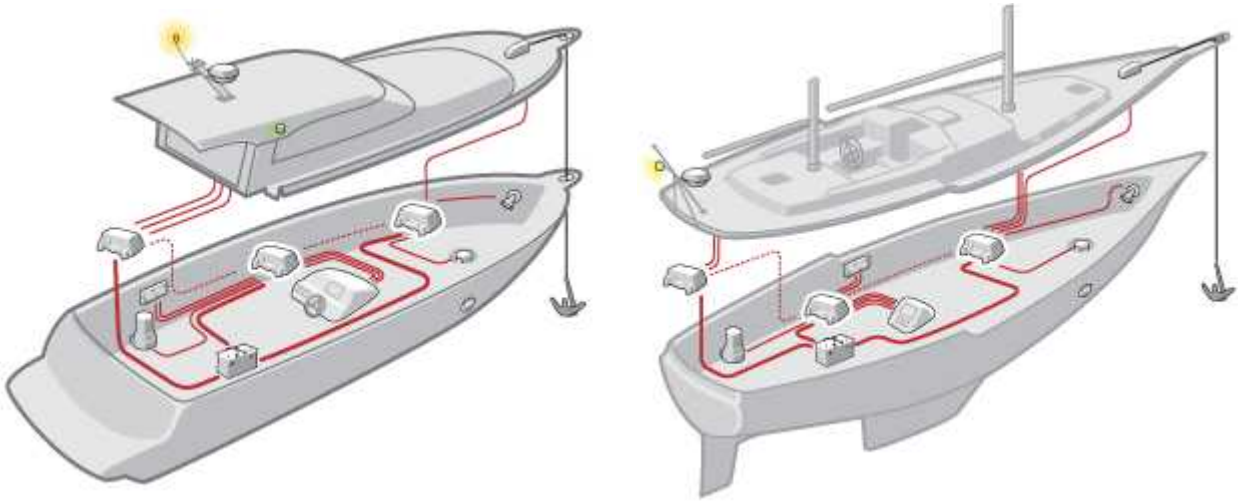
EmpirBus™

Leading the distributed power evolution



EmpirBus Config User's Manual

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1 Welcome

EmpirBus Config
User's manual

Version 2.44

Revision 1

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2 About EmpirBus

The EmpirBus system is a decentralized power supply system that not only delivers power in a system but also makes it possible to control and handle the electrical system in a very efficient way.

The design of the EmpirBus system makes it favourable to use in the marine, recreational vehicle and special vehicle production. Savings are made in material purchases and installation times. Functionality will also be increased.

3 Buttons and menus

Function buttons

Toolbar buttons

3.1 Function buttons

Create a new project
Creates an empty EmpirBus configuration project.

Open an existing project
Display the open project dialog.

Save current project
Save the active EmpirBus Config project using the existing filename.

Print current project
Display the print dialog for printing the bus layout.

About EmpirBus Config
Displays the EmpirBus Config version information.

Open bus monitor
Display the bus monitor.

Bus connection online/offline
Connects EmpirBus Config to the bus. The connection is established using the connection method selected in settings.

3.2 Toolbar buttons

Zoom out
Zooms out the view of the active project.

Zoom in
Zooms in the view of the active project.

Show circuit diagram
Display the circuit diagram view.

Create excel sheets of all project units
Creates an excel file with one spreadsheet per unit. Channel name and fuse size for each channel is displayed. This information is often used as end-user documentation for the installation.

Add new unit
Adds an empty unit to the active project.

Add new predefined
Display the new unit dialog used to add predefined units.

Delete selected unit or module

Delete the selected unit or the selected module.

Move unit one position to the left
Change the order of the units in the bus layout.

Move unit one position to the right
Change the order of the units in the bus layout.

Send configuration to all units
Display the send configuration dialog used to send the unit configuration in the active EmpirBus project to the units on the bus. All units will be initially selected. You must be online to perform this task.

Send configuration to selected unit
Display the send configuration dialog used to send the unit configuration in the active EmpirBus project to the units on the bus. Only the unit selected in the bus layout will be initially selected. You must be online to perform this task.

