is selected among the sources above, then set the flywheel teeth count here.

General Configuration

RPM Rounding rounds off the displayed value to nearest 1, 5 or 10 RPM.

Run Setpoint is the RPM at which the DCU indicates the engine is running.

There are also four additional RPM Setpoints that can be used as input to event handling.

RPM Ready to take Load is a signal that can be configured to an output relay. It activates when that RPM is reached. It deactivates when a stop command is given, OR the speed drops below the threshold minus 15%.

RPM Nominal Speed is the engine's nominal speed, and is used to calculate the overspeed setpoint and RPM overspeed test setpoints.

General

Configures how the channel is used.

Display

Configure how the channel is displayed on the panels.

Overspeed

RPM Overspeed is the setpoint where the DCU indicates overspeed.

RPM Overspeed Delay is the delay – in milliseconds – before shutdown. Typical setpoint is 100ms.

RPM Overspeed Shutdown Enabled is where the overspeed behaviour is selected.

Select Yes for the DCU to shutdown the engine. Select No to disable overspeed shutdown.



Disabling DCU overspeed is valid for the DCU only. The SDU is able to shutdown the engine.

4.3.2 Individual Speed Sensors

Note that any speed signal can be configured here, and that this is treated separately from the Engine Speed channel configured above.

By configuring these sensors it is possible to view the current RPM from an individual speed sensor as opposed to the standard Engine Speed sensor that acts on many inputs at once.

This is where the display and alarm settings of the three different types of speed sensors available, can be configured.

- Engine Speed - DCU
- Engine Speed - J1939
- Engine Speed - J1939:2 (If enabled)
- Engine Speed - SDU 404
- Engine Speed - SDU 410
- Engine Speed - SDU 420

All Individual Speed sensors are configured the same way.

Engine Speed (DCU)

Copy

Copy configuration from: None ▼ Copy

Configure

assign custom name

General

Channel Use: DCU+RP ▼

Sensor

Sensor Unit: RPM ▼

Sensor Range Min: 0.00

Sensor Range Max: 10000.00

Display

Display Unit: US

Display Unit: RPM ▼

Display Range Min: 0.00

Display Range Max: 2000.00

Display Major Divider: 500.00

Display Minor Divider: 250.00

Display Multiplier: 1 ▼

Mirrored View: No ▼

Alarming (in Metric Units)

Event: None ▼

Note! Submit to apply new unit.

Metric

RPM ▼

0.00

2000.00

500.00

250.00

1 ▼

Update US

Submit



home / dcu / i/o configuration / individual speed sensor

The individual speed sensors are configured as any standard analog channel.

4.3.3 Engine Load

The engine load is used within the DCU as an additional setting when configuring alarms.

Engine Load

Source

Engine Load Source: None ▼

 home / dcu / i/o configuration / engine load

In order to configure engine load, the DCU is required to have at least one analog channel (4-20 mA, 0-5 V input or J1939) with a Sensor Unit of Percent. For electronic engines this can typically be J1939 PGN 0XF003, SPN 92.

The engine load selected is now used as engine load when configuring alarms.

4.3.4 Transmission

The transmission section is used to configure transmission related channels. They are used for Gear Control and visualization. For information on how to enable Gear Control, see the User Interface chapter.

[/ home](#) / [dcu](#) / [i/o configuration](#) / [transmission](#)

Transmission

- Gear**
- Interlocks/Indications**
- Clutch Slip**
- Clutch Temperature**
- Clutch Pressure**
- Thrustbearing Temperature**
- Shaft Speed**

Transmission

Name	Status	Source
Gear	Not In Use	In Gear Switch
Clutch Slip	Not In Use	None
Clutch Temperature	Not In Use	None
Clutch Pressure	Not In Use	None
Thrustbearing Temperature	Not In Use	None
Shaft Speed	Not In Use	None
Troll Mode	Not In Use	None
Clutch Interlock	Not In Use	None
Shaft Lock	Not In Use	None
RPM Interlock	Not In Use	None
Shaft Brake	Not In Use	None

 home / dcu / i/o configuration / transmission

4.3.4.1 Gear

Gear is used as a start interlock, and can also be configured as an additional setting for alarms. Gear can also be configured to be shown in the header, as well as in pages.

Gear

Source
Gear Source: In Gear Switch ▼

General
Channel Use: Not in use ▼

Troll Mode

Source
Troll Mode Source: None ▼

Submit



home / dcu / i/o configuration / transmission / gear

Gear Source

Gear Source configures the source for the gear information in the DCU. It can be any of the following.

- In Gear Switch (T95 on DCU 410E or configurable input on DCU 210E and DCU 410E)
- Ahead / Astern / Neutral Switches
- Ahead / Astern / Neutral / In gear Switches
- J1939 Transmission Current Gear (SPN 523)
- J1939:2 Transmission Current Gear (SPN 523)

In Gear/Neutral Switches

No input active gives Neutral gear state.

Active input gives In Gear state.

Ahead / Astern / Neutral Switches

No input active gives Neutral gear state.

Neutral takes precedence over ahead and astern.

Ahead takes precedence over astern.

Ahead / Astern / Neutral / In Gear Switches

No input active gives Unknown gear state.

Ahead takes precedence over Astern, Neutral and In Gear.

Astern takes precedence over Neutral and In Gear.

In Gear takes precedence over Neutral.

Gear General

Configures how the channel is used.

Troll Mode Source

Configures the source for troll mode.



The troll mode source must be an enabled switch input.

Troll mode is indicated as an overlay on gear in Gear Control form and in the header, if configured.



4.3.4.2 Interlock/Indications

Interlocks

Shaft Lock

Source
Shaft Lock Source:

RPM Interlock

Source
RPM Interlock Source:

Clutch Interlock

Source
Clutch Interlock Source:

Indications

Shaft Brake

Source
Shaft Brake Source:



home / dcu / i/o configuration / transmission / interlocks

All of the interlocks and indications are used in conjunction with Gear Control. Configure the source for each interlock / indication.



The sources must be an enabled switch input.

4.3.4.3 Clutch Slip

Clutch Slip, if enabled, can be configured to all analog widgets in pages. In addition, Clutch Slip is shown in the Gear Control page.

Clutch Slip

Configure

assign custom name

Source
Clutch Slip Source:

General
Channel Use:

Sensor
Sensor Unit: **Note! Submit to apply new unit.**
Sensor Range Min: 0.00
Sensor Range Max: 100.00

Display	Metric
Display Unit: <input type="text" value="Percent"/>	<input type="text" value="Percent"/>
Display Range Min: <input type="text" value="0.00"/>	<input type="text" value="0.00"/>
Display Range Max: <input type="text" value="100.00"/>	<input type="text" value="100.00"/>
Display Major Divider: <input type="text" value="0.00"/>	<input type="text" value="0.00"/>
Display Minor Divider: <input type="text" value="0.00"/>	<input type="text" value="0.00"/>
Display Multiplier: <input type="text" value="1"/>	<input type="text" value="1"/>
<input type="button" value="Update Metric"/>	<input type="button" value="Update US"/>

Mirrored View:

Alarming (in Metric Units)
Event:



home / dcu / i/o configuration / transmission / clutch slip

Source

Clutch Slip Source configures the source for the clutch slip signal. It can be configured to the following.

- J1939: Percent Clutch Slip
Uses the pre-calculated sensor from J1939.
- DCU: Engine Speed
The DCU calculates clutch slip internally according to the following formula.
$$\text{Clutch Slip} = (\text{Engine Speed} - \text{Shaft Speed}) / \text{Engine Speed}$$



DCU only calculates Clutch Slip while Trolling.

The rest of the Clutch Slip configuration follows common analog channel configuration.

4.3.4.4 Clutch Temperature

Clutch Temperature

Configure

assign custom name

Source
Clutch Temperature Source:

General
Channel Use:

Sensor
Sensor Unit: **Note! Submit to apply new unit.**
Sensor Range Min: 0.00
Sensor Range Max: 0.00

Display	US	Metric
Display Unit: <input type="text" value="Fahrenheit"/>	<input type="text" value="Celsius"/>	<input type="text" value="Celsius"/>
Display Range Min: <input type="text" value="0.00"/>	<input type="text" value="0.00"/>	<input type="text" value="0.00"/>
Display Range Max: <input type="text" value="0.00"/>	<input type="text" value="0.00"/>	<input type="text" value="0.00"/>
Display Major Divider: <input type="text" value="0.00"/>	<input type="text" value="0.00"/>	<input type="text" value="0.00"/>
Display Minor Divider: <input type="text" value="0.00"/>	<input type="text" value="0.00"/>	<input type="text" value="0.00"/>
Display Multiplier: <input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>
	<input type="button" value="Update Metric"/>	<input type="button" value="Update US"/>

Mirrored View:

Alarming (in Metric Units)
Event:



home / dcu / i/o configuration / transmission / clutch temperature

Source

Clutch Temperature Source configures the source channel for the Clutch Temperature.

The rest of the configuration follows common analog channel configuration.

4.3.4.5 Clutch Pressure

Similar to Clutch Temperature configuration.

4.3.4.6 Thrustbearing Temperature

Similar to Clutch Temperature configuration.

4.3.4.7 Shaft Speed

The Shaft Speed channel can be configured to any enabled RPM channel in the system.

Shaft Speed

Configure

assign custom name

Source

Shaft Speed Source: ▼

Use "Gear": ▼ Indicates forward/reverse.

Gearbox Ratio:

General

Channel Use: ▼

Sensor

Sensor Unit: ▼ Note! Submit to apply new unit.

Sensor Range Min:

Sensor Range Max:

Display

Display Unit: **Metric**

<input type="text" value="RPM"/> ▼	<input type="text" value="RPM"/> ▼
<input type="text" value="0.00"/>	<input type="text" value="0.00"/>
<input type="text" value="0.00"/>	<input type="text" value="0.00"/>
<input type="text" value="0.00"/>	<input type="text" value="0.00"/>
<input type="text" value="0.00"/>	<input type="text" value="0.00"/>
<input type="text" value="1"/> ▼	<input type="text" value="1"/> ▼
<input type="button" value="Update Metric"/>	<input type="button" value="Update US"/>

Mirrored View: ▼

Alarming (in Metric Units)

Event: ▼



home / dcu / i/o configuration / transmission / shaft speed

The Shaft Speed channel is configured as any standard analog channel, with the exception of the Source section which is described here.

Source

Shaft Speed Source sets the source for the Shaft Speed channel.

Use "Gear" controls the rotation direction of the shaft, if used.

Gearbox Ratio is a multiplier for the Shaft Speed.



If gear is used to control direction, it is recommended to enable "Mirrored view" which will put the zero value on top of the gauge.

4.3.5 Switch

Switch Input #3

Copy

Copy configuration from: None Copy

Configure

assign custom name

Function Note! Enabling a function will automatically disable the channel use.

Use as: None

General

Channel Use: Not in use

Submit



home / dcu / i/o configuration / switch

The switch input channels are configured as any standard switch channel.

4.3.6 Loop Monitored Switch

Loop Monitored Switch #1

Copy

Copy configuration from: None Copy

Configure

assign custom name

Function Note! Enabling a function will automatically disable the channel use.

Use as: None

General

Channel Use: Not in use

Submit



home / dcu / i/o configuration / loop monitored switch

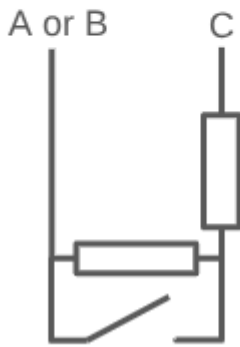
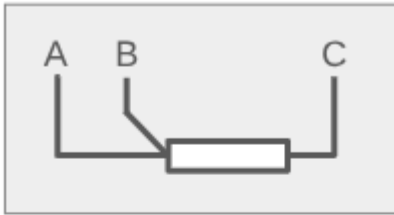
Loop Monitored Switches are an alternative application to three wire thermistor interfaces, for example PT100 inputs on the DCU 410E and Thermistor Inputs in the DCU 210E. The physical switch is a two wire circuit with two resistors connected in series where the physical switch bypasses (shorts) one of the resistors. This enables the DCU to detect 4 different switch states:

- Open
- Closed
- Broken Wire
- Short Circuit

A loop monitored switch is configured in the same ways as a standard switch.



A Loop Monitored Switch is very similar to a Type I SDU switch. Instead of using 10 kOhm resistors it is using 120 Ohm resistors



A loop monitored switch is connected at one end to the A or B terminal and the other side is connected to C.

4.3.7 4-20 mA

4-20mA #1

Configure

assign custom name

General

Channel Use:

Active Sensor Range

Sensor Range Min [milliAmpere]:

Sensor Range Max [milliAmpere]:

Sensor

Sensor Unit:

Sensor Range Min:

Sensor Range Max:

Display

Display Unit:

Display Range Min:

Display Range Max:

Display Major Divider:

Display Minor Divider:

Display Multiplier:

Mirrored View:

Alarming (in Metric Units)

Event:

Note! Submit to apply new unit.
 Corresponds to active sensor range min.
 Corresponds to active sensor range max.

Metric



home / dcu / i/o configuration / 4-20 mA

The 4-20 mA input channels are configured as any standard analog channel.

4.3.8 PT100



DCU 410E/408E only.

PT100 #1

Configure

assign custom name

General

Channel Use: Not in use ▼

Sensor

Sensor Unit: Celsius ▼

Sensor Range Min: 0.00

Sensor Range Max: 800.00

Display

Display Unit: US

Display Range Min: Fahrenheit ▼

Display Range Min: 0.00

Display Range Max: 0.00

Display Major Divider: 0.00

Display Minor Divider: 0.00

Display Multiplier: 1 ▼

Mirrored View: No ▼

Alarming (in Metric Units)

Event: None ▼

Note! Submit to apply new unit.

Metric

Celsius ▼

0.00

0.00

0.00

0.00

1 ▼

Update Metric

Update US

Submit



home / dcu / i/o configuration / pt100

The PT100 input channels are configured as any standard analog channel.

4.3.9 Temperature Sensor



DCU 210E/208E only.

Temperature Sensor #1

Configure

assign custom name

General

Channel Use:

Sensor

Sensor Type:

Sensor Unit: **Note! Submit to apply new unit.**

Sensor Range Min:

Sensor Range Max:

Display

Display Unit: **Metric**

Display Range Min:

Display Range Max:

Display Major Divider:

Display Minor Divider:

Display Multiplier:

Mirrored View:

Alarming (in Metric Units)

Event:



home / dcu / i/o configuration / temperature sensor

The Temperature Sensor channels are configured as any standard analog channel, with the exception of the Sensor Type in the Sensor section which is described here.

Sensor

Sensor Type sets the type of sensor used. This is typically PT100.

4.3.10 Voltage sensor

Voltage Sensor #1

Configure

assign custom name

General

Channel Use:

Active Sensor Range

Sensor Range Min [Volt]:

Sensor Range Max [Volt]:

Sensor

Sensor Unit:

Sensor Range Min:

Sensor Range Max:

Display

Display Unit:

Display Range Min:

Display Range Max:

Display Major Divider:

Display Minor Divider:

Display Multiplier:

Mirrored View:

Alarming (in Metric Units)

Event:

Note! Submit to apply new unit.
Corresponds to active sensor range min.
Corresponds to active sensor range max.

Metric



home / dcu / i/o configuration / voltage sensor

The voltage sensor channels are configured as any standard analog channel.



For DCU 210E/208E, flexible I/O #6 (C3.1) can be configured as supply for 0 - 5 V sensors.

For DCU 210E/208E, flexible I/O #2, #5, #12 and #18 can be configured for 0 V.

4.3.11 24V Input Functions



DCU 410E/408E only.

The 24V input functions are used for configurable input functions. In this section it is also possible to change the polarity of Fixed Functional Inputs on the DCU 410E.

User Config Switch Input #1

Function:

Input State:

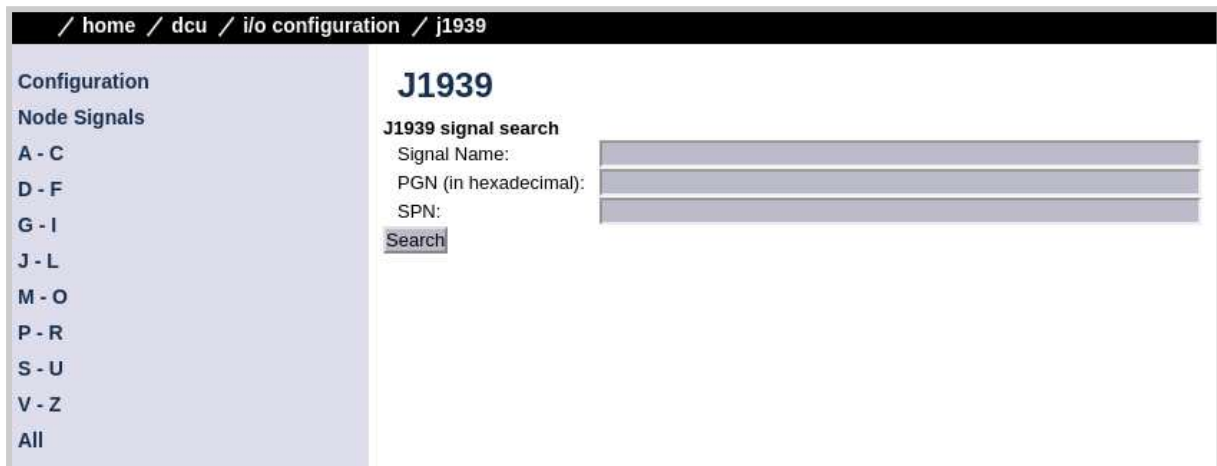
home / dcu / i/o configuration / 24v input functions

The input functions are configured as the Function part of any standard switch channel. The available functions are listed in that chapter as well.

! These are configurable input functions only, and not available for standard switch input channel configuration.

4.3.12 J1939

The DCU supports a large number of the standard SAE J1939 SPNs. To verify that a SPN is supported, the DCU supports a search mechanism in the web interface. Either search by one term or several. If several search terms are used they must all match.



home / dcu / i/o configuration / j1939

In order to configure a SPN, either search for it using the search mechanism provided or browse through the supported SPNs in the left side column.

For instance, if looking for “Fuel Rate” signal, select D-F in the left side column.

Depending on the SPN selected for configuration, it can be configured as a standard analog channel or a standard switch channel.

! Some SPNs are categorised as enumerable SPNs, such as SPN 3543 (Engine Operating State). These are configured similar to standard switch channels with the exception that the event configuration is extended to the different enumerable states of the SPN.

4.3.12.1 Configuration

Configuration

Enable Average Filters [SPN 92, SPN 94, SPN 101, SPN 183, SPN 7469]: Yes ▼

Note!

This selection applies to all J1939 interfaces.

Submit



home / dcu / i/o configuration / j1939 / configuration

It is possible to configure a 32 samples mean filter for the SPNs listed above.

4.3.12.2 Node Signals

The node signals makes it possible to configure a SPN from an individual J1939 node.

J1939 Node Signal #1

Configure

assign custom name

Source

Node 0x01 ▼

SPN 190 (Engine Speed (J1939)) ▼

Submit



home / dcu / i/o configuration / j1939 / node signal

Source

Once a Node and SPN is selected, and Submit is pressed, the node signal is locked to the configured J1939 node. The Node Signal is thereafter configured as any standard J1939 channel.

Be sure to assign a custom name to node signals as the default name are “J1939 Node Signal”.

4.3.13 Differential

A differential channel is a logical (not physical) channel, made up of two physical channels. The physical channels may be hardwired, originate from a J1939 ECM or from any other source. The differential channel will output the difference between the two source channels.

Diff Signal #1

Configure

assign custom name

General

Diff Source Signal #1: None ▼

Diff Source Signal #2: None ▼

Submit



home / dcu / i/o configuration / differential

General

Select Diff Source Signal #1 and Diff Source Signal #2. The two selected source signals must measure the same quantity, for example both pressure or both temperature.

After two channels with the same quantity have been selected, the differential signals are configured as any standard analog channel.

4.3.14 Average

An average channel is a logical (not physical) channel, made up of the average of two or more physical channels. The physical channels may be hardwired or from the J1939 CAN bus.

[/ home](#) / [dcu](#) / [i/o configuration](#) / [average](#) / [average signal #1](#)

<p style="margin: 0;">Average Signal</p> <p style="margin: 0;">Deviation Configuration</p> <p style="margin: 0;">Exclude From Average</p> <p style="margin: 0;">Naming</p>	<h2 style="margin: 0;">Average Signal #1</h2>
--	---



home / dcu / i/o configuration / average

It is possible to configure deviation from average, as well as exclusion from the average channel.

4.3.14.1 Average Signal

The average channel will output the average between the two or more source channels. The sensor unit must be the same for the selected source signals, for instance they must both be bar, and not one bar and one psi.

Average Signal #1

Configure

assign custom name

General
Signal Use: Not in use

Sensor
Sensor Unit: No unit **Note! Submit to apply new unit.**

Submit



home / dcu / i/o configuration / average / average signal

Once a Sensor Unit is selected, all enabled channels with that sensor unit are selectable for the average signal.

Average Signal #1

Configure

assign custom name

General
Signal Use: DCU+RP+Event

Sensor
Sensor Unit: Fahrenheit **Note! Submit to**
Sensor Range Min: 32.00
Sensor Range Max: 32.00

Source Signals

Source Signal #1:	None
Source Signal #2:	None
Source Signal #3:	None
Source Signal #4:	None
Source Signal #5:	None
Source Signal #6:	None
Source Signal #7:	None
Source Signal #8:	None
Source Signal #9:	None
Source Signal #10:	None
Source Signal #11:	None
Source Signal #12:	None
Source Signal #13:	None
Source Signal #14:	None
Source Signal #15:	None
Source Signal #16:	None
Source Signal #17:	None
Source Signal #18:	None
Source Signal #19:	None
Source Signal #20:	None

Display
Display Unit: US **Metric**
Display Range Min: Fahrenheit Celsius
Display Range Max: 0.00 0.00
Display Major Divider: 0.00 0.00
Display Minor Divider: 0.00 0.00
Display Multiplier: 1 1

Mirrored View: Update Metric Update US
No

Alarming (in Metric Units)
Event: None

Submit



home / dcu / i/o configuration / average / average signal

Source Signals

Selects the signals to be included in the average channel.



The channels selected will be shown in the same order if the Average Signal is configured in an Average template.



4.3.14.2 Deviation Configuration

Configures the deviation from average for all channels included in the average channel.

Average Signal #1 - Deviation Configuration

Configure Deviation Signals

General
 Signal Use: DCU+RP

Sensor
 Sensor Unit: Celsius
 Sensor Range Min: -800.00
 Sensor Range Max: 800.00

	US	Metric
Display Unit:	Fahrenheit <input type="button"/>	Celsius <input type="button"/>
Display Range Min:	<input type="text" value="0.00"/>	<input type="text" value="0.00"/>
Display Range Max:	<input type="text" value="0.00"/>	<input type="text" value="0.00"/>
Display Major Divider:	<input type="text" value="0.00"/>	<input type="text" value="0.00"/>
Display Minor Divider:	<input type="text" value="0.00"/>	<input type="text" value="0.00"/>
Display Multiplier:	1 <input type="button"/>	1 <input type="button"/>
	<input type="button" value="Update Metric"/>	<input type="button" value="Update US"/>

Mirrored View: No

Configure Deviation Event
 When configuring a low threshold value, keep in mind that the low warning threshold normally should be negative.

Alarming (in Metric Units)
 Event:



home / dcu / i/o configuration / average / deviation configuration

4.3.14.3 Exclude From Average

If any of the included average channels shall be excluded from the average calculation, this can be configured here.

4.3.14.4 Naming

If any deviation events are configured for the average channel, the custom name of the individual deviation channel can be configured here.



The default naming for a deviation from average is “Deviation: <Channel Name>”, for instance “Deviation: PT100 #1”.

4.3.15 Special

These are a group of “special” signals as follows.

4.3.15.1 Input Voltage

The Input Voltage channel monitors the currently active power supply to the unit.



For DCU 410E/408E, this channel monitors either Supply 1 or Supply 2, whichever the DCU is currently using.

Input Voltage

Configure

assign custom name

General

Channel Use:

Sensor

Sensor Unit:

Sensor Range Min:

Sensor Range Max:

Display

Display Unit:

Display Range Min:

Display Range Max:

Display Major Divider:

Display Minor Divider:

Display Multiplier:

Mirrored View:

Alarming (in Metric Units)

Event:

Note! Submit to apply new unit.

Update Metric

Update US



home / dcu / i/o configuration / special / input voltage

The Input Voltage channel is configured as any standard analog channel.

4.3.15.2 Calculated Fuel Rate

The DCU can calculate the fuel consumption and present an approximate figure.

Calc. Fuel Rate

Configure

assign custom name

Calculation Configuration

Enabled:

Nominal/Max RPM:

Nominal Consumption (from Engine Datasheet) [l/h]:

Nominal Boost Pressure (from Engine Datasheet) [bar]:

Idle/No-load Constant (Mul by RPM Equals Consumption) [l/h]:

General

Channel Use:

Sensor

Sensor Unit: **Note! Submit to apply new unit.**

Sensor Range Min:

Sensor Range Max:

Display

Display Unit: **US** **Metric**

Display Range Min:

Display Range Max:

Display Major Divider:

Display Minor Divider:

Display Multiplier:

Mirrored View:

Alarming (in Metric Units)

Event:



home / dcu / i/o configuration / special / calc. fuel rate

Calculation Configuration

This is a function within the DCU that approximates the current fuel rate by using the current engine speed and boost pressure as input. There's also a number of configurable constants that affects the calculation. The algorithm uses the standard engine speed as input. To receive boost pressure data it is required that this sensor is connected to the 4-20 mA channel #2 on the DCU.

Enabled sets if the calculated consumption should be enabled or not.

The remaining four constants are used to fine tune the output. Consult your engine data sheet and adjust these constants until a reasonable output is received.



The Boost Pressure MUST be connected to 4-20 mA channel #2. Remember to enable and configure this input as a pressure input.

After the calculation has been enabled and the four constants have been configured, the channel is configured as any standard analog channel.

4.3.15.3 Calculated Engine Hours

If the engine hours are not sourced from the J1939 CAN bus, it is being calculated internally by the DCU.

The appearance of the counter is configured in this dialog.

It is possible to set an alarm or other event connected to the engine hours.

4.3.15.4 Instantaneous Fuel Economy (DCU)

The DCU can be configured to calculate instantaneous fuel economy. In order to do so, fuel rate and vessel speed need to be supplied to the DCU.

Instantaneous Fuel Economy (DCU)

Configure

assign custom name

General

Inst. Fuel Rate Signal:

Vessel Speed Signal:



home / dcu / i/o configuration / special / instantaneous fuel economy

4.3.15.5 Calc. Electrical Power

These are input signals that, when provided with two input signals, one for electrical voltage and the other for electrical current, calculate the corresponding electrical power.

Calc. Electrical Power #1

Configure

assign custom name

General

Signal Use:

Current Source:

Voltage Source:



As electrical current may be negative depending on direction the calculated electrical power may also result in a negative value.

4.3.15.6 Calc. Percentage

An analog type signal that, given an analog input signal, calculates the percentage of level of the given signal. Based on the sensor range of the input signal a percentage value is calculated.

Calc. Percentage Signal #1

Configure

assign custom name

General

Signal Use:

Source Signal:

Sensor

Sensor Unit:

Sensor Range Min: 0.00

Sensor Range Max: 100.00



Tip! If having a throttle input measuring requested RPM, use one of these signals to translate the measured throttle value to percent before displaying it on an instrument page.

General

Inst Fuel Rate Signal selects the instantaneous fuel rate channel.

Vessel Speed Signal selects the vessel speed channel.

Once both are selected, the instantaneous fuel economy channel is configured as any standard analog channel.

4.3.16 Analog Modbus

The DCU has 50 analog Modbus channels that external devices can access.

Please see the communication manual for further technical description of the registers.

Modbus Analog Sensor #1

Configure

assign custom name

Sensor

Sensor Unit: **Note! Submit to apply new unit.**

Sensor Range Min:

Sensor Range Max:



home / dcu / i/o configuration / modbus analog

The Analog Modbus channels are configured as any standard analog channel.



Modbus Watchdogs can be used to detect loss of communication to an external device. They are configured under the section Event Configuration in the Miscellaneous section.

4.3.17 Digital Modbus

The DCU has 500 digital Modbus channels that external devices can access. Please see the communication manual for further technical description of the registers. The Digital Modbus channels are configured as any standard switch channel.



The Modbus Watchdog can be used to detect loss of communication to an external device.

4.3.18 EGT (Exhaust Gas Temperature)

4.3.18.1 Cylinder Deviation Event

The deviation is the difference between the cylinder value and the average value. Deviation is positive (above zero) if the cylinder value is above the average, and negative (below zero) if the cylinder value is below the average.



home / dcu / i/o configuration / egt / cylinder deviation event

4.3.18.2 Turbo Deviation Event

The deviation is the difference between the turbo value and the average value. Deviation is positive (above zero) if the turbo value is above the average, and negative (below zero) if the turbo value is below the turbo average.

4.3.19 Constant

Constant signals can be used in the DCU to define a constant value. This constant value can be used to realize sensor signal offset using differential signals or act as a non variable input to similar signals, for example a constant voltage input to a Electrical Power signal.



home / dcu / i/o configuration / constant

4.3.20 Operator Switch

Operator switches are a special type of input which can be manipulated by the operator of the system. When enabling one or more of these switches the DCU and connected RPs automatically creates an operator interface which the operator can access to manipulate the state of the switches.

Operator Switch #1

Copy

Copy configuration from: None Copy

Configure

assign custom name

English Used: Walk Lights, Aft

Switch Type

Type: Toggle

General

Channel Use: DCU+RP

Alarming

Event: None

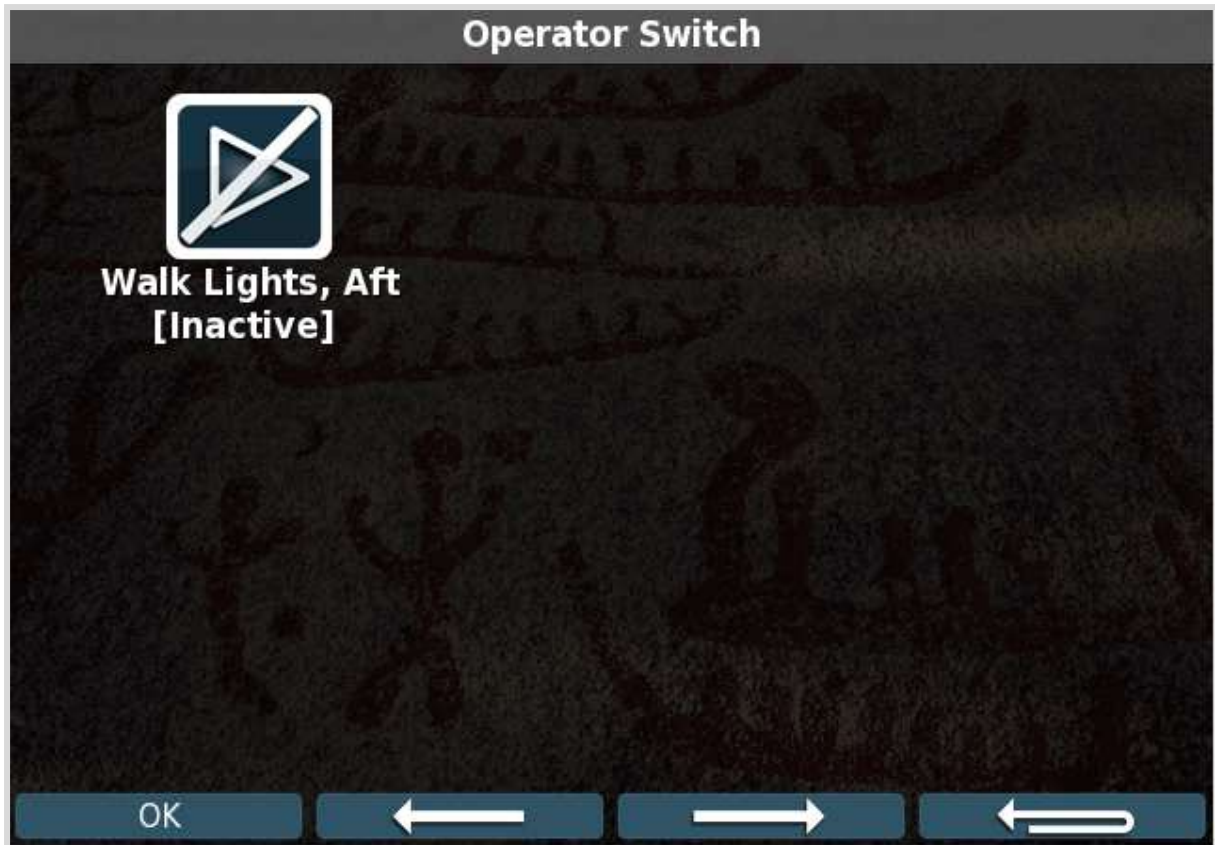
Submit



home / dcu / i/o configuration / operator switch

An operator switch can be used like a normal digital type input, for example, it can be shown in an instrument page or be mapped to drive a digital output.

On a DCU and RP 210E operator switches are accessible from the “Controls” menu form. On an RP 480i they are available under the Engines menu section. These forms are automatically made available to the operator if at least one Operator Switch is enabled.



Operator Switch form example from a DCU 410E.

4.3.21 Logical Signal

Logic signals can be used to define internal logical signals based on Boolean algebra.

The logical signals can be configured for view, alarm monitoring, and they can be connected to any configurable output.

Logic Signal #1

Copy

Copy configuration from: None

Configure

assign custom name

Function Note! Enabling a function will automatically disable the channel use.

Use as: None

General

Channel Use: Not in use

Logic Statement

Choose an operand to enable selection of input signals. Select inputs and an output.
When statement is complete a submit button or an add button will appear at the end of the line.
Maximum number of lines is 20.

-: Select output... := Select discrete signal... Select operand... Select discrete signal...
Select output function... Select event... Select output function... Select event...



home / dcu / i/o configuration / logic signal

The logical signal has a Logic Statement attached to it which defines the logic signal. The Logic Statement can consist of up to 30 lines of Boolean algebra.

<line> = <value> <operator> <value>

Each line of the Logic Statement can utilize AND, OR, or NOT operators.

Each Boolean value in the expression can consist of the following

- Any configured discrete signal (e.g. Switch Input #1)
- Any fixed functional output (e.g. In Local Mode)
- Any configured Event or Silent Event (e.g. Event: High Coolant Temp)

In addition, if the Logic Statement has defined any intermediate signals, they can be used in the expression as well.

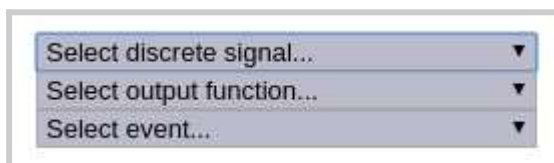
The Logic Statement is completed by configuring “Output” as the output type. Whenever a Logic Statement is completed it can not be modified unless entirely cleared.

The output from a logic signal can either be configured as a normal digital signal, for instance to drive diagnostic rules, or it can be directly mapped onto an input function.

4.4 Config Outputs

4.4.1 Common Output Configuration

Any discrete output in the DCU can be configured to one of the following selections.



Select discrete signal...

This selects any configured switch input channel. If selected, the output will follow that switch input channel.

Select output function...

This selected any builtin output function. If selected, the output will follow that function.

The **highlighted** functions are the most typically being used.

Function Name	Description
Acknowledge button	The acknowledge button is activated
Buzzer active	The buzzer is active
Shutdown in alarm list	There is a shutdown event in the alarm list
Load Reduction in Alarm List	There is a Load Reduction event in the alarm list
Alarm in alarm list	There is an alarm event in

	the alarm list
Warning in alarm list	There is a warning event in the alarm list
Unacknowledged Shutdown	Any unacknowledged shutdowns
Unacknowledged Load Reduction	Any unacknowledged load reductions
Unacknowledged Alarm	Any unacknowledged alarms
Unacknowledged Warning	Any unacknowledged warnings
All faults (Unacknowledged)	Any new event in the alarm list

Active Faults	Any active faults
Unacknowledged or Active Faults	Any unacknowledged or active faults
Common DM1 in Alarm List	Any ECM-sourced diagnostic message in the alarm list
Ready state	The DCU is in Ready state
Init. delay state	The time between reception of the automatic start signal until the first start attempt
Cranking state	Panel is cranking (starting) the engine
Awaiting run state	Panel finished cranking and is waiting for the engine to spin up
Running state	Engine is running
Crank delay state	Crank rest time between automatic start attempts
Delay before disconnecting generator breaker	Delayed Stopped state is active and the timer is running.
Cooling state	Panel has activated the Gen. Breaker Disconnect signal and the engine is now running on idle load
Stopping state	Engine is stopping
Cooling or stopping state	Cooling or stopping state
Stopped state	Engine has stopped/is below 5 rpm. This state is minimum 10 sec in duration.
Blocked state	Engine cannot be started, usually caused by a shutdown that is not acknowledged
Stopped for unknown reason	The panel lost all signals indicating that the engine is running, but no stop command was ever given

	to the panel. Out of fuel?
First start attempt failed	The first in a sequence of start attempts has failed
Final start attempt failed	During an automatic start sequence, after the final start attempt, + crank rest time
In Local mode	The panel is in local mode and will not accept remote commands
In Remote mode	Panel can be commanded from remote
Prelube Override	Prelube override
DCU Tacho Failure	The pickup (MPU) signal is lost during engine run
Service Interval	One of the configured service intervals are due
Engine Protection Override	The panel is in shutdown override state, and shutdown channels are now alarming only. Overspeed setpoint is always enabled.
Engine Protection Override /Emergency Mode	Same as "Engine Protection Override" but also with Emergency mode activated.
Power on	The panel is powered
Power off	The panel is powered off
Supply Voltage Low	The supply voltage is below the fixed setpoint. Note different setpoints for 12V and 24V systems.
Speed Relay 1, 2, 3, 4	The function activates at the configured rpm value
Alarm or Ack Button or Remote Acknowledge	The panel is being acknowledged and the buzzer is silenced
Common Start Failed	Start or crank failure
Common Stop Failed	Stop failed. A configurable timer

	(Engine Stopping Time) passed without the engine stopping.
Start, Stop, Alarm, Up, Down, Home Button	Individual buttons pressed
Soft Button 1, 2, 3, 4	One of the soft buttons at the bottom of the screen is pressed
Ready To Take Load	Engine rpm is above the setpoint
Ready for PMS Start	Panel is ready for power management start: - Panel is in Auto - Panel is not in Local - Panel supply V. is OK - Panel is in Ready state
In Gear	In gear
On Secondary Supply	Panel is running on secondary supply
New Alarm Pulse	Whenever a new event appears in the alarm list, this function activates for a second, then de-activates automatically
In Manual Mode	Panel is in manual mode and will not start automatically
In Automatic Mode	Panel is in automatic mode
Primary Power Failure	Primary power failure
Secondary Power Failure	Secondary power failure
Overspeed	Engine rpm is above configured setpoint for overspeed
Overspeed Test Active	The DCU is in Overspeed Test Mode.
ETR	Energize to Run. Active when engine cranks or runs.

ETS	Energize to Stop. Activates when engine is stopping
Load Reduction	Load reduction active
Shutdown	Engine is being stopped automatically from a sensor input, including overspeed
Running	Engine is running
Crank	Panel is cranking/ starting the engine
Prelube Activation	The panel has activated the prelube function
J1939 <State>	Individual states of SPN 3543
Emergency start/mode	Panel is in emergency mode, or an E-Start sequence is activated
Crank#2	Secondary crank
Prelube Failed	Prelube failed
J1939 DM1 Amber Lamp	DM1 Amber Lamp in alarm list
J1939 DM1 Red Lamp	DM1 Red Lamp in alarm list
J1939:2 DM1 Amber Lamp	DM1 Amber Lamp in alarm list
J1939:2 DM1 Red Lamp	DM1 Red Lamp in alarm list
Delayed Shutdown Imminent	Shutdown is imminent
SDU Acknowledge	Pulse when SDU event is acknowledged
Event Indicator	Event indicator
DM1 Function	DM1 function is active
Postlube Activation	Postlube active

Select event...

This selects any configured event in the DCU. If selected, the output will follow the event state of the configured channel.



Output functions starting with “Event:”, the function will activate when any event on that channel activates. The function will deactivate when all events for that channel are cleared from the alarm list (both inactive and acknowledged).

All other output functions (such as “Silent Event:” or “Warning High Event:”), the function will activate when that particular event on the channel activates. The function will deactivate when the corresponding event is inactivated.

4.4.2 24V Output Functions

The 24 V outputs of the unit are configured here.



home / dcu / i/o configuration / 24v output functions

The configuration is the same as any common output configuration.

4.4.3 Relay Functions

The on-board relays are configured here.

The configuration is the same as any common output configuration.



The Alarm Relay can not be assigned any other function. However, the Alarm Relay can be configured to Normal or Pulsed operation.

4.4.4 Speed Relays

A Speed Relay is a logical signal that activates on a certain engine speed RPM, and deactivates when below the same RPM.

Speed Relays

Speed Relay #1

Enabled: ▾

Activate Speed [RPM]:

Delay After Crossing Threshold [sec]:

Event: ▾

Event Log: ▾

Speed Relay #2

Enabled: ▾

Activate Speed [RPM]:

Delay After Crossing Threshold [sec]:

Event: ▾

Event Log: ▾

Speed Relay #3

Enabled: ▾

Activate Speed [RPM]:

Delay After Crossing Threshold [sec]:

Event: ▾

Event Log: ▾

Speed Relay #4

Enabled: ▾

Activate Speed [RPM]:

Delay After Crossing Threshold [sec]:

Event: ▾

Event Log: ▾



home / dcu / i/o configuration / speed relays

For instance, speed relay #1 can be configured to activate at 1200 RPM, and will then deactivate at 1199 RPM.

Set Event Log to Yes to create an event in the log when the speed relay activates.

The Speed Relay can be assigned to any output.

4.4.5 DM1 Functions

The DCU contains 40 internal DM1 functions which can be configured individually.

DM1 Function #1:	SPN 0	FMI All FMIs
------------------	----------	-----------------

When a DM1 function is configured, for instance SPN 91, FMI 3, it can be assigned to any output.

 DM1 Functions are active if the DM1 is active or unacknowledged in the DCU.

4.4.6 J1939 Outputs


The DCU has a variety of predefined messages available to be transmitted over J1939.

J1939 Outputs

Transmit J1939 On Idle Bus:

Transmit DM1:

Receive Transmitted Signals:

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Transmit J1939 On Idle Bus means that the DCU will attempt to transmit J1939 data even though the DCU is not receiving any data. If set to No the DCU will not initiate any transmission until it detects traffic on the network from other components.

Transmit DM1 means that the DCU will transmit DM1 diagnostics for relating to the configured transmit J1939 SPNs. For example if SPN 110 and SPN 1234 is configured as output any events active on the source signals configured for these SPNs will result in active DM1 faults to be broadcasted.

Event Type	FMI	
	Low	High
Warning	17	15
Alarm / Load Reduction	18	16
Shutdown	1	0
Out of Range	2	

Receive Transmitted Signals makes it possible for the DCU to receive SPNs transmitted by the DCU, treating them as any other J1939 input.

4.4.6.1 J1939

The DCU is able to broadcast J1939 data by mapping any input signal to any standard J1939 SPN as long as the quantity of the signals match.

Select the SPN which the DCU should transmit. This can be accomplished either by manually selecting the DPN in the left side column or by using the builtin search mechanism of the DCU.

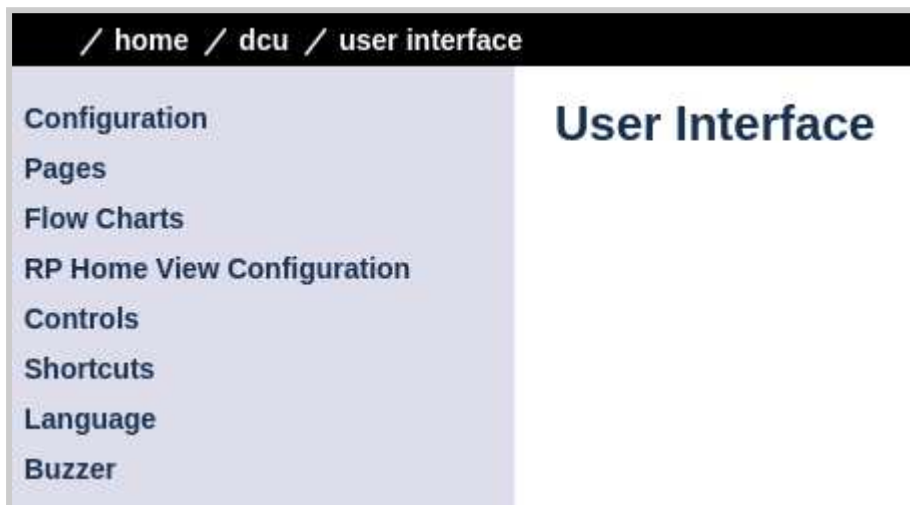
Once a SPN is selected, the DCU will present a list of possible source signals in a drop down combo box called "Signal to be Transmitted".



The channels presented must be enabled and of the same quantity. Otherwise, they will not show up in the list.

5 User Interface

In this section aspects of the operator user interface are defined.



home / dcu / user interface

5.1 Configuration

Changes done in configuration will apply globally.

Configuration

Header

Show Gear Indicator Instead Of All Ok: ▾

Pages

Show Page Name Popup: ▾

Instruments

Industrial Style Instruments: ▾

Green Section on Gauges: ▾

J1939 Display Switchover: ▾

Alarm List

Show Source in Alarm List: ▾



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Header

Show Gear indicator Instead Of All Ok.

This will enable an arrow in the upper right corner of the screen displaying gear position.



Only enable this option if the DCU is capable of receiving gear state. See the Gear section under Transmission in the I/O configuration section.

Pages

Show Page Name Popup configures the page number and potential naming to be shown for a brief period of time when switching pages.

Instruments

Industrial Style Instruments will not show yellow or red indication unless active.

Green section on Gauges will change the outer line of all gauges to green. If a warning or an alarming threshold is set, this will still be red.

J1939 Display Switchover is an option for displaying automatic switchover from J1939#1 to J1939#2.

Alarm List

Show Source in Alarm List If set to **Yes**, information is added to each event in the Alarm List relating to the source of the event. For example, for J1939 DM1 faults the source address of the node reporting the fault is shown.

5.2 Pages

This is where the configuration of the different pages is done.

A Page is a screen on the panel. The DCU 410E panel can maximum have 40 instrument screens, whereas the DCU 210E can maximum have 9 instrument screens.

- A **page** is built using one of several available **templates**.
- A **template** has several slot positions. A **slot** is simply an area on the screen.
- Each slot position can hold one **widget** type. A **widget** is for example a needle instrument or a bar graph.





Each **widget** can be assigned a **signal** configured in the I/O section.

Widget Types



There are two different types of widgets amongst the available templates.

1. **Value Widgets.** Displays the value of a signal, for instance Engine Speed
2. **Event Widgets.** Displays the event status of a signal, for instance Warning.




Analog channels can be assigned to the following widgets.

Value Widgets		Event Widgets	
			

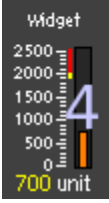
Digital channels can be assigned to the following widgets.

Value Widgets		Event Widgets	
			

Enumerable channels can be assigned to the following widgets.

Value Widgets		Event Widgets	
			
			

Gear channel can be assigned to the following widgets.

Value Widgets		Event Widget	
			

Pages

Page Manipulation

Insert Page Before Page 1

Select Page

Page 1 Page 2

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In the example above, two pages are already created. Click on a page to select it, for instance click on Page 1.

Page Details

In the picture below, Page 1 is selected.



As can be seen above, **Page 1** is made using **Template 14**.

There are **9 slot sections** in the template, each with a **Widget**.

Slots 1, 2, 3, 6 and 7 are assigned a signal.

Apply a Signal to a Slot

To add a signal to a slot position, select the drop-down list for the desired slot, then select the signal from the selection of available signals.

Only signals that have been configured for use are visible in the drop-down list.



Multiple slots can be manipulated in one go. When pressing submit the changes will immediately be reflected on the DCU screen if the page is currently viewed.

Edit a Signal

Click on the Edit Signal link to edit the signal.

Insert a New Page

Choose whether the new page is to appear before or after an existing page, then press the Insert Page button.

The pages will be renumbered automatically.

Choose a Template

A range of templates will be presented. Choose a template and start populating the page with predefined signals.

The chosen template will appear at the bottom of the screen. Select a signal and press Submit to clear the other templates.

Delete a Page

First Select the page, and then press the Delete button.

There is no undo-function, so make sure the correct page is deleted.

The pages will be renumbered automatically.

5.2.1 EGT Page

The EGT page is a dynamic page adapting to its configuration.

EGT Configuration

Setup

Engine Type:

Number of Turbos per Bank:

Cylinders And Turbo

Left Bank

Values Below Bar Graph

Right Bank

Values Below Bar Graph

Display Bank Label Letter For Each Cylinder:

Cylinder

Cylinder Average Per Bank:

Turbo

Turbo Temperature Average Per Bank:

Engine Type selects the engine type, for instance V8 or Inline 9.

Number of Turbos per Bank defines the number of turbos per bank in case of V-engines. For inline engines, this is the number of turbos.

- 1: One T/C inlet and one T/C outlet sensor (per bank)
- 2: Two T/C inlet and two T/C outlet sensors (per bank)

The Display Bank Label Letter For Each Cylinder is used to prepend bank information to the cylinder labels.

Cylinder Average Per Bank and Turbo Temperature Average Per Bank are only available for V-engines, and defines whether average shall be calculated per bank or not.

5.2.1.1 EGT Turbo Configuration

The EGT turbo configuration can be used in a variety of different applications.



Turbo Temperature per Bank

- **No:** Calculate turbo temperature average over T/C inlet sensors and T/C outlet sensors respectively. The average value is always displayed.
- **Yes:** Calculate turbo temperature average per bank. In case of only 1 turbo the average for that bank is the same as the sensor value, and the average is NOT displayed.

Below follows different EG turbo configurations, all with a V8 engine.

One Turbo per Bank Examples

Turbo Temperature Per Bank: No	Turbo Temperature Per Bank: Yes
<p>Since the average is for all turbo sensors, the average value needs to be displayed.</p>	<p>Since the average value for 1 turbo is the same as the turbo value, the average value is not displayed, to make the display less cluttered.</p>

Two Turbo per Bank Examples

Turbo Temperature Per Bank: No	Turbo Temperature Per Bank: Yes
--------------------------------	---------------------------------



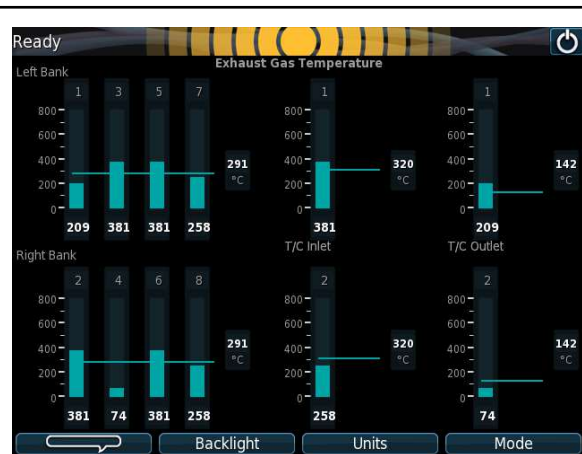
T/C Inlet average is calculated over all 4 T/C inlet sensors. Same for T/C Outlet.



T/C Inlet average and Outlet average is calculated per bank.

Two Turbo Per Bank, Only Configuring One Examples

Turbo Temperature Per Bank: No



T/C Inlet average is calculated over all 4 T/C inlet sensors. By only configuring 1 we trick the DCU to only present one.

Turbo Temperature Per Bank: Yes



T/C Inlet average is calculated per bank. By only configuring 1 we trick the DCU to only present one, and hence displaying the turbo reading as well as the average line and value.

Common Turbo Sensor for Both Banks

Common T/C Inlet and T/C outlet

Common T/C inlet, separate T/C outlet

<p>Only configure one T/C inlet and one T/C outlet sensor will display the following.</p>	<p>By configuring both banks outlet sensors the following is displayed. Same for inlet.</p>

5.3 Flow Charts

Flow charts are specialized pages that display signal data for a predefined process. Flow charts are added to the same display rotation as normal pages.

Currently there's only one flowchart available. This flowchart is only applicable for Genset installations and can be used to display specialized data when the DCU is connected to a RIO 425 module or the LSU 408.

5.4 RP Home View Configuration

This section can be used to customize the contents of the home screens of Remote Panels (RP 410E or RP 206E/210E/220E/420E) connected to this DCU.

Choose the appropriate template by clicking on it and assign signals to dual and quad view.



These settings will only affect connected RPs and have no impact on the DCU itself.

Currently it is only possible to change the template for dual view.

5.5 Controls

Some controls of the DCU can be enabled here. If enabled they will appear in the DCU menu structure, directly under Controls.

Controls

General

Allow Start Disabled from Panel: Yes ▾

Aftertreatment

Enable Aftertreatment System Control [SPN 8148]: No ▾

External Aftertreatment System Control [SPN 8148]: None ▾

Enable Aftertreatment Operating Mode Control [SPN 9175]: No ▾

External Aftertreatment Operating Mode Control [SPN 9175]: None ▾

Note! External aftertreatment control will override panel control.

Gear

Enable Gear Control: Yes ▾

Propulsion Type: Bi-directional Propeller ▾

In Local Mode Only: Yes ▾

Automatic Neutral Gear on Shutdown: No ▾

Request Neutral on Modbus Watchdog Timeout: No ▾



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General

Allow Start Disabled from Panel controls whether there should be a menu option to put the DCU in a Start Disabled state. By default this menu option is available to the operator. By setting this option to **No** the menu option is removed from the operator menu. Setting the option to **Yes** adds the menu option to the operator menu.

Aftertreatment

Aftertreatment system control, SPN 8148, and operating mode, SPN 9175, can be controlled by DCU if configured.

Enable Aftertreatment System Control enables the transmission of SPN 8148. If enabled the operator can toggle this in the DCU interface, under Controls. If External Aftertreatment System Control is configured to any switch channel, this will override the current setting making aftertreatment system control available by switch channel only.

Enable Aftertreatment Operating Mode Control enables the transmission of SPN 9175. If enabled the operator can toggle the mode (Standard / Reduced) in the DCU interface, under Controls. If External Aftertreatment Operating Mode Control is configured to any switch channel, this will override the current setting making mode control available by switch channel only.

Gear

Enable Gear Control enables gear control and will show a Gear Control Form in the DCU.



The Gear Control form can be configured as a Shortcut.

The Gear Control form is highly dependent on how the Transmission section in Config Inputs under I/O Configuration is configured.

The “Gear” widget displays current gear status according to the Gear Source for the Transmission Input. Gear requests are performed by setting dedicated Modbus registers. In order to make full use of this function an external PLC or similar is required to read gear requests from the DCU via Modbus, as well as physically order the change of gear.

Propulsion Type defines the types of gear commands shall be available as function buttons commands in the Gear Control form. For example **Waterjet With Backflush** provides these commands: “Engage”, “Disengage” and “Backflush” whereas **Bi-directional Propeller** provide the following commands: “Ahead”, “Neutral” and “Astern”

In Local Mode Only will only allow for gear changes to be requested when the DCU is in Local Mode.

Automatic Neutral Gear on Shutdown instructs the DCU to request neutral gear should a shutdown occur. Neutral Gear is requested when the RPM drops below the configured RPM during the shutdown sequence.

Request Neutral on Modbus Watchdog Timeout configures DCU to utilize the internal Gear Watchdog feature. If enabled, a Watchdog Time configures the time in which the external transmission unit must refresh the watchdog before DCU requests neutral gear.

5.6 Shortcuts

This section allows overriding of the default functions connected to the four soft buttons while in instrument page view.



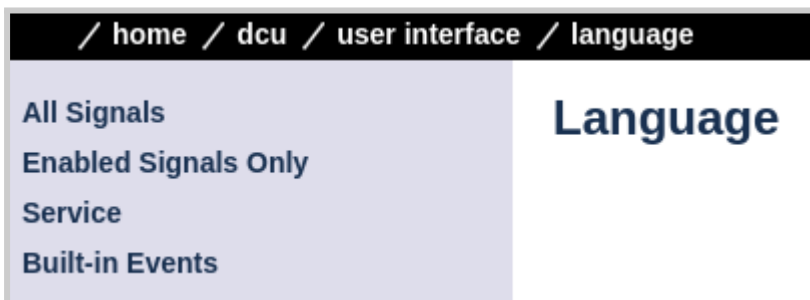
The following shortcuts are available for configuration.

Shortcut	Function
None	No function.
Language	Show the language selection form.
Backlight	Show the backlight selection form.
Units	Show the unit selection form.
Mode	Show the mode selection form.
Controls	Show the Controls menu form.,
Gear	Show the Gear Control form.
Quick Nav	DCU 410E only. Show the quick navigation page.

Select any function from the dropdown boxes for each function button and press Submit.

5.7 Language

In this section, the custom language can be configured for channels, services, and built-in events.



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5.7.1 All Signals

Press All Signals to display all signals available in the DCU.

All Signals

Note! This page only shows the custom naming for different languages, if available. If a custom naming exists, that name will be used for the specific language. All names have a default translation to the corresponding language, but this translation is not seen here.

Select Languages:

English Default

Throttle Position

Air Filter Diff Press.

Air Inlet Pressure

English


▼

English Used

[default]

[default]

[default]

 home / dcu / language / all signals

The page displays three columns of signal text. The first column is the English Default text, the second column is the currently selected language (for example English), and the third column is a selectable language in the web interface.

English Default	English Used	2nd Language
Engine Oil Press.	Engine Oil Pressure	Motoroljetrykk
Engine Speed	[default]	Motorturtall



The English language is always available in the DCU and the RP.

The text [default] means that the English default text (column 1) will be used. Select any [default] text to change the signal text description.

5.7.2 Enabled Signals Only

This is the same as All Signals, except that only signals that are in use are listed.

Enabled Signals Only

Note! This page only shows the custom naming for different languages, if available.
If a custom naming exists, that name will be used for the specific language.
All names have a default translation to the corresponding language, but this translation is not seen here.

Select Languages: English None

Default Text	English
Engine Speed	[default]
Input Voltage	[default]
Engine Hours	[default]



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5.7.3 Service

Service

Note! This page only shows the custom naming for different languages, if available.
If a custom naming exists, that name will be used for the specific language.
All names have a default translation to the corresponding language, but this translation is not seen here.

Select Languages: English None

Service	English
Service 1	[default]
Service 2	[default]
Service 3	[default]
Service 4	[default]



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The four Service intervals will indicate with a text. The default text can be changed.
As above, press the [default] text to change the default text.

5.7.4 Built-in Events

All internal events that can be generated can be customized to a different name.

Built-in Events

Note! This page only shows the custom naming for different languages, if available. If a custom naming exists, that name will be used for the specific language. All names have a default translation to the corresponding language, but this translation is not seen here.

Select Languages:	English	None <input type="button" value="v"/>
<input type="button" value="Submit"/>		
English Default		English Used
Engine Start Failed		[default]
Engine Stopped?		[default]
Engine Stop Failed		[default]
Prelube Failure		[default]



home / dcu / language / built-in events

The only place where the text is shown is in the alarm list.

5.8 Buzzer

Automatic Buzzer Off is a function that may be used during the configuration phase of a DCU. When active, any new event that triggers the Buzzer, will be automatically silenced by the DCU. Each new event will only produce a single short buzzer beep.

This setting is automatically turned off after 10 hours or when the DCU is powered off.

6 Start/Stop/Prelube

This menu section covers the manual and automatic start and stop sequence. There are several settings for start/stop on the DCU.

6.1 Settings

Settings

General

DCU Engine Start/Stop Control:

Disable Local Start/Stop Buttons:

Hold Button to Start/Stop:

Allow E-Start:

Only Allow Local Start In Local or Emergency Mode:

Allow Automatic Start/Stop in All Operation Modes:

Prohibit Crank Above RPM Threshold [RPM]:

Prohibit Stop if Engine Running and Clutch Engaged:

Start Consent

Allow Manual Start in Start Disabled:

Prelube

Prelube Type:

Oscillating Prelube

Oscillating Prelube:

Postlube

Postlube Type:

Automatic Start

Initial Start Delay [seconds]:

No. of Start Attempts (per starter):

Prelube Before Each Start Attempt:

Starter 1

Cranking Time [seconds]:

Disengage Crank Output [RPM]:

Delay Between Start Attempts [seconds]:

Valid range: 1 - 300 seconds
For all starters. 0 = Disabled
Valid range: 1 - 1200 seconds

Starter 2

Enable Secondary Starter:

Automatic Stop

Delay Before Disconnecting Generator Breaker [seconds]:

Cooling Time [minutes]:

Stopping

Stopping Time [minutes]:

Safety Stopping Time [seconds]:

Time Hysteresis for Unsolicited Stopped [seconds]:

Valid range: 1 - 60 minutes
Valid range: 1 - 500 seconds
Valid range: 0 - 10 seconds



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General

General	
DCU Engine Start/Stop Control:	Exclusive ▼
Disable Local Start/Stop Buttons:	No ▼
Hold Button to Start/Stop:	No ▼
Allow E-Start:	Yes ▼
Only Allow Local Start In Local or Emergency Mode:	Yes ▼
Allow Automatic Start/Stop in All Operation Modes:	No ▼
Prohibit Crank Above RPM Threshold [RPM]:	5 ▼
Prohibit Stop if Engine Running and Clutch Engaged:	No ▼

DCU Engine Start/Stop Control

The DCU Engine Start/Stop Control can be configured to three different modes.

- **Exclusive**, the DCU has exclusive control of the engine start/stop. Warnings will be given for unexpected state changes.
- **Shared**, the DCU has shared control of the engine start/stop. No warnings will be given for unexpected state changes.
- **Deactivated**, the DCU is not in control of the engine start/stop. No warnings will be given for unexpected state changes.

Disable Local Start/Stop Buttons disables the local start/stop buttons on the DCU.

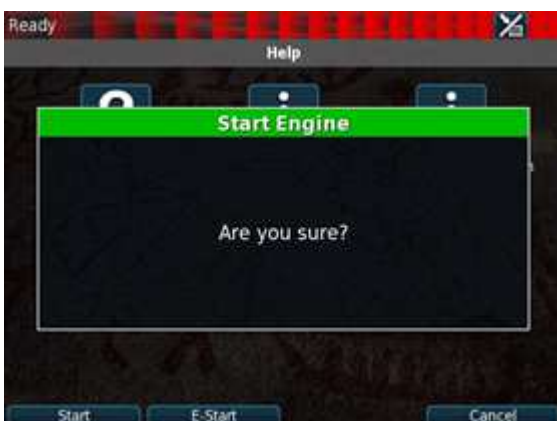


Any functional inputs configured for Local Start or Local Stop will still work.

Hold Buttons to Start/Stop selects if the Start and Stop buttons shall be Latched or Momentary. Set to **Yes** for a momentary Hold-To-Start/Stop button. The button must be pressed until the engine has started/stopped. Set to **No** for a latched button. The button needs to be pressed momentarily, after which the DCU completes the start/stop sequence as if the button was held continuously.

Typical setting is No (gives a latched button operation, which is normally preferred).

Allow E-Start allows the option to emergency start the engine. The E-Start will automatically override any prelube sequence and override and shutdowns.



Only Allow Local Start in Local or Emergency Mode should in virtually all installations be set to **Yes**. If the setting is **No**, local start/stop will work in any mode of operation.

Allow Automatic Start/Stop in All Operation Mode should in virtually all installations be set to **No**. If the setting is **Yes**, automatic start/stop will work in any mode of operation.

Prohibit Crank Above RPM Threshold selects if the DCU should prohibit crank if engine is turning. Selectable choices are **Not in use**, **5 RPM**, or **300 RPM**.

Prohibit Stop if Engine Running and Clutch Engaged selects if stop should be prohibited if clutch is engaged.

Start Consent

Start Consent		
Allow Manual Start in Start Disabled:	Yes ▼	
Requesting Start Consent Timeout [seconds]:	10	Valid range: 1 - 30 seconds
Action Upon Consent:	Go to Ready ▼	

Allow Manual Start in Start Disabled When set to **Yes** it is now possible for the operator to issue a Start Consent request when the DCU is in Start Disabled state. A request is made by attempting a start of the engine from any location. When the DCU receives a Start Consent request it is indicated in the status bar: “Start Disabled - Requesting Start Consent”. The DCU remains in this state until either it is timed out after which it returns to “Start Disabled” or the conditions causing the DCU to remain in disabled start attempts are removed.

When in the “Requesting Start Consent” state the DCU also activates the output function “Start Disabled - Requesting Start Consent”

If set to **No**, start attempts are blocked by the system with a message indicating the cause.

Requesting Start Consent Timeout [seconds] controls the timeout for the function. The configured number is the number of seconds the DCU should remain in “Start Disabled - Requesting Start Consent” state before reverting back to “Start Disabled” state. If consent to start is given by removing the conditions causing the start disabled state.

Action Upon Consent dictates what the DCU should do once consent is given. With **Go to Ready** the DCU moves back to ready state, with Proceed with Start the active start attempt is carried out.

Prelube

The DCU can prelube the engine at certain regular intervals, and/or before start.

Prelube Type selects the prelube operation before start. It can be **No Prelube**, **Fixed Time**, or **Until Prelube Complete Signal**.

Fixed Time	Until Prelube Complete Signal
<p>Prelube</p> <p>Prelube Type: Fixed Time ▼</p> <p>Prelube Time [seconds]: 1</p> <p>Prelube Until Running: No ▼</p> <p>Override Allowed: No ▼</p> <p>Activate ETR During Prelube: No ▼</p>	<p>Prelube</p> <p>Prelube Type: Until Prelube Complete Signal ▼</p> <p>Prelube Timeout [seconds]: 1</p> <p>Action Upon Timeout: Abort Start ▼</p> <p>Prelube Until Running: No ▼</p> <p>Override Allowed: No ▼</p> <p>Activate ETR During Prelube: No ▼</p>
<p><u>Prelube Time</u> sets the time to prelube. Typical setting is 5 - 30 seconds.</p>	<p><u>Prelube Timeout</u> is the time the DCU will wait for a prelube completion indication. Typical setting to 5 - 30 seconds.</p>

	<p><u>Action Upon Timeout</u> sets the action if the prelube times out. If set to Allow Start, the DCU will crank the engine upon timeout. If set to Abort Start, the DCU will abort the start sequence and issue a Prelube Failure alarm.</p>
--	--

Prelube Until Running selects if the prelube output shall be activated until engine RPM passes the Run Setpoint.

Override Allowed selects if a prelube should be possible to manually override, to continue the start sequence with an incomplete prelube sequence.



The override is performed in the Controls form on the DCU.

Activate ETR During Prelube selects if the ETR output should be activated when prelubing.

Oscillating Prelube

The DCU can prelube the engine continuously, in a never ending sequence. The sequence is disabled while the engine is running.

Oscillating Prelube	
Oscillating Prelube:	Yes ▾
On Time [seconds]:	15
Off Time [minutes]:	10
Start with On Time:	No ▾
Oscillating Feedback:	Yes ▾
Oscillating Feedback Time [seconds]:	15

Oscillating Prelube enables the oscillating prelube. This function is activating the Prelube Activation output and output function.

Oscillating On Time sets the number of seconds the DCU shall lubricate the engine. Typical setting is 60 seconds.

Oscillating Off Time sets the number of minutes between each lubrication action. Typical setting is 60 minutes.

Start with On Time After stopping the engine and the DCU reaches ready state, this setting dictates whether it should drive the prelube output directly for the configured duration or instead wait for the configured Off Time to expire before doing so.

Oscillating Feedback selects if feedback from the oscillating prelube is required. The feedback will have to be connected to prelube complete.

Oscillating Feedback Time sets the time for oscillating feedback failed warning, Prelube Failure.

Prelube Complete Signal

Prelube Complete Source selects the channel to be used as a prelube complete indication. This is typically the “Prelube Complete Switch” input signal, but can be changed if needed.



The prelube complete signal is used for both normal prelube and oscillating prelube.

Postlube

The DCU can be configured to postlube the engine at stopping. Postlubing takes place in Stopping and Stopped states.

Postlube	
Postlube Type:	Fixed Time ▾
Postlube Time [minutes]:	10
Postlube RPM Threshold [RPM]:	400
Postlube Activate "Prelube Activation" Output:	No ▾

Postlube Type enables the postlube. Selectable choices are **No Postlube** or **Fixed Time**.

Postlube Time specifies the total time to postlube during a stop sequence.



The postlube time can make the DCU stay in Stopped state longer than normal before going to Ready state.

Postlube RPM Threshold specifies under which RPM level Postlubing should start during the stop sequence of the engine.

Postlube Activate "Prelube Activation" Output selects whether postlube shall also activate any "Prelube Activation" outputs.



There is an output function called Postlube Activation. This output function can be used to signal an lube pump or similar to perform the actual postlubing.

Automatic Start

The DCU can start the engine automatically. In order for an automatic start to begin the DCU must be in automatic mode, and an automatic start request must be initiated (for instance terminal 89 on DCU 410E).

Automatic Start	
Initial Start Delay [seconds]:	1
No. of Start Attempts (per starter):	3
Prelube Before Each Start Attempt:	No ▾

Initial Start Delay sets the time before the first start attempt is performed when an automatic start attempt is initiated. Typical setting is 1 second.

No. of Start Attempts sets the total number of start attempts. Typical setting is 3.

Prelube Before Each Start Attempt selects how the prelubing shall be performed on an automatic start attempt. Select **Yes** to prelube before each start attempt. Select **No** to prelube before the first attempt only.

Starter 1

Starter 1

Cranking Time [seconds]:

Disengage Crank Output [RPM]:

Delay Between Start Attempts [seconds]:

Starter Type:

Cranking Time sets the time the starter engine is engaged. Typical setting is 5 - 7 seconds.

Disengage Crank Output allows the crank output to be disengaged before the RPM Setpoint is reached. This is achieved by assigning this value slightly lower than the configured setpoint. The DCU de-energizes the crank output, but remains in the cranking state when this threshold is reached.



When this setting is used it applies to both Starter 1 and Starter 2 if Secondary Starter is enabled..

Set to 0 to disable this feature. In this case the crank output is energized throughout the entire cranking phase.

Delay Between Start Attempts selects the delay between start attempts in an automatic start. If the engine did not start after the previous attempt, it will delay this many seconds until it does the next start attempt. Typical setting is 5 - 7 seconds.



The timer starts when the engine rpm is less than 5 RPM.

Starter Type sets the starter type.



Starter Type is only available if Secondary Starter is selected.

Starter 2

Starter 2

Enable Secondary Starter:

Cranking Time [seconds]:

Delay Between Start Attempts [seconds]:

Starter Type:

Enable Secondary Starter enables a dual starting functionality. Select **Yes** for dual starting, and **No** for just starting the one engine.



If the Secondary Starter is enabled, a 2nd crank output needs to be configured on an output.

Cranking Time and Delay Between Start Attempts are the same as for Starter 1.

When Starter 2 is enabled, start modes can be selected under the General section.

Automatic Start Mode:

Manual Start Mode:

Automatic Stop

The DCU can stop the engine automatically. In order for an automatic stop to begin the DCU must be in automatic mode, and an automatic stop request must be initiated (for instance terminal 90 on DCU 410E).

Automatic Stop	
Delay Before Disconnecting Generator Breaker [seconds]:	180
Cooling Time [minutes]:	3

Delay Before Disconnecting Generator Breaker sets the time the DCU will wait when an automatic stop is initiated before disconnecting the generator breaker, if any. Typical setting is 1 - 60 seconds.



The Disconnect Generator Breaker signal is not a standard output signal, and must be configured to a suitable 24V or relay output.

Cooling Time sets the time the engine will continue to run (with no load) to cool down. When the timer has elapsed, the DCU will stop the engine. Typical setting is 1 - 5 minutes.

Stopping

Configurable settings for stopping.

Stopping	
Stopping Time [minutes]:	1
Safety Stopping Time [seconds]:	30
Time Hysteresis for Unsolicited Stopped [seconds]:	0

Stopping Time sets the time for the duration of the stop sequence before issuing a stopping failure event.

Safety Stopping Time is the time for the duration of safety stopping, where the DCU has lost all run indications.

Time Hysteresis for Unsolicited Stopped is the configurable time for which the engine speed needs to be below 5 RPM in order to transition to stopping from a running state.

7 Communication

All the panel communication interfaces.



7.1 Network

Set the IP address, netmask and gateway for the DCU.

The default values are as follows:

- IP address: 192.168.0.101
- Netmask: 255.255.255.0
- Gateway: 192.168.0.1

Make sure the IP address is unique on the network.

If installing the DCU in an already established ship Ethernet environment, consult the network manager to obtain an IP address.



The last two digits form the engine number, as part of the engine name.
 Example: The Engine name is “Auxiliary”, the IP address is selected as 192.168.0.110. The engine name then becomes “Auxiliary #10”.

7.2 Broadcast

Broadcast is a remote monitoring solution that allows certain data managed by the DCU to be securely uploaded to a cloud server on the internet. This allows any Internet connected site to view the data from a remote location. Examples of data being broadcasted by the DCU are the alarm list and live sensor data.



In order for Broadcast to function the DCU must have access to an Internet connected uplink. The DCU will attempt to use the configured gateway to reach the Internet. See the “Network Configuration” section.

By enabling broadcast the DCU will automatically attempt to send data to the Broadcast cloud server.



Be advised that as this service is relying on an Internet uplink, additional traffic costs may be incurred as a result.

Note, certain OEM versions of the DCU software do not support this function.

7.3 LSU 408

Selects the IP address for the LSU 408.

7.4 Modbus RTU

The DCU has an built-in Modbus RTU communication interface.



The Modbus register map is the same as for the Modbus TCP interface.
For DCU410E/408E, the Modbus RTU interface is optocoupled and needs to be powered with 24 V.

Modbus RTU

Note! For best performance consider the following tips:

- Use a high-quality twisted pair cable with shield.
- Take care to use the shortest possible cable.
- Make sure the cable shield is connected at only one end.
- If possible have the cable travel alone. Not together with any other cables, especially power cables.
- Make sure the cable is terminated with 120 Ohm resistors at both ends.

Address:

Baudrate:

Parity:

Maximum Timeout [s]:



home / dcu / communication / modbus rtu

Address selects the Modbus address for the DCU.

Baudrate and Parity select the communication parameters. The interface always uses 8 data bits and 1 stop bit.

Maximum Timeout selects the maximum time a request is allowed to take. If a request takes longer the reply is silently discarded.

7.5 Modbus TCP

The DCU has a built-in Modbus TCP communication interface.



The Modbus register map is the same as for the Modbus RTU interface.

Modbus TCP

Maximum Timeout [s]:

Block Write Requests [FC 05, 06, 15, 16]:

| [home](#) / [dcu](#) / [communication](#) / [modbus tcp](#)

Maximum Timeout selects the maximum time a request is allowed to take. If a request takes longer the reply is silently discarded.

Block Write Requests selects whether all write requests shall be blocked.

7.6 J1939

This section covers configuration of communication relating to both J1939 interfaces.

[/ home](#) / [dcu](#) / [communication](#) / [j1939](#)

J1939:1

J1939:2

J1939:1

General

Source Address [hex]:

Request Address [hex]:

Note! Request address is the address to which on-request PGNs are requested. A request address of 0xff is broadcasted.

Allowed Source Addresses

Allow All:

Allowed DM1 Source Addresses

Allow All:

Other

Periodic DM53 Requests Enabled:

Note! Active service only DTCs (DM53) will be added to alarm list.

Node Monitoring

Note! A configured node, not present on the J1939 network, is defined as "high". If any event is configured, the node will be shown in the alarm list.

Number of Configured Nodes [max 32]:

| [home](#) / [dcu](#) / [communication](#) / [j1939](#)

Source Address sets the DCU address for the J1939 interface. Default setting is 0xF2 on both interfaces.

Request Address selects which J1939 address the DCU should request PGNs which are defined by SAE to be on-request. 0xFF is a broadcast request. Default setting is 0x00 on both interfaces.

Allowed Source Addresses defines a list of source addresses the DCU should accept sensor data from. Default behavior is that the DCU accepts data from any source address. If selecting No, an input field is shown in which a comma separated list of source addresses can be defined. Example: 0x00, 0x01, 0xF0

Allowed DM1 Addresses makes it possible to filter DM1, so that the DCU only received DM1 from certain J1939 nodes on the network. Up to 10 addresses can be filtered by the DCU.

Periodic DM53 Requests sets if the DCU should periodically request DM53 (Active service codes). Any DM53 replies will be added to the alarm list.

Node Monitoring instructs the DCU to monitor received CAN data and generate an event should any of the configured source addresses not broadcast on the bus.

Configure how many source addresses (nodes) the DCU should monitor and configure each with its name, source address, event severity etc. Example:

Number of Configured Nodes [max 32]: <input type="text" value="2"/>				
#	Name	Address	Event When Lost	
1.	SB Main ECM	0 (0x00)	Alarm	Edit Node
2.	SB Secondary ECM	1 (0x01)	Alarm	Edit Node

7.7 Communication Info

The page on the web interface contains useful information, especially when utilising the Modbus Alarm Log.

Carefully read through the register encoding and download the id-mapping files to be able to decode the Modbus registers for the Modbus Alarm Log.

8 Miscellaneous

These configuration items do not naturally belong in other sections.



Do not skip this section, as it highlights important configurations.

[/ home](#) / [/ dcu](#) / [miscellaneous](#)

- Engine Application Configuration
- Event Configuration
- Counter Configuration
- Counters
- Acknowledge Configuration
- Operation Mode Configuration
- Event Log
- Override Configuration
- Sea Trial
- Custom Version Text
- Factory Reset

Miscellaneous

 | [home](#) / [dcu](#) / [miscellaneous](#)

8.1 Engine Application Configuration


Configuration of the Engine Application and displays which modes of operation are available for said application.

Engine Application

Engine Application: Auxiliary ▼

Submit

Engine Application	Available Modes
Auxiliary	Local Manual Automatic
Combined	Local Harbor Emergency
Propulsion	Local Remote
Emergency	Local Emergency

 | [home](#) / [dcu](#) / [miscellaneous](#) / [engine application configuration](#)

Auxiliary

Operator Mode selections

- Automatic
- Manual
- Local

Combined

Operator Mode selections

- Emergency
- Harbor
- Local

Propulsion

Operator Mode selections

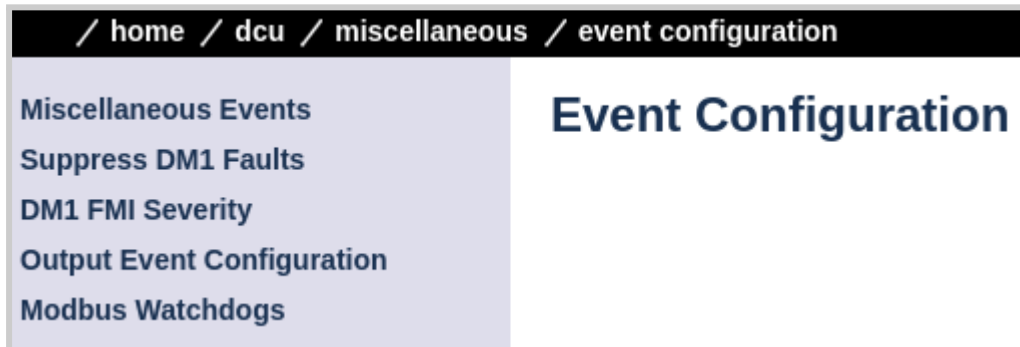
- Remote
- Local

Emergency

Operator Mode selections

- Emergency
- Local

8.2 Event Configuration



home / dcu / miscellaneous / event configuration

8.2.1 Miscellaneous Events

Miscellaneous Events

Power

Primary Power Fail Alarm Enabled: ▾

Secondary Power Fail Warning Enabled: ▾

Communication

J1939 CANbus Broken Wire Alarm When Engine Not Running: ▾

J1939 CANbus Nodes Lost Warning Enabled: ▾

Erratic J1939 Data Warning Enabled: ▾

J1939 CANbus Red Lamp Severity: ▾

J1939 CANbus Amber Warning Lamp Enabled: ▾

RP Lost Warning Enabled: ▾

LSU 408 Lost Warning Enabled: ▾

Other

Shutdown Override Warning Enabled: ▾



home / dcu / miscellaneous / event configuration / miscellaneous events

Primary Power Fail Enabled and Secondary Power Fail Enabled are used to enable events when either supply is low. Typical setting is **Yes**, as the DCU 410E/408E should be powered by two individual power supplies.



Primary Power Fail Enabled and Secondary Power Fail Enabled are only available on DCU 410E/408E.

If the secondary power is not in use, the low voltage alarm on this input needs to be disabled.

J1939 CAN bus Broken Wire Alarm When Engine Not Running selects if the DCU should issue an event (J1939 Data Link Inactive) when the J1939 link is detected as idle. Some engines' electronic control modules (ECM) stop sending CAN traffic when the engine is not running or when stopping a running engine. To avoid nuisance alarms in these situations, set this setting to **No**.

J1939 CAN bus Nodes Lost Warning selects if the DCU should issue an event (J1939 Nodes Lost) when a J1939 node is lost on the network.

Erratic J1939 Data Warning Enabled selects if erratic data on the SPN should generate a sensor fault warning for that SPN.

J1939 CANbus Red Lamp Severity configures how the DM1 red lamp signal status is handled by the DCU. The DCU can be configured to **Disabled**, **Alarm**, or **Shutdown**.

J1939 CAN bus Amber Warning Lamp Enabled configures whether the DM1 amber lamp should generate a warning or not.

RP Lost Warning Enabled selects whether the DCU should issue a warning when a connected RP is lost.

Shutdown Override Warning Enable Control whether shutdown override should drive the buzzer or not.

8.2.2 Suppress DM1 Fault

The ability to suppress combinations of SPN and FMI appearing on the J1939 interface.

Suppress DM1 Faults

SPN	FMI	
<input type="text" value="0"/>	<input type="text" value="All FMIs"/>	<input type="button" value="Suppress"/>



home / dcu / miscellaneous / event configuration / suppress dm1 faults

8.2.3 DM1 FMI Severity

Each FMI can be configured to either **Inactive**, **Maintenance**, **Warning**, **Alarm**, or **Load Reduction**.

8.2.4 Output Event Configuration

Output Event Configuration

Latched is defined as active or unacknowledged event in alarm list.

Latched Outputs For Threshold Events:



home / dcu / miscellaneous / event configuration / output event configuration

Latched Outputs For Threshold Events selects whether the individual threshold events (Warning High Event, Alarm High Event etc) used within the DCU should be latched or not. Latched is defined as an active or unacknowledged event in the alarm list.



The common output events (for instance Event: 4-20mA #1) are always latched.

8.2.5 Modbus Watchdogs

Modbus Watchdogs can be used to generate events if an external device does not kick the watchdog in the DCU within a configured time.



In order to kick the watchdog, external devices must write a logical '1' to the Modbus coil.

Reading the Modbus coil will show if the watchdog has timed out or not.

Modbus Watchdogs

Name	Channel Use	Update Interval [sec]	Address
Modbus Watchdog #1	Not In Use	5	70
Modbus Watchdog #2	Not In Use	5	71
Modbus Watchdog #3	Not In Use	5	72
Modbus Watchdog #4	Not In Use	5	73
Modbus Watchdog #5	Not In Use	5	74



home / dcu / miscellaneous / event configuration / modbus
watchdogs

8.3 Counter Configuration

Counter Configuration

Display

General

Note! By enabling any of the general counters below, a dedicated "Counters" form is made available in the "Log & Counters" menu form on the DCU and RP.

Show Hours:

Show Idle Hours:

Show Fuel:

Show Fuel Average:

Show Distance:

Show Fuel Economy:

Diesel Exhaust Fluid and Aftertreatment

Note! By enabling any of the diesel exhaust fluid or aftertreatment counters below, a dedicated "Aftertreatment Counters" form is made available in the "Log & Counters" menu form on the DCU and RP.

Show Diesel Exhaust Fluid Tank 1 Empty:

Show Diesel Exhaust Fluid Quality Malfunction:

Show Diesel Exhaust Fluid Frozen:

Show Aftertreatment SCR Malfunction:

Show SCR Operator Inducement Total:

Show SCR High Temperature Time:

Regulated Exhaust Emission Level Exceedance (DM32)

Regulation:

Source

General

Engine Hours Input Source:

Idle Hours Input Source:

Total Fuel Input Source:

Instantaneous Fuel Input Source:

Diesel Exhaust Fluid and Aftertreatment

Diesel Exhaust Fluid Tank 1 Empty Source	J1939: Diesel Exhaust Fluid Tank 1 Empty Time	SPN 6817
Diesel Exhaust Fluid Quality Malfunction Source	J1939: Diesel Exhaust Fluid Quality Malfunction Time	SPN 6818
Diesel Exhaust Fluid Frozen Source	J1939: Diesel Exhaust Fluid Frozen Time	SPN 7938
Aftertreatment SCR Malfunction Source	J1939: Aftertreatment SCR Malfunction Time	SPN 6819
SCR Operator Inducement Total Source	J1939: SCR Operator Inducement Total Time	SPN 7095
SCR High Temperature Time Source	J1939: SCR 1 High Temperature Time	SPN 8327



home / dcu / miscellaneous / counter configuration

Display

Configures what counters to show.

Source

Set the counter source to be either from the J1939 CAN bus, or from a locally generated counter in the DCU.

- Typically, on an electronic engine this shall be set to J1939.
- Likewise, if there is no CANbus on the engine, this setting must be Local for the counters to work.

8.4 Counters

The DCU calculates and stores engine running hours.

home / dcu / miscellaneous / c

Counters

General

	Total	Since Start	Since Reset
Engine Hours	N/A	N/A	N/A
Idle Hours	N/A	N/A	N/A
Total Fuel	N/A	N/A	N/A
Fuel Average	N/A	N/A	N/A
Distance	N/A	N/A	N/A
Fuel Economy	N/A	N/A	N/A

Update Local Calculated Values

Engine Hours [h]:	<input type="text" value="0"/>	<input type="button" value="Set"/>	
Idle Hours [h]:	<input type="text" value="0"/>	<input type="button" value="Set"/>	Idle Hours is incremented when engine is running below 600 RPM
Total Fuel [l]:	<input type="text" value="0"/>	<input type="button" value="Set"/>	
Total Distance [NM]:	<input type="text" value="0"/>	<input type="button" value="Set"/>	

ounters

General

Display of current counters.

Update Local Calculated Values

If required, the local calculated counters can be updated / adjusted here.

8.5 Acknowledge Configuration

Acknowledge Configuration

Only Acknowledge Visible Events: ▼

Disable Remote Acknowledge: ▼

Enable DM11: ▼

Perform SDU Acknowledge over Modbus: ▼

home / dcu / miscellaneous / acknowledge configuration

Only Acknowledge Visible Events selects if the DCU can only acknowledge events that are visible in the current view of the alarm list when performing an acknowledge all.

Disable Remote Acknowledge can disable all types of remote acknowledge.

Enable DM11 selects if the DCU should perform a DM11 request when an acknowledge all is performed.

Perform SDU Acknowledge over Modbus is used to acknowledge SDU events over the SDU Link when one or many SDU events are acknowledged in the DCU alarm list.

8.6 Operation Mode Configuration

Operation Mode Locked to Input can be used to lock the operation mode to switch inputs.

When this is selected, the DCU will react to operation mode changes on fixed or configured input channels only. The DCU also defaults to the following:

- LOCAL (set REMOTE on input channel to change)
- MANUAL (set REMOTE and AUTOMATIC on input channel to change)

8.7 Event Log

The DCU has a built-in event log. The event log is the same as seen on the unit.



Everything

This displays a list of all events in chronological order.

Alarms Only

This displays a list of all warning, alarm and autostop (shutdown) events.

User Interaction Only

This displays a list of all button presses.

- Local Start/Stop Button
- Local Alarm List Button
- Service Complete Button
- Service Remind me later Button

Commands Only

This displays a list of all remote commands to the DCU.

Events Only

This displays a list of all events that are not alarms.

- Automatic Mode input (terminal 88, or configurable input configured as Automatic Mode).
- Speed Switches
- Prelube Override
- Power On/Off
- Crank Without Prelube
- Start Disabled input (terminal 87)

Sequence Only

The following events are logged as Sequence.

- Automatic Start/Stop (terminal 89/90)
- Remote Start/Stop (terminal 91/92)
- Remote Acknowledge (terminal 93)
- Remote Start/Stop by command (RP and Modbus)
- Remote Acknowledge by command (RP and Modbus)

Save As...

The current list of events can be saved into a text file.

8.8 Override Configuration

Override Configuration

Shutdown Override Configuration

SDU

Transmit Shutdown Override to SDU:

J1939

Transmit Shutdown Override J1939:1 [SPN 1237]:

Transmit Shutdown Override J1939:2 [SPN 1237]:

Shutdown Override from J1939:

Load Reduction Override Configuration

J1939

Transmit Load Reduction Override J1939:1 [SPN 9174]:

Transmit Load Reduction Override J1939:2 [SPN 9174]:

Load Reduction Override from J1939 [SPN 9173]:



home / dcu / miscellaneous / override configuration

Shutdown Override Configuration

Transmit Shutdown Override to SDU automatically transmits shutdown override to SDU over the SDU Link.



This does not affect the transmitting of shutdown override from SDU to DCU.

Transmit Shutdown Override J1939 selects if the DCU should transmit shutdown override over J1939 link.

Shutdown Override from J1939 selects if the DCU should use shutdown override from J1939.

Load Reduction Override Configuration

Transmit Load Reduction Override J1939 selects if the DCU should transmit load reduction over J1939 link.

Load Reduction Override from J1939 selects if the DCU should use load reduction override from J1939.

8.9 System Voltage Configuration



This function is only available on DCU 210E/208E.

System Voltage Configuration

System Voltage

System Voltage:

Power Bank

Power Bank Enabled:

Supply Voltage Drop [V]:



home / dcu / miscellaneous / System Voltage Configuration

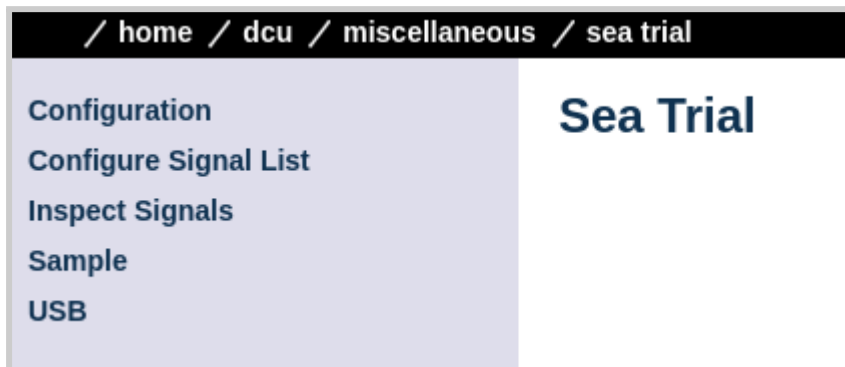
System Voltage The 200E Series is designed to be used in either 12VDC or 24VDC installations.

Select the correct system voltage for this application.

Power Bank Enabled can be used to add an offset to the supply voltage measured by the DCU.

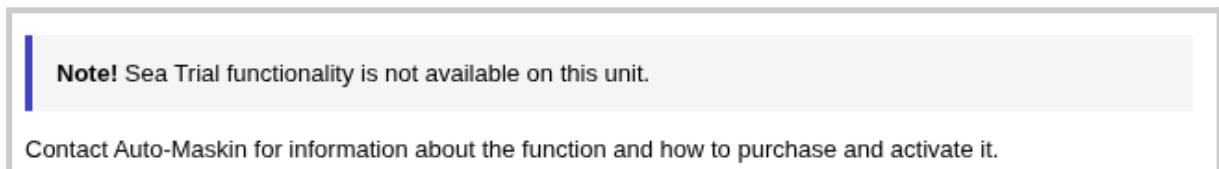
Supply Voltage Drop is added to the measured voltage by the DCU and the resulting voltage is used both when displaying Input Voltage and in diagnostics. This function can for instance be used to compensate for voltage drops on the supply induced by external power banks or diodes.

8.10 Sea Trial

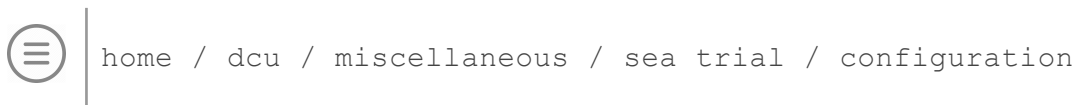


The Sea Trial functionality in the DCU provides tools to define and sample sensor data during sea trials.

Sea trial is a non standard feature, and if not available this text is shown:



8.10.1 Configuration



Sea Trial Mode Enabled activates sea trial related functions and configuration options.

Sea Trial Active Reminder Warning makes it possible to deactivate a reminder warning that would otherwise be displayed in the Alarm List as long as Sea Trial Mode is enabled.

8.10.2 Configure Signal List

Configure Signal List

Signals

4-20mA #1	<input type="button" value="Remove"/>
Switch Input #1	<input type="button" value="Remove"/>
Gear	<input type="button" value="Remove"/>
Engine Hours	<input type="button" value="Remove"/>
Input Voltage	<input type="button" value="Remove"/>
Engine Speed	<input type="button" value="Remove"/>
Coolant Temp.	<input type="button" value="Remove"/>

Append Signal

Signal: ▼

List Presets

▼



home / dcu / miscellaneous / sea trial / configure signal list

This section is used to define a list of sensor data that is to be sampled during a sea trial run.

Signals

Displays the currently configured list of signals.

Append Signal


By selecting a signal from the combo box and clicking Submit, the chosen signal is added to the list. Any signal currently enabled (including signals configured as Seatrial Only) can be added to the list. It is only possible to add a signal once, so only signals currently not on the list are available.

List Presets

Provides a few predefined list options. If selecting any of these options and pressing submit, the current list is replaced by a preset list of signals.

8.10.3 Inspect Signals

Inspect Signals	
Description	Status
4-20mA #1	25.71 Percent
Switch Input #1	1 (Digital)
Gear	0 (Enum)
Engine Hours	1.77 hour
Input Voltage	21.65 Volt
Engine Speed	Not Available
Coolant Temp.	Not Available

 | home / dcu / miscellaneous / sea trial / inspect signals

Provide a quick view of the status of the current list of sea trial signals. Each signal is displayed together with its current value if available. Reload the page to get a new reading of signal values.

8.10.4 Sample

 | home / dcu / miscellaneous / sea trial / sample

Can be used for sea trial to retrieve a sample of all configured signals. If a USB stick is inserted in the DCU the sample is also stored on the USB drive.

8.10.5 USB

 | home / dcu / miscellaneous / sea trial / usb

Provides USB related functions during sea trial mode if a USB stick is inserted. For example the complete data log can be downloaded.

8.10.6 Preparation for Sea Trial

To aid the personnel performing the Sea Trial consider adding the Sea Trial sample button under Shortcuts to make it convenient to reach the Sea Trial form from any instrument page shown on the DCU. See the Shortcuts section under the User Interface chapter above.

Also remember to enable Sea Trial mode as described in the Configuration section in this chapter.

8.11 Custom Version Text

Custom Version Text

RECOMMENDED FORMAT

<code><Device Description>:</code>	<code><Version Identification></code>
Examples:	
RIO 412:	v6.0.3
ACME I/O Converter:	4.0.0.4-beta

Note! Max 255 characters allowed in the text (depending on language used).
 Characters NOT allowed in the text: " (quote)

Any custom version text can be entered here and be made available for view in the DCU panel.

8.12 Factory Reset

Command for factory resetting the DCU.



A factory reset removes the current configuration from the DCU. Consider making a backup before carrying on.

9 Communication Interface List

The DCU Communications Interface List covers the communication interface for

- Modbus RTU (COM 3 for DCU410E/408E)
- Modbus TCP (COM 6 for DCU410E/408E)

The Communication I/O list is available online from one of the following links

- Click [here](#), or
- <https://goo.gl/MP7EQM>

9.1 DCU Capacity

9.1.1 Functionality and Content Highlights

- 2 x 24 V DC redundant supply (DCU 410E/408E only)
- 5.7" TFT colour
- Touch interface (DCU 210E only)
- RP 210E, 410E and RP 480i Remote Panel link (TCP/IP)
- Internal web server for configuration and support
- PIN code protected configuration

- User selectable units (U.S. / Metric)
- True multilingual
- Sophisticated alarm configuration
- Supply voltage monitoring and alarm
- Extensive alarm list with ECM diagnostics
- SPN/FMI codes, translated into current selected language
- Log of all events
- Configurable prelube functionality
- Service interval timers
- Ambient light sensor for automatic backlight adjustment (DCU 410E only)
- Calculated approximate fuel consumption values
- Certified by major classification societies (DCU 410E/408E only)

9.1.2 Total I/O capacity

The I/O capacity of the DCU can be expanded using one or more of the RIO units.

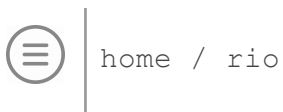
Signal type	DCU 400E	DCU 200E	RIO 410	RIO 210	RIO 412	MK-14
4-20 mA	4	19	9	-	-	-
PT100	4	2	8	8	-	-
Switch Inputs	8	21	4	6	-	-
Thermocouple K-type	0	0	2	2	20	-
Configurable Relays	2	2	2	2	-	14
Configurable 24V Out	4	19	2	2	-	-
0-5V Inputs	0	19	1	8	-	-
J1939 Channels	Many	Many	-	-	-	-
RIO 410 Support	4	1				
RIO 210 Support	1	1				
RIO 412 Support	1	1				
MK-14 Support	1	-				



Note that the standard I/O capacity of the DCU210E/208E utilises flexible I/O, meaning a total of 19 I/O are available for 4-20mA, Switch Input, 24V output, and voltage input. If the secondary J1939 interface is not used, additional 2 switch inputs can be used.

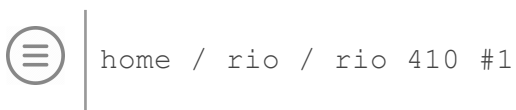
10 RIO Configuration

The configuration of RIO units is part of the DCU configuration. From the DCU web interface home page, select RIO.



10.1 Standard RIO

All standard RIO units, such as RIO 410, can be configured in the DCU web interface.



Hardware Configuration

Enable for every RIO device if a warning for lost device should be given.

All I/O configuration of the RIO 410 is configured as normal channel configuration as described earlier.

10.2 3rd Party Integration

10.2.1 RIO Generic

The DCU supports custom integration to any Modbus RTU device.

RIO Generic Analog #1

Configure

assign custom name

Modbus

Node Id:

Address:

Function Code:

Data Type:

Resolution:

General

Channel Use:

Sensor

Sensor Unit:

Display

US	Metric
Display Unit: <input type="text" value="Percent"/>	<input type="text" value="Percent"/>
Display Range Min: <input type="text" value="0.00"/>	<input type="text" value="0.00"/>
Display Range Max: <input type="text" value="100.00"/>	<input type="text" value="100.00"/>
Display Major Divider: <input type="text" value="20.00"/>	<input type="text" value="20.00"/>
Display Minor Divider: <input type="text" value="10.00"/>	<input type="text" value="10.00"/>
Display Multiplier: <input type="text" value="1"/>	<input type="text" value="1"/>
<input type="button" value="Update Metric"/>	<input type="button" value="Update US"/>

Mirrored View:

Alarming (in Metric Units)

Event:



home / rio / rio generic / i/o configuration

All I/O configuration of the RIO Generic is configured as normal channel configuration as described earlier, with the following additional configuration.

Node Id specifies Modbus node address.

Address defines the Modbus register address, and the Function Code defines the actual function code to be used.

Data Type specifies the actual data type. Selections are 16-bit, 32-bit, and 32-bit swapped.

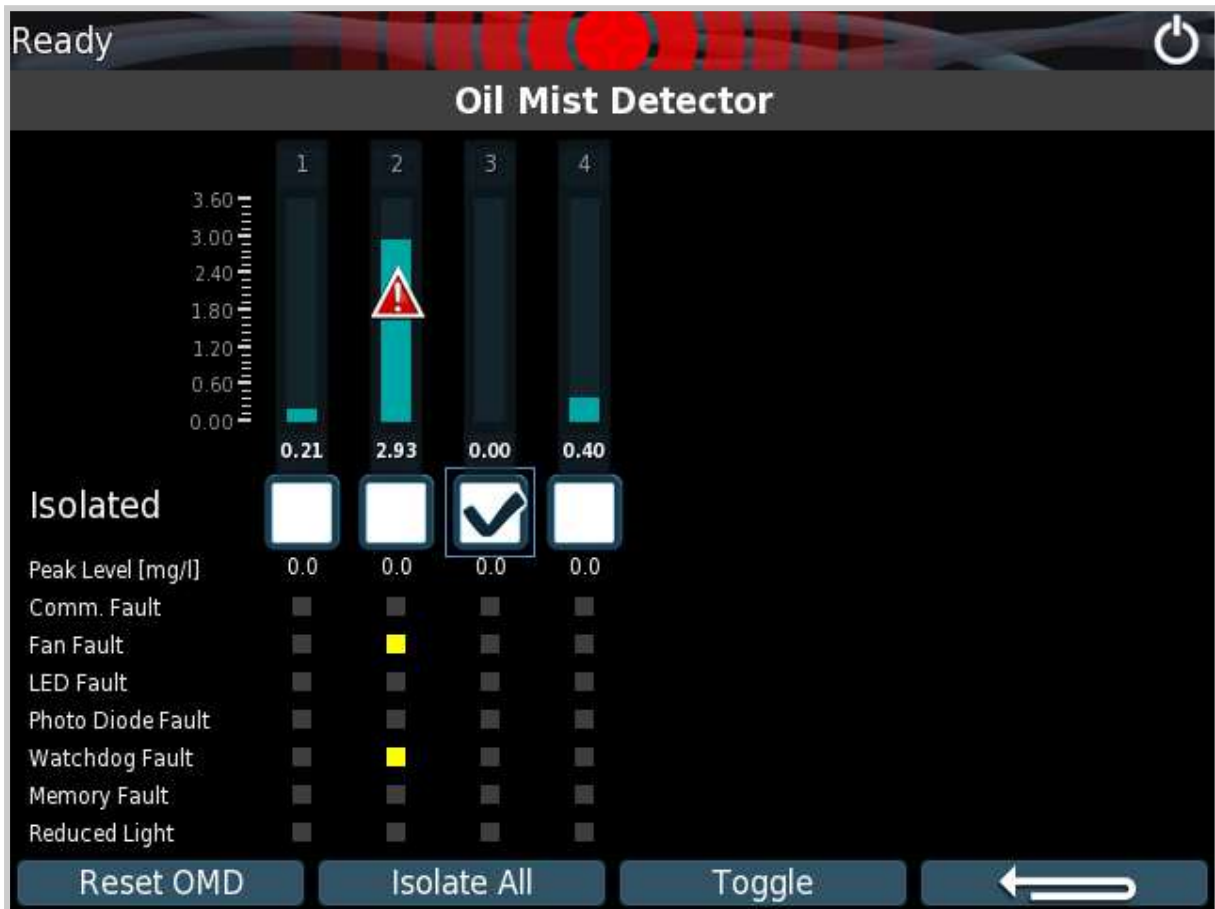
Resolution defines the multiplier.



Any RIO generic signal configured will perform a Modbus request, which can impact the responsiveness of other RIO units.

10.2.2 OMD Mk7

This refers to a special Oil Mist detector from Kidde Graviner called Mk7. Marine features pre-programmed functionality for this particular system.



The DCU communicates with the Mk7 using the Modbus RIO link. The DCU is pre-programmed to use 19200 8E1 communication parameters. It expects the Mk7 to respond to Modbus ID 1.

Current Oil Mist Level and Peak Oil Mist Level can be configured as normal analog input signals.

OMD Detector #1 Current Oil Mist Level

Configure

assign custom name

General
 Channel Use:

Sensor
 Sensor Unit: **Note! Submit to apply new unit.**
 Sensor Range Min: 0.00
 Sensor Range Max: 3.60

Display	Metric
Display Unit: <input type="text" value="mg/l"/>	<input type="text" value="mg/l"/>
Display Range Min: <input type="text" value="0.00"/>	<input type="text" value="0.00"/>
Display Range Max: <input type="text" value="10.00"/>	<input type="text" value="10.00"/>
Display Major Divider: <input type="text" value="2.00"/>	<input type="text" value="2.00"/>
Display Minor Divider: <input type="text" value="1.00"/>	<input type="text" value="1.00"/>
Display Multiplier: <input type="text" value="1"/>	<input type="text" value="1"/>
<input type="button" value="Update Metric"/>	<input type="button" value="Update US"/>

Mirrored View:

Alarming (in Metric Units)
 Event:

For more details contact Auto-Maskin.

10.2.3 OMD VN2020

This refers to a special Oil Mist detector from Schaller called Visatron VN2020. Marine features pre-programmed functionality for this particular system. There is no pre-built operator screen for the VN2020, instead the DCU provides a number of inputs related to the VN2020 that are configured and used similar to standard input signal to the DCU.

Inputs

VN2020 Oil Mist Transmission

VN2020 Oil Mist Opacity

VN2020 Error Number

Events

VN2020 Ready

VN2020 Alarm

VN2020 Pre-Alarm

VN2020 Electronics Temperature
Too High

VN2020 Ambient Temperature Too
High

VN2020 Electronics Temperature
Too Low

VN2020 Suction Pressure Too
Low

VN2020 Suction Pressure Too
High

VN2020 Suction Pressure Too
Low

VN2020 Voltage of Internal Battery
Too Low

VN2020 Checksum Error EEPROM

VN2020 Common Hardware Fault

VN2020 Optical Path Value Too
High

VN2020 Optical Path Value Too
Low

VN2020 Optical Path Dirty

VN2020 Optical Path Very Dirty

The DCU communicates with the VN2020 using the Modbus RIO link. The DCU is pre-programmed to use 19200 8E1 communication parameters. It expects the VN2020 to respond to Modbus ID 48.

For more details contact Auto-Maskin.

11 SDU Configuration

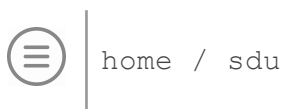
11.1 Overview

All SDUs are designed to operate independently of the DCU. To support this, each SDU variant stores its own configuration in internal non-volatile memory. As a result, an SDU can perform its configured tasks even when powered on without a DCU connection.

The DCU is used to write configuration data to an SDU whenever changes are required. During this process, the DCU also maintains a complete copy of the SDU configuration in its Configuration File for safekeeping. The DCU continuously monitors both configuration sets—the configuration stored locally in the SDU and the configuration maintained by the DCU—and reports any discrepancies that may arise (for example, when an SDU is replaced with a new unit from the factory).

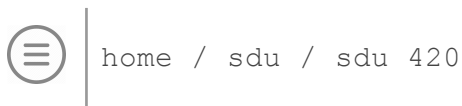
When a configuration mismatch is detected and reported by the DCU, it can be resolved by either updating the SDU with the configuration stored in the DCU or updating the DCU with the configuration currently stored in the SDU.

The DCU stores configurations separately for each supported SDU model (SDU 420, SDU 410, and SDU 404). This allows a single Configuration File to contain configuration data for multiple SDU types.



11.2 Configuration

All three supported SDU types are configured in a similar fashion. The available options and capabilities differ between the models but are basically following the same structure. As the SDU 420 carries the most features and interface it is described in this document.



The Hardware Configuration setting indicates if the DCU should expect to be connected to the SDU or not. It also provides indication to the DCU whether it should store SDU configuration in its Configuration file or not.



Important! Make sure that the Hardware Configuration for the SDU you intend to use in your installation is set to **Yes** before performing any further configuration.

With this setting set to **No** the DCU will generate a Warning if an SDU 420 is connected to the DCU, indicating that an SDU 420 has been found that the DCU did not expect. Any configuration changes made to the SDU will not be stored in the DCU Configuration File

With this setting set to **Yes** the SDU the DCU generates a warning if it is unable to detect an SDU420. This is the required setting for type approved installation to make sure an operator is notified if the DCU loses connection to the SDU and that the DCU will store the SDU configuration in its Configuration File.


11.2.1 Version

If the SDU is connected to the DCU the firmware version of the SDU is shown here.

11.2.2 Speed Sensor


Speed Sensor

Sensor Type:	<input type="text" value="Passive"/>	
Mismatch Check:	<input type="text" value="No"/>	
Pickup Pulses Per Revolution:	<input type="text" value="152"/>	Valid range: 10 - 1000
Run Setpoint [RPM]:	<input type="text" value="500"/>	Valid range: 80 - 800 RPM
Nominal Speed [RPM]:	<input type="text" value="1500"/>	Valid range: 200 - 3000 RPM
Overspeed [RPM]:	<input type="text" value="1725"/>	Valid range: 300 - 3000 RPM
Fault on MPU Generates Shutdown:	<input type="text" value="No"/>	


 home / sdu / sdu 420 / Speed Sensor

Sensor Type


Define what type of speed sensor is connected to the SDU (Active or Passive).


 This setting is only available for SDU 420 and SDU 404.

Mismatch Check

This setting instructs the DCU to provide the SDU with RPM readings based on the local Engine Speed configured on the DCU. This setting is required to be set to yes if using an active speed sensor to fulfill class rules, if using either a SDU 420 or a SDU 404.

As it is not possible to detect sensor faults on active speed sensors and the SDU 404 and SDU 420 only have a single speed sensor interface, the DCU will act as a second source of RPM. This enables these SDUs to perform mismatch checking even so.


 This setting is only available for SDU 420 and SDU 404. If using an active speed sensor on the SDU this setting must be set to **Yes**, to comply with class rules.

Pickup Pulses Per Revolution

The number of teeth on the flywheel the pickup sensor is measuring.

Run Setpoint [RPM]

This is the RPM threshold above which the SDU considers the engine to be running.

Nominal Speed [RPM]

This setting defines the engine's nominal operating speed in RPM and informs the SDU of that value. It is used exclusively during the Over Speed Test, in which the SDU temporarily sets the over-speed trip threshold to 95% of the nominal speed specified here.

Overspeed [RPM]

This setting defines which RPM value above which the SDU should initiate an overspeed shutdown.

Fault on MPU Generates Shutdown

When activated the SDU performs a Shutdown if it detects an MU sensor fault.



As only the SDU 420 and SDU 404 is capable of detecting MPU sensor faults this setting is only available for these products. Also note that it only works if using a passive pickup.

11.2.3 Switch

All switch inputs on the SDUs are 2 wire interfaces to allow for loop detection diagnostics. All switches can be given customised naming.

SDU 420 Switch Input #1

assign custom name

General

Type: Type III (Not able to detect any faults) ▼

Event: Shutdown ▼

Delay Before Load Reduction [sec]: 0 Valid range: 0 - 360

Delay Before Shutdown [sec]: 0 Valid range: 0 - 360

Delayed Shutdown [sec]: 0 Valid range: 0 - 360

Shutdown Override Disabled: No ▼

Shutdown Override #2 Disabled: Yes ▼

On Run Only: Yes ▼

Requires Gear: Yes ▼

Speed Limit Enabled: Yes ▼

Speed Limit [RPM]: 1000 Valid range: 80 - 4000

Initial Delay [sec]: 0 Valid range: 0 - 360

Submit

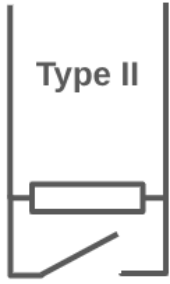



home / sdu / sdu 420 / switch

Type

Defines the type of switch to be used. There are three types of switches available.

Switch Type	Description	Schematics
Type I	Capable of both Short Circuit and Broken Wire detection. The physical switch is constructed with two 10kOhm resistors in series, where the physical switch element is shorting one of the two resistors.	

Type II	Capable of detecting broken wire only. The physical switch is constructed with one 10kOhm resistor which is shorted by the physical switch element	 <p style="text-align: center;">Type II</p>
Type III	With this switch type the SDU is unable to perform any sensor fault detection. The switch state is always reported as open or closed.	 <p style="text-align: center;">Type III</p>

Event

This setting defines the type of event the SDU should generate for the switch. Setting this to None is equivalent to disabling the switch (not using it).

Delay Before Load Reduction [sec]

Delay Before Shutdown [sec]

These settings indicates how long a switch needs to be in an active state (closed and all other preconditions active) before generating the configured Event

Delayed Shutdown [sec]

When all other conditions and possible delays has been met (which would normally trigger a shutdown) this setting delays the delay further. This delay does not stop the event from being reported but it merely delays it. When this timer starts it is reported to the DCU which shows a "Shutdown Imminent" popup to inform the operator that a shutdown situation has been detected and the SDU till shutdown the engine shortly.



If activating Shutdown Override after the Delayed Shutdown timer has started a Shutdown can be overridden, provided the input source of the shutdown allows shutdown override.

Shutdown Override Disabled

If set to Yes the switch is still active independent of whether Shutdown Override is active or not

Shutdown Override #2 Disabled

If set to Yes the switch is still active independent of whether Shutdown Override #2 is active or not.



A switch that is disabled for both types of shutdown override can never be overridden. This is typically the configuration done on switch inputs used for emergence stop buttons.

On Run Only

The engine must be running before evaluating the switch if this setting is set to **Yes**.

Requires Gear

If set to Yes the SDU will monitor the switch only if it has received indication that gear is active.



See the Miscellaneous section below on how to configure the SDU to receive gear status. The Acknowledge Switch Function can be changed to achieve this.

Speed Limit Enabled

Enables a Speed Limit for this switch.

Speed Limit [RPM]

Sets the Speed Limit value for this switch.



A Speed Limit on a switch causes the SDU needs to be fulfilled, for the SDU to evaluate the switch input for possible events. To fulfil a speed limit the engine speed must surpass the configured threshold. Also note, should the engine speed drop below the speed limit the Speed Limit is no longer considered fulfilled until the RPM drops below the configured Speed Limit minus 50 RPM.

Initial Delay

Initial Delay is only of importance if at least one of On Run Only, Requires Gear or Speed Limit is in use. The SDU waits for all of the used three conditions to have been met before evaluating the remaining event configuration.

11.2.4 Analog

Only the SDU 420 features analog inputs.

All analog inputs can be given custom names.

SDU 420 4-20 mA #1

SDU 420 4-20 mA #2

SDU 420 Thermistor

SDU 420 4-20 mA #1

assign custom name

General

Event:

Sensor

Sensor Unit: Note! Submit to apply new unit.

Sensor Range Min:

Sensor Range Max:

Alarming

Load Reduction Threshold Type:

Load Reduction Threshold:

Delay Before Load Reduction [sec]: Valid range: 0 - 360

Shutdown Threshold Type:

Shutdown Threshold:

RPM Dependent Speed @p1 [RPM]:

RPM Dependent Shutdown @p1 [Percent]:

RPM Dependent Speed @p2 [RPM]:

RPM Dependent Shutdown @p2 [Percent]:

Delay Before Shutdown [sec]: Valid range: 0 - 360

Delayed Shutdown [sec]: Valid range: 0 - 360

Shutdown Override Disabled:

Shutdown Override #2 Disabled:

On Run Only:

Requires Gear:

Speed Limit Enabled:

Speed Limit [RPM]: Valid range: 80 - 4000

Initial Delay [sec]: Valid range: 0 - 360

home / sdu / sdu 420 / switch

Most of the configuration settings relating to Analog inputs on the SDU share the same function as on a Switch input. Here we only describe the settings unique to Analog inputs.

Type

Only available on SDU 420 Thermistor. Defines the type of sensor used, P100 or PT1000.

Event

Analog inputs feature an additional Event option compared to switches called RPM Dependent Shutdown. This option allows the SDU to adjust the shutdown threshold based on the current engine speed. The fields RPM Dependent Speed @p1 and @p2 and RPM Dependent Shutdown @p1 and @p2 are interpolation points. When the rpm falls between these two points the shutdown threshold is calculated using linear interpolation. When the rpm lies outside the two points the shutdown threshold of the closest point is used.

Sensor Unit, Sensor Range Min and Sensor Range Max

Assign the unity measures by the sensor as well as its measurement range. Min corresponds to 4mA and Max corresponds to 20mA.

11.2.5 Miscellaneous

This section covers various settings.

Power Low Threshold [Volt] and Power Low Delay [sec]

Power Very Low Threshold [Volt] and Power Very Low Delay [sec]

These settings define the parameters for how the SDU should monitor its supply voltage. The Power Low diagnostics produces a Warning and the Power Very Low produces an Alarm.



These settings are only available on the SDU 404 and SDU 420.

Allow Load Reduction Override

Allow or disallow override of Load Reduction.

Automatic Buzzer Off

This function causes the SDU to sound the internal buzzer for only 1 second when a new event occurs. Normally, the buzzer continues to sound until the acknowledge button is pressed. The main purpose of this function is to assist during SDU configuration in a new project by reducing unnecessary annoyance.



Important! Remember to turn this function off when ready as it is required by class rules that the buzzer shall sound until manually silenced.

Shutdown Until Stopped Time [s]

This value sets the minimum time that must expire after the engine has stopped during a shutdown before the shutdown can be acknowledged.

Shutdown Override Switch Type

Defines the type of switch used for Shutdown Override. Type I, II and III follow the same definition as normal switches.

Shutdown Override Switch Enabled

Enables and disables the Shutdown Override Switch input.

Acknowledge Switch Type

Defines the type of switch connected to the acknowledge input. Type I, II and III follow the same definition as normal switches.

Acknowledge Switch Function

Defines the function connected to the acknowledge input. Available options are **Acknowledge** (default), **In Gear** and **Shutdown Overred #2**.

11.2.6 Output Functions

In this section the outputs on the SDU are controlled. The number of outputs (Relays or 24 V outputs) differ between the products. Also, the available Output Functions differ between the products.

Select the desired output function for each output.

Function	Description
Crank Cutoff	<p>Activates at the configured Engine Run setpoint, typically 400 RPM.</p> <p>Deactivates when the SDU senses that the engine has stopped (<5 RPM).</p>
Buzzer	<p>Activates for any new shutdown or fault.</p> <p>Deactivates when the operator commands the Acknowledge button.</p>
Fault	<p>This is the Common Fault indication.</p> <p>Activates for any new fault.</p> <p>Deactivates when all faults are acknowledged and has disappeared.</p>
Running	<p>Activates at the configured Engine Run setpoint, typically 400 RPM.</p> <p>Deactivates when the SDU senses that the engine has stopped.</p>
Overspeed Shutdown	<p>Activates for any overspeed shutdown.</p> <p>Deactivates when engine is stopped (<5 RPM, and a configurable delay), and overspeed is acknowledged.</p>
Shutdown	<p>Activates for any shutdown.</p> <p>Stays activated until the engine has stopped, and the operator commands the Acknowledge button.</p>
Load Reduction	<p>Activates for any load reduction.</p> <p>Deactivates when load reduction is inactive.</p>
Overspeed Test Mode	<p>Activates when SDU is in Overspeed Test mode.</p>
Shutdown Override	<p>Activates when SDU is in shutdown override mode.</p>

Delayed Shutdown Imminent	Activates when SDU is in shutdown imminent state.
Shutdown Until Stopped	Activates for any shutdown. Deactivates when the engine has stopped (RPM < 5, and a configurable time).
Follow Switch 1-12	Activates when the configured switch is closed.


11.2.7 Synchronize

In this section the synchronization state between the DCU Configuration File and the SDUs configuration can be reviewed and controlled.

With the SDU connected to the DCU the current status of synchronization can be reviewed. If the SDU and DCU both hold the exact same configuration a message is displayed indicating this:

Synchronize


DCU and SDU 420 configuration are intact

 | home / sdu / sdu 420 / Synchronize

If the DCU reconnects to an SDU and detects a configuration mismatch a Warning event is shown on the DCU Alarm List indicating this. In such a situation, this form lists the individual configuration options that differ, and options are given to synchronize the system

Synchronize

Name	DCU	SDU 420
Pickup Pulses Per Revolution	154	152
Switch 1 Delay Before Shutdown	2 sec	0 sec
	Update SDU 420	Update DCU

 | home / sdu / sdu 420 / Synchronize

A configuration mismatch typically occurs if configuration changes are made without the SDU connected to the DCU at the time. It also occurs if replacing an SDU or loading another configuration file in the DCU.

Update SDU

Click this button to keep the configuration held by the DCU and overwrite the conflicting settings in the SDU.

Update DCU

Click this button to keep the configuration held by the SDU and overwrite the conflicting settings in the DCU Configuration file..



Take care to select the correct synchronization option for the given situation. Once chosen, the operation is carried out immediately and cannot be reverted.

12 RP Configuration (All RPs except RP 480i)

The RP remote panel reads the engine configuration from the DCU panel, so no detailed configuration is necessary.

In addition to the Power-On wizard, this chapter explains the Administration section of the panel.



The screenshots in this section are mixed from RP 210E and RP 410E. The functionality is however the same.

12.1 Power On Wizard

When power is first applied, the RP will perform a first power-on startup wizard.

Finish the steps to proceed with the installation.



Everything in the startup wizard can be changed in the panel menu later.



Calibrate Touch Screen

This step is only used on the RP 410E. Follow the instructions on the screen to complete the calibration.

Select Installation Language

The selected language is used during the installation process only. The operator can change language in the menu later.

Select Administrator Password

First, the RP asks for the default PIN. From the factory, this is 1234.

Next, the RP asks for the administrator PIN, which must be typed twice. The PIN must be at least 4 digits long and no longer than 8 digits.

Select IP Address

The IP address shall be unique on the ethernet network.

The RP default address is 192.168.0.201.



If installing several panels in the same network, make sure they all have unique addresses.

Select Panel Location

Select the location that best matches the location of the panel.

This information is used on other RP remote panels only.

DCU Connection / Scan for DCUs

Press the Search button to search for DCU engine panels in the network.



The RP 210E can connect to one DCU engine panel only.

The RP 206E/220E/420E can connect to two DCU engine panels.

The RP 410E can connect to eight DCU engine panels.

If the engine panel is not ready at this time, simply proceed. This step can be revisited in the RP panel menu later.

Done

The RP startup wizard has now finished.

If no DCU panel has been attached, then the RP menu is displayed.

12.2 Administration Menu

To get to the Administrative menu, do as follows.

1. Press the Home button
2. Select the Settings icons
3. Select the Administration icon
4. Enter the Administration menu by entering the PIN code.

The RP administration menu has installation selections that should be considered for each installation.



12.2.1 DCU Connection / Connections

In the DCU Connection menu, press the Search button. The panel will list all available DCU engine panels on the network.

For the RP 210E, select an engine and press the Ok button.

For the RP 206E/220E/420E, select up two engines and press the Ok button.

For the RP 410E, select up to eight engines and press the Ok button.



For RP 206E/220E/420E and RP 410E, toggle the ignore check box on or off to assign a desired set of connected DCUs.

Ignoring a DCU makes it completely invisible to an operator on the RP.

Once ready with the selection, press Ok and the RP will automatically self-configure to match each of the selected DCUs configuration.

The RP has now saved the connection and will be displaying the instruments pages from the connected DCU.

12.2.1.1 Manually Assignment of DCUs

It is possible to manually assign DCUs to the RP, in case a router is used blocking the DCU / RP discovery protocol mechanism.


Manual DCU

Add DCU

IP Address:


 home / rp / communication / manual dcu

Add the IP address of the DCU. Up to 5 DCUs can be manually added.


 When a DCU is manually added, the operator needs to enable it manually using the DCU Connection in the RP panel.

12.2.2 DCU Alarms


If enabled, the RP will display all alarms from the DCU engine panel.

If disabled, the RP will not display any alarms from the DCU engine panel. This is typically used in the wheelhouse, if there is another RP panel in a manned engine control room.

12.2.3 DCU Acknowledge

This controls how the RP shall handle alarm reset and acknowledge.

No Engines

 Not Active Station

DCU Acknowledge

Acknowledge Mode

Not allowed Never allow DCU acknowledge

Silence only Only silence DCU buzzer


Ack & Silence Acknowledge and silence DCU buzzer

Acknowledge Options

Only Acknowledge Visible Events

DCU Acknowledge without being Active Station.

Ok



Acknowledge Mode

- **Not allowed.** The RP can not acknowledge engine alarms. Select this only if the alarms are to be acknowledged in another panel instead.
- **Silence only.** The Buzzer can be silenced, but the alarms can not be acknowledged.
- **Ack & Silence.** Full acknowledge control, just as on the local DCU engine panel.

Acknowledge Options

- **Only Acknowledge Visible Events.** Check this option to not be able to acknowledge all alarms with a long-press (1 sec) on the Acknowledge button.
- **DCU Acknowledge without being Active Panel.** Allow acknowledge of DCU engine alarms independent of active panel.

12.2.4 IP Address

If necessary, change the RP panel IP address.

Always make sure that

- The three first digits are equal for all panels in the network.
- The last digit is unique in the Ethernet network.

Changing the RP IP address does not require a new DCU Connection to be performed.



Make sure the new IP address is unique on the network.

12.2.5 Cameras

Connect an IP camera to the Ethernet network, and key in the camera IP address. The RP can connect and display images from IP cameras. Below is an example picture from the galley.



Select the camera type and set the IP address (as printed on the camera) for the camera.



The RP 206E/210E/220E/420E support 1 camera, where the RP 410E supports up to 4 cameras.

Each camera needs to have a unique IP address.

If using the Generic Camera Type, the protocol must be selected, either HTTP or RTSP. Only limited configuration of the Generic camera type is available from the panel screen. Should more advanced configuration be required, such as login details and paths etc, such options are available from the Web Interface of the RP.



Connecting a Generic camera to the RP normally requires specific configuration of the camera itself. Consult the documentation from the Camera provider.

12.2.6 Panel Location

Select the current location for this panel.

This is used in conjunction with multiple RP remote panels, where there is a need for the other panels to see which panel is asking to become the active panel for a certain engine.

12.2.7 System Sleep

With this setting enabled the RP enters a sleep mode (screen turned off) when all connected DCUs have also entered sleep mode.

For example if an RP is connected to two DCUs, the RP will “goto sleep” if both of these DCUs enter sleep mode. When any of the DCU exists sleep mode, the RP will automatically wake up.



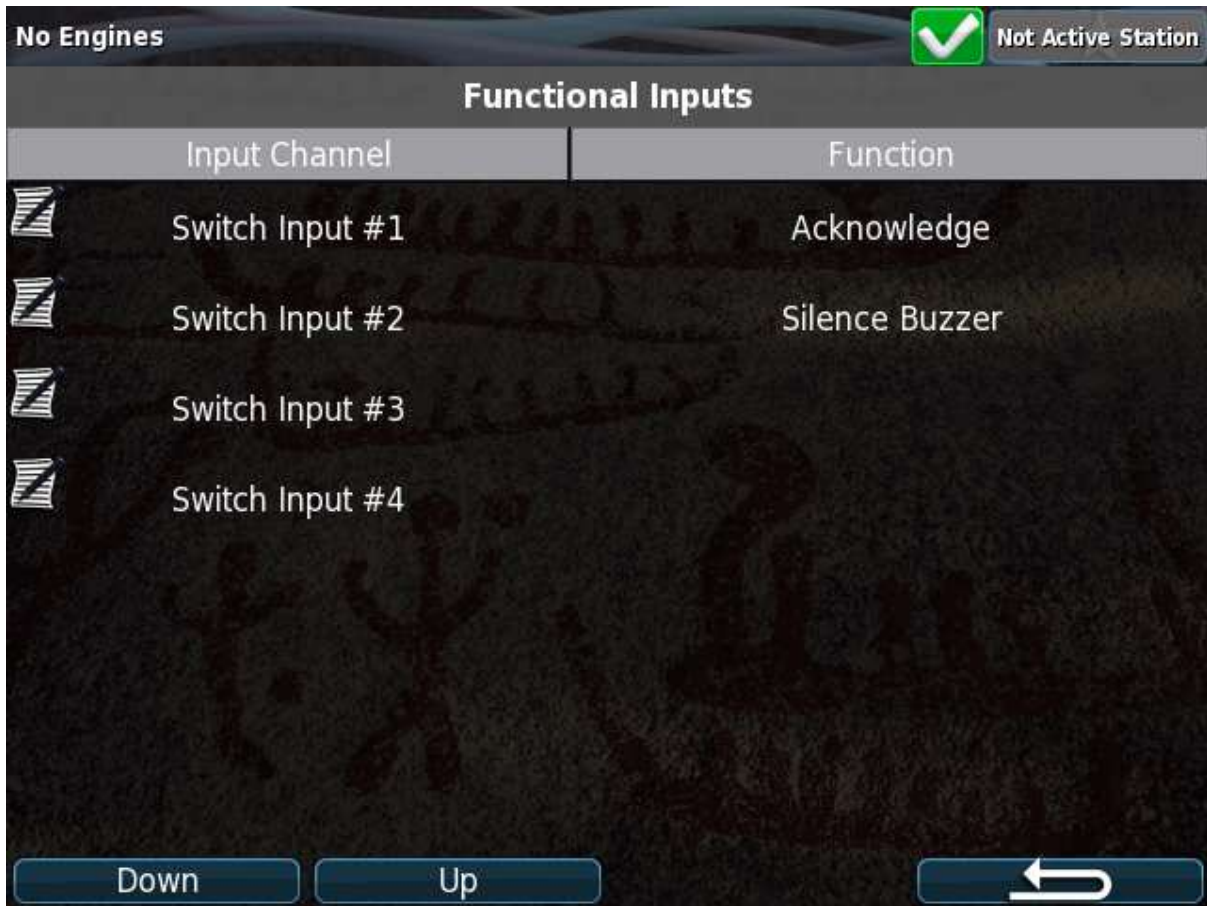
DCU sleep mode is controlled by through the System On/Off interface on a DCU 410E. On a DCU 210E sleep mode is controlled by mapping the function “System On” to any input.

Functional Inputs

Assign input functions to available switch inputs.



RP 206E/210E/220E/420E supports 3 functional inputs, C1.1, C1.2, and C1.4.
RP 410E supports 4 functional inputs, terminal 4 - 7.



To assign or change the function for an Input Channel, click the channel and select the desired option from the popup dialog.

Available functions are:

Function	Description
None	No function.
Acknowledge	Acknowledge all events.
Silence Buzzer	Silence buzzer.
Request Active Panel	When energised, make an Active Panel request. No action if the RP is already Active Panel. On RP 206E/220E/420E/410E the request is made for all DCUs not already under Active Panel.
Start	The input replicates the start button behaviour when energised .
Stop	The input replicates the stop button behaviour when energised .
Operator Lock	While energised all operator input is blocked. Neither the touch interface nor the buttons respond to user input. An indicator is shown at the bottom right to signify this state.

Night Theme	An external input to be able to toggle between night theme and day theme.
-------------	---

12.2.8 Functional Outputs

Certain functions can be configured to control the onboard relays.

If the optional relay board module MK-14 is connected to the RP, 14 additional relays will be available.



The MK-14 option is only available for RP 410E through COM 5.

Function	Description
None	No function.
Buzzer Active	Buzzer is active.
Active Panel	RP is active panel over at least one DCU.
Active Panel for <DCU name>	RP is active panel over this specific DCU.
Engine(s) Running	At least one configured engine is in a running state.
All Engines Running	All configured engines are in running states.
Acknowledge Button	Acknowledge button is pressed.
Acknowledge Button (1 second pulse)	1 second pulse when the acknowledge button is pressed.
Alarms in Alarm List	Warnings, Alarms, Shutdowns in Alarm List.
Diagnostics in Alarm List	J1939 Diagnostics in Alarm List.
All Faults	Unacknowledged Warnings, Alarms, Shutdowns in Alarm List.

12.2.9 Change PIN

The default PIN is 1234.

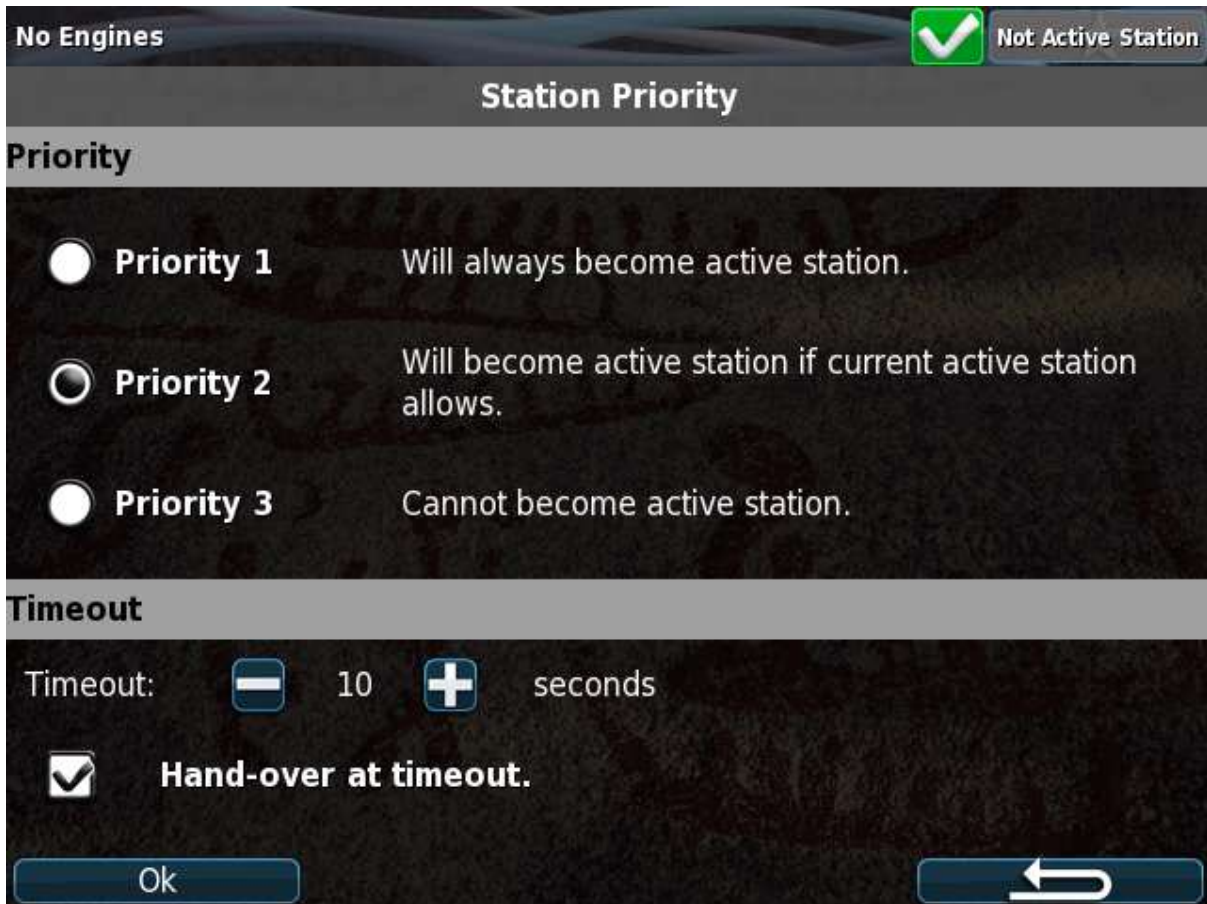
In order to preserve the configuration from unauthorised access, the PIN should be changed. Enter a PIN, 4 to 8 digits long, to secure the configuration, and keep this PIN in a safe place.



If the PIN is lost, the encrypted PIN code can be used to recreate the original PIN.

12.2.10 Panel Priority

Set the RP panel priority that is right for the application. Depending on the priority the panel is given it acts differently in conjunction with other RP remote panels.



Priority

There are three RP priorities.

- **Priority 1** panels will always become an active panel if required. It will take the engine control from panels with priority 1, 2 or 3.
- **Priority 2** panels must ask for engine control. Priority 1 and Priority 2 panels with engine control must agree to the handover.
- **Priority 3** panels can never do engine commands.

The following are guidelines for selecting a station priority.

- If this RP is the only remote panel in the installation, then select **Priority 1**.
- If there are more RP remote panels than this one, then select **Priority 1 or 2**.
- If this RP remote panel is for monitoring only, then select **Priority 3**.

	Priority 1 Typically highest priority control station, like the engine control room. Also if one RP in the network only.	Priority 2 Typically lower priority control station or wheelhouse.	Priority 3 Typically in a possible public area, or where commands shall not be possible.
Take command	Can always take command from the current active panel;	Can request to take over Active Panel from panels with priority 1	Disabled. This priority can never

	no question asked. Note! If the operator tries to execute a command, and the panel is not the Active Panel, it will immediately become the Active Panel and execute the command.	or 2 after confirmation at the current active panel.	be Active Panel.
Release command	Will handover command to any other priority 1 panel immediately. May handover command to priority 2 panels, depending upon Confirmation Timeout Priority.	Will handover command to any other priority 1 panel immediately. May handover command to priority 2 panels, depending upon Confirmation Timeout Priority.	If in command, will handover command to priority 1 or 2 panels immediately.

Timeout

This function is used in conjunction with multiple RP remote panels and Active Panel handover.

Example: An RP panel X is currently the Active Panel for an engine.

If an RP panel Y is requesting Active Panel for an engine, and the operator at RP panel X does not respond to the request within the defined period of time, then it is assumed there is no operator at RP panel X.

In these instances, the RP panel X can be configured to automatically either release its Active Panel status for the engine, or deny the request altogether.



Either action takes place after the defined timeout.

12.2.11 Lock

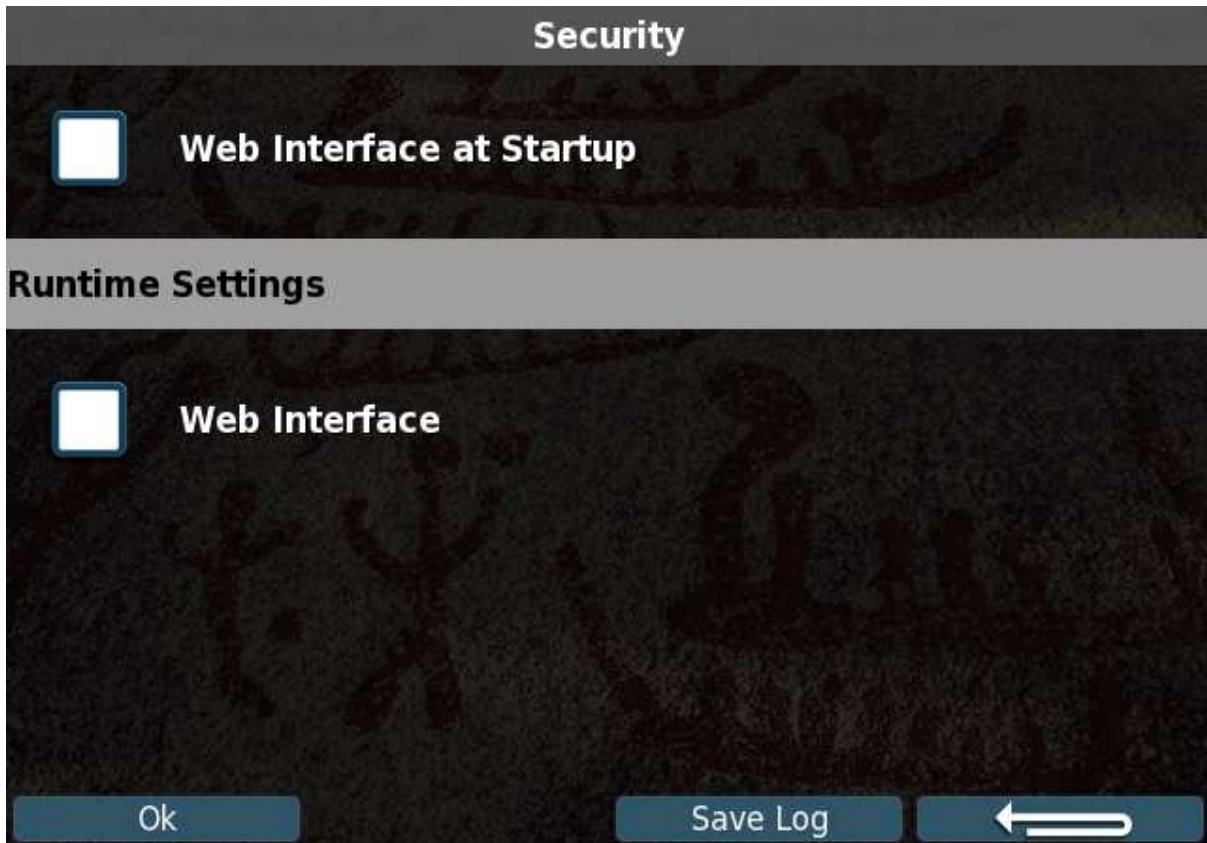
Leave the administrative menu area, and lock the unit.

12.2.12 Start/Stop Buttons

Enable or disable the start/stop buttons of the RP.

12.2.13 Security

This form covers security related functions and parameters.



Web Interface at Startup controls if the RP should always enable access to its web interface even after a power cycle of the panel. The default state of this setting is: Enabled

Runtime Settings

Web Interface enables access to the internal web interface of the RP. The web interface remains available until this setting is disabled or a power cycle of the RP is performed. This setting is only available if **Web Interface at Startup** is disabled.

Save Log button extracts the security log of the RP to a USB drive. To extract the log insert a USB drive into the RP's USB port and select "Save Log".

12.2.14 Reset to Factory Defaults

Command to restore factory defaults. All configuration will be lost.

13 RP 480i Configuration

This is the section where most of the local configuration is managed. In order to access the Administrations menu a PIN code is required.

From the user accessible Administrations overview menu page press the Log In button.

Enter PIN

[Empty Input Field] [←]

1 2 3 ±

4 5 6 .

7 8 9 0

OK CANCEL

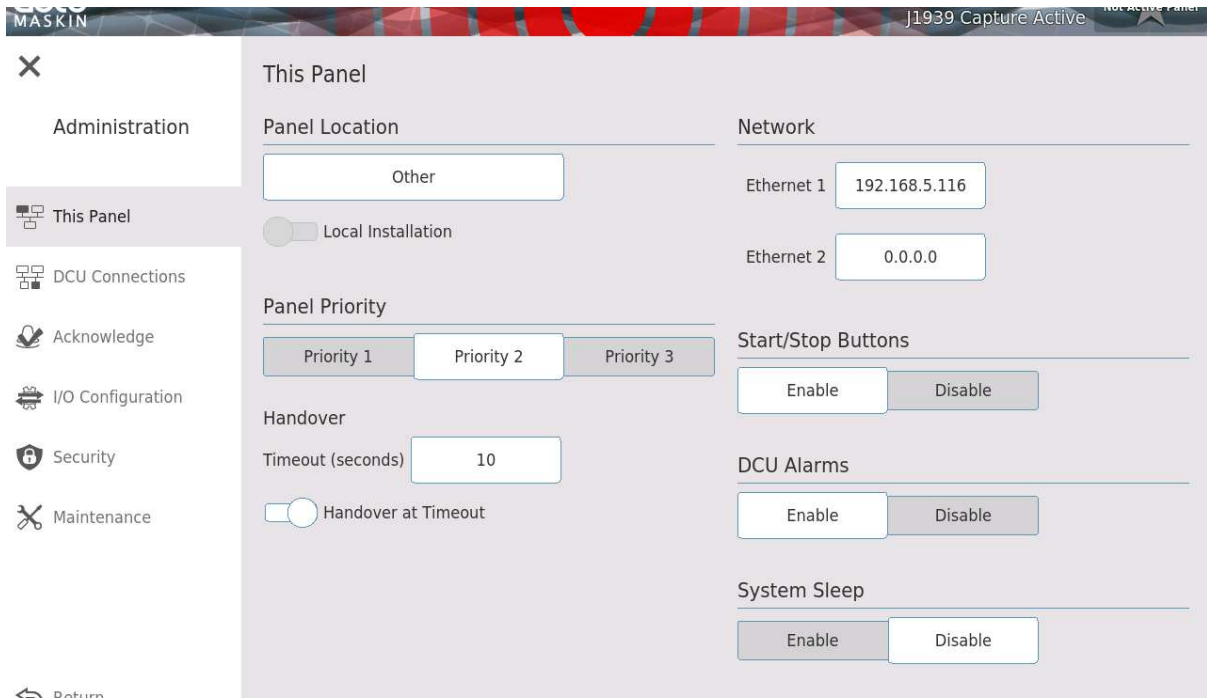
Input the admin PIN code and press OK.



If you fail to input the correct PIN code, the PIN code dialog provides an encrypted number. If you can't remember your PIN code, take note of this encrypted number and contact your representative for help on how to restore access.

13.1 This Panel

In this page basic configuration of the RP 480i is managed.



13.1.1 Panel Location

Assigns a Panel Location to the RP 480i. This is mainly used to identify the station with respect to Command requests from other remote panels in a system.

Local Installation is a specialized mode of operation that can be enabled to allow the RP 480i to mirror the behavior of a DCU. This can be used to locate a RP 480i as the main display for an engine in the Engine Room. This option can only be used when the RP 480i is connected to a single engine.



It is recommended to discuss the Local Installation with an Auto-Maskin representative before enabling it due to its specialized nature.

13.1.2 Panel Priority

The Panel Priority settings are affecting the RP 480i's behavior in relation to Command and transfer thereof.

Priority	Description
Priority 1	Highest priority station. This station will never negotiate when attempting to take Command. Unless the DCU in question is in local mode, the RP 480i takes command of the engine.
Priority 2	Standard priority station. If attempting to take Command from another remote panel, a handover question is presented on the current station in Command to either accept transfer or block it.
Priority 3	This station will and cannot take command over any engines.

The Handover settings control how this station should behave when currently in Command and another station requests to take over Command. The Timeout value specifies how long the dialog should linger on the screen in case no answer is given. The Handover at Timeout switch dictates if this station should relinquish or retain Command if the dialog times out.

13.1.3 Network

This is the IP address used by the RP 480i. By pressing the address it is possible to change the address.



Important! Make sure to assign the IP address to be on the same subnet as the DCUs you're attempting to connect to.

Example, if your DCUs have IP number 192.168.7.1 and 192.168.7.2 a good IP address for the RP 480i would be 192.168.7.201

13.1.4 Start/Stop Buttons

This setting controls whether the physical start and stop buttons on the RP 480i should be enabled. An information popup is given if pressing either of these buttons if disabled here.

Note, disabling the start and stop buttons does not affect any Inputs on the RP 480i configured to Start or Stop functions.

13.1.5 DCU Alarms


When this setting is Enabled the RP480i Alarm List will show events from all connected DCUs. If disabled, no events from any DCU are included in the alarm list.


13.2 DCU Connections


In this menu page the RP 480i's connections to DCUs are managed.


✕


Administration


 This Panel


 DCU Connections

 Acknowledge

 I/O Configuration

 Security

 Maintenance

 Return

DCU Connections

Engine	Type	IP Address	Version	Status	In Use
Engine #2	DCU 210E	192.168.5.102	3.11B5	OK	<input type="checkbox"/>
STB Prop. #19	DCU 410E	192.168.5.119	3.11B5	OK	<input type="checkbox"/>
O_o #24	DCU 410E	192.168.5.124	3.10B19	OK	<input type="checkbox"/>

The page is automatically updated to show a list of all available DCUs on the network.

The “In Use” switch is enabled or disabled to instruct the RP 480i to connect to a DCU.

Note, the list shows a real time reflection of the DCUs currently available on the network with one exception. In case a DCU has been previously set to In Use but is no longer available it will still show on the list. If setting such a DCU to Not In Use it will immediately be removed from the list.

13.3 Acknowledge

This page defines how the RP 480i should act with respect to acknowledgement of DCU events.

General - Acknowledge visible events only	
Enable	Acknowledge All only acknowledges events currently visible on the Alarm List.
Disable	Acknowledge All affects all events on the Alarm List.
DCU Acknowledge	
Not Allowed	Not possible to acknowledge any DCU events from this station.
Silence	This station can silence the Buzzer on a DCU but cannot acknowledge any events on DCUs
Ack. & Silence	Allows both silence oc DCU buzzers as well as acknowledgment of DCU events

If enabling Acknowledge without being Active Panel the RP 480i allows acknowledgement of DCU events without being in Command.



Important! Acknowledge without being Active Panel breaks class requirements and should not be enabled in classed installations.

13.4 I/O Configuration

In this page local I/O functionality is managed.

The RP 480i features 8 flexible I/O interfaces and one internal relay that can be configured.

13.4.1 Flexible I/O

Each Flexible I/O interface can be configured to act either as a Discrete Input or Output direction interface.

Once a direction has been chosen a Function is mapped to the I/O interface.



Depending on the direction of an I/O Interface, the list of available Functions change.

The Relay is treated as an Output with respect to available Functions.

13.4.2 Input Functions

For any I/O configured as Input press the Function button to assign an Input Function.

I/O #1 - Input		
None	Acknowledge	Silence Buzzer
Request Active Panel	Start	Stop
Operator Lock	Night Theme	
OK		Cancel

Click on an Input Function to assign this function to the selected Input. Inputs on the RP 480i use an active-high concept. This means that when the physical interface is energized with 24 VDC the associated function is also considered active.



I/O Interface configured as Input features an internal pull-down to 0V. This means that any input that is not wired will default to inactive state.

Input Function	Description
None	No function.
Acknowledge	Acknowledge events. Any events in the alarm list that are eligible are acknowledged. This means that if the RP480i is allowed to acknowledge DCU events and is currently in Command over a given DCU those events are affected. A DCU over which the RP 480i is not in Command is unaffected.
Silence Buzzer	Silence the local RP 480i buzzer if activated. Also silences buzzers on connected DCU if the RP 480i is configured to perform this.
Request Active Panel	When activated the RP480i attempts to request command over all connected DCUs. If the RP480i is configured as a Priority 3 station this function has no practical meaning.
Start	Replicates the function of the Start Button on the front of the RP480i.
Stop	Replicates the function of the Stop Button on the front of the RP480i.
Operator Lock	When active, all operator input is blocked. Neither the touch interface nor the buttons respond to user input. An indicator is shown at the bottom right to signify this state.
Night Theme	When active, the entire user interface is using a discrete color scheme that is suitable for low ambient light conditions.

13.4.3 Output Functions

When an Output Function function is active any output mapped to this function is energized.

Output Functions	Description
None	No function.
Buzzer Active	Active when the Buzzer on the RP 480i is active.
Active Panel	Active when this RP 480i is in Command over at least one DCU.
Engine(s) Running	At least one connected DCU (engine) is in a running state.
All Engines Running	All connected DCUs (engines) are in a running state.
Acknowledge Button (1 second pulse)	Function generates a 1 second pulse when the acknowledge button is pressed.
Alarms in Alarm List	At least one Warning, Alarm, Load Reduction or Shutdown Event in the Alarm List.
Diagnostics in Alarm List	At least one J1939 Diagnostic Event in the Alarm list.

Output Functions	Description
Active Panel for xxx	Active when the RP 480i is in Command over DCU xxx. Each connected DCU is given an individual Output Function of this type.

13.5 Security

This section provides options relating to security aspects of the panel.

13.5.1 PIN

The “Change PIN” button allows changing of the current pin code.

In order to change the PIN the current PIN needs to be entered first after which the new PIN can be given and confirmed. The number of digits in the PIN code must be at least 4 digits and at most 8 digits.

13.6 Maintenance

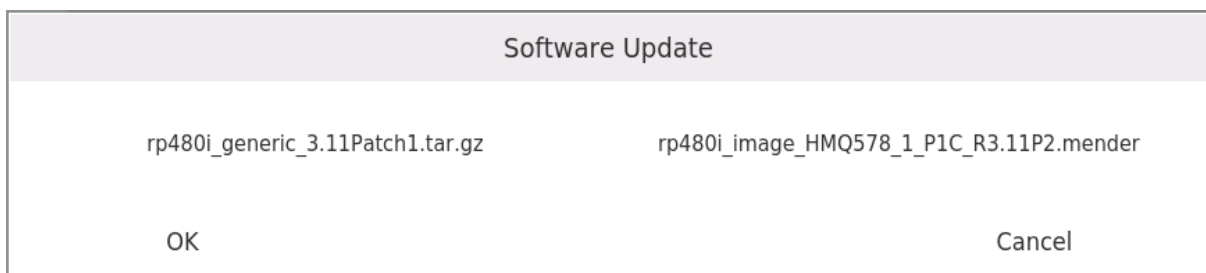
13.6.1 Panel Maintenance

Software Update

To use this function, prepare a USB stick in advance by adding the desired software update file to the USB stick and insert the stick in any USB port on the panel. There can be several different software update files on the USB stick but normally only one is needed.

Ask your sales representative or consult Auto-Maskin’s webpage on how to retrieve software update files.

When pressing the Software Update button a dialog is shown displaying all available software update files on the USB stick.



Select the desired software file to use and press OK to select it. Press Yes in the confirmation dialog to start the update process.

The RP 480i supports two different file formats for software updates,, either a file with the “.tar.gz” suffix or a “.mender” suffix. Either one can be used to update the software, however it is recommended to use the mender-file. In the example above the USB stick holds two software files, one of each type.



Important! While the software update process is running, don't remove the USB from the panel or turn off the power to the panel.

When the update process is complete, the RP will restart. Once restarted, it is safe to remove the USB stick from the panel.



Tip! Make sure to double check the reported Software Version in the Administrations form to verify the update took place.

Factory Reset

Press and confirm this operation to reset all configuration done to the RP 480i to its default state.

This operation will not affect any DCU connected to the RP.

14 Cyber Security

This chapter is applicable for all DCUs and RPs in a system.

In order to comply with the cyber security regulations by IACS, this chapter describes the configuration required, and any input to a potential Cyber Security Management System.

14.1 Configuration

Required Configuration

On each product, make sure the following is configured correctly

- Web Interface at Startup shall be disabled.
- Web Interface shall be disabled. (Enable this setting temporarily if web access to the DCU is needed for service or re-configuration purposes)

The Marine Broadcast remote monitoring service is currently not in compliance with Cyber Security regulations. Based on this, the Broadcast service must be disabled in classed installations. This setting is available under the Miscellaneous section of the Administration menu on any DCU Engine Controller or LT-ONE Alarm Panel.

Recommended Configuration

- Change the PIN code on each panel in the system to something which is not the default.



It is recommended, but not required, to assign different PIN codes on each panel.

- For the DCUs, if no external commanding over Modbus is required, turn off Modbus Write access.

Configure the option Block Write Requests to Yes unless specifically needed.

[/ home](#) / [/ dcu](#) / [/ communication](#)

Network Configuration

- Broadcast
- LSU 408
- CANopen
- Modbus RTU**
- Modbus TCP**
- J1939 Configuration
- Communication Info

Modbus TCP

Maximum Timeout [s]:

Block Write Requests [FC 05, 06, 15, 16]:



[home](#) / [dcu](#) / [communication](#) / [Modbus TCP](#)

Inspect Configuration

The configuration can be inspected from the Administrative Menu on each panel.

On DCU 410E, the security information is reached from the Miscellaneous section in the Administration menu. On all other products, the security information is reached directly from the Administrative menu.

Security

Web Interface at Startup

Runtime Settings

SSH Login

Web Interface

14.2 Integration to Cyber Security Management System

Each product shall be backed up and the backups are to be stored in a safe place.



If recovering a system with one or several RPs in the system, start by recovering DCU(s) first before proceeding to RP(s).

Input to Owner’s Incident and Response and Recovery Plan

Task	Step	Description
Local Independent Control	Change the DCU / LT-ONE to Local Mode to block remote control of the engine.	This is done from the operator menu on the panel.
Network Isolation	Unplug the RJ45 Ethernet cable from the back of the DCU / LT-ONE panel.	
Extract Security Log	Insert a USB memory stick.	The USB port is located on the back of the panel.
	Copy the Security Log to the USB memory stick.	Navigate to the Security form under the Administration menu and select the “Save Log” option.
Deterministic Outputs	No action.	The DCU / LT-ONE keeps all outputs in a “fixed state” should an incident occur.
Backup & Restore		See below for details.
Controlled Shutdown, Reset, Roll-back and Restart	It is safe to cut the power to the panels at any time. No Controlled Shutdown method is needed.	
	See the recovery from backup section below on how to reset and roll-back.	

Backup and recovery of a DCU / LT-ONE

	Step	Description
Backup	Take note of the DCU software version and IP address	The Software Version and IP address can be inspected from the Version Information screen, available under Help in the Menu.
	Copy configuration file	Use a USB memory stick to extract a copy of the current configuration and store it.
Recovery	Remove Ethernet cable(s)	Disconnect the DCU from the Ethernet network by disconnecting the network cable from the back of the DCU.
	Perform software update to the version in the backup	Perform software update of the DCU to the version noted in the backup using a USB memory stick.
	Perform factory reset	Perform factory reset

	Step	Description
	Complete wizard	Complete the startup wizard. Assign a PIN and the IP number noted in the backup during this phase. Choose any values for System Type and Classed option.
	Restore the backed up configuration by loading configuration from USB	Restore the saved configuration using a USB. If a SDU configuration mismatch event is generated, synchronise the SDU with the DCU. (DCU -> SDU)
	Insert Ethernet cable(s)	Insert Ethernet cable

Backup and recovery of an RP / LT-ACE

	Step	Description
Backup	Take note of the RP software version and IP address	The Software Version and IP address can be inspected from the Version Information screen, available under Help in the Menu.
	Take note of additional settings	Take note of the following from the Administrative settings <ul style="list-style-type: none"> - IP Addresses if all connected DCUs - DCU Alarms - DCU Acknowledge - Panel Location - Functional Inputs - Functional Outputs - Panel Location - Panel Priority - Start/Stop Buttons
Recovery	Remove Ethernet cable(s)	Disconnect the RP from the Ethernet network by disconnecting the network cable from the back of the RP.
	Perform software update to the version in the backup	Perform software update of the RP to the version noted in the backup using a USB drive.
	Perform factory reset	Perform factory reset
	Complete wizard	Complete the startup wizard. Change the PIN and Assign IP number noted in the backup during this phase. Skip the DCU Connections step (by pressing next).
	Restore the backed up configuration by loading configuration from USB	Reassign all settings from the backup except DCU Connection(s)

	Step	Description
	Insert Ethernet cable(s)	Insert Ethernet cable
	Reconnect to DCU(s)	Using the DCU Connections form in the Administration menu to re-connect to the DCUs noted in the backup. Note: This step requires that recovery has been already performed on all DCUs in the system

Periodical Functionality Audit

At a minimum, perform the following periodically to verify security functionality.

1. Attempt to login to the Administrative menu with an incorrect PIN. Verify that this is not possible.
2. Login to the Administrative menu with the correct PIN.
3. Insert a USB memory stick, and extract the security log from the Security section of the Administrative menu.
4. On a PC, verify two latest records are “FACTORY unsuccessful log in” and “FACTORY log in” in each log file.
5. Verify that the configuration requirements are met. See the “Inspect Configuration” section in chapter [13.1 Configuration](#)
6. Make sure that it is not possible to browse to any of the applicable panels (DCUs, RPs, etc). Use a standard browser write the IP address to the panel in the URL input box. Example <http://192.168.5.101> should result in “This site can’t be reached” or similar message.
7. Make sure the Broadcast service is set to “Disabled” under the Miscellaneous section of the Administration menu on any DCU Engine Controller and LT-ONE Alarm Panel.

Security Updates

Visit <http://auto-maskin.com> regularly to verify if there are any applicable security updates available. Read the supplied documentation and consider if the addressed security issue is applicable to your installation.



Auto-Maskin recommends installing security fixes as soon as possible.

15 Troubleshooting

15.1 PIN

The panel will respond with a Reset Code if a wrong PIN is entered. If you’ve forgotten your PIN contact Auto-Maskin and provide the using the Reset Code, the model and the Serial Number for your product Auto-Maskin can help you reset your PIN to the factory default setting.



The factory default PIN is **1234**. If this PIN does not work, a new PIN has been set.