Read configuration from bus
Display the read configuration dialog used to read configuration or armament from the bus. You must be online to perform this task.

Upgrade unit and module firmware
Display the multiple unit update dialog used to update the firmware of multiple units on the bus. You must be online to perform this task.

Get the units serial and version numbers
Read the unit serial id and the version number of the selected unit. You must be online to perform this task.

Create systemdescription file
Read all connected units information and write it in a document. You must be online to perform this task.

3.3 Menus

File menu

View menu

Edit menu

Tools menu

Window menu

Help menu

3.3.1 File menu

New project
Create a new EmpirBus project.

Open...
Open an existing EmpirBus Config project.

Close
Close the active EmpirBus Config project.

Save
Save the active EmpirBus Config project using the existing filename.

Save as...
Save the active EmpirBus Config project as a new file.

Save as readonly...
Saves a copy of the configuration which cannot be altered, just downloaded to the system in its original.

Export to XML...
Save a .xml file. Generates a XML representation of the configuration.

Create systemdescription file...
Read all connected units information and write it in a document. You must be online to perform this task.

Print...
Display the print dialog for printing the bus layout.

Print preview
Preview the bus layout before printing.

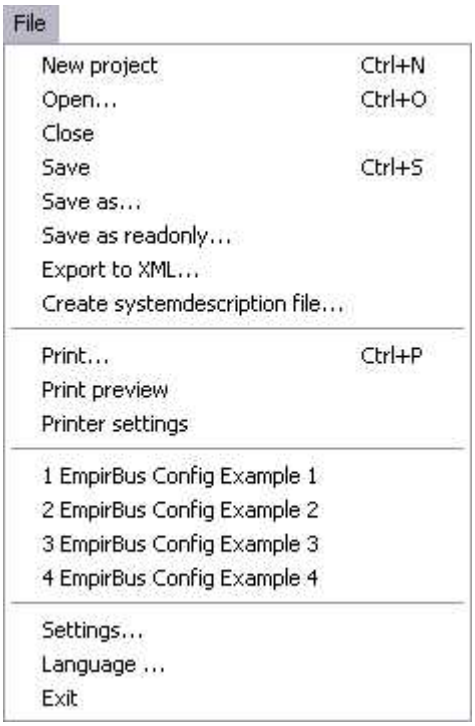
Printer setting
Display the printer settings.

Previously used files
Shortcuts to the four latest EmpirBus Config files opened.

Settings...
Display the settings dialog.

Language...
Change the user interface language of EmpirBus Config.

Exit
Exit the program.



3.3.2 View menu

Zoom out
Zooms out the view of the active project.

Zoom in
Zooms in the view of the active project.

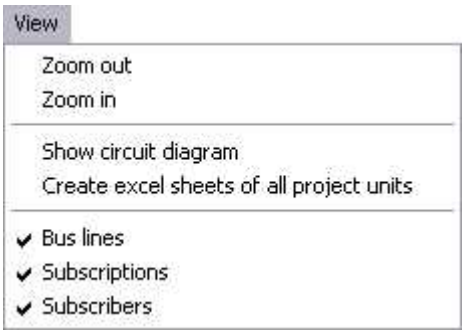
Show circuit diagram
Display the circuit diagram view.

Create excel sheets of all project units
Creates an excel file with one spreadsheet per unit. Channel name and fuse size for each channel is displayed. This information is often used as end-user documentation for the installation.

Bus lines
Show the bus lines in the bus layout.

Subscriptions
Show indications in the bus layout for the channels the selected channel is subscribing to.

Subscribers
Show indications in the bus layout for the channels that subscribes to the selected channel.

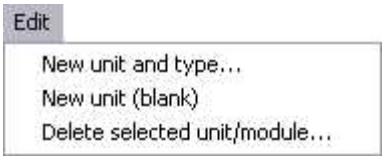


3.3.3 Edit menu

New unit and type...
Display the new unit dialog used to add predefined units.

New unit (blank)
Adds an empty unit to the active project.

Delete selected unit/module
Delete the selected unit or the selected module.



3.3.4 Tools menu

Bus connection online/offline
Connects EmpirBus Config to the bus. The connection is established using the connection method selected in settings.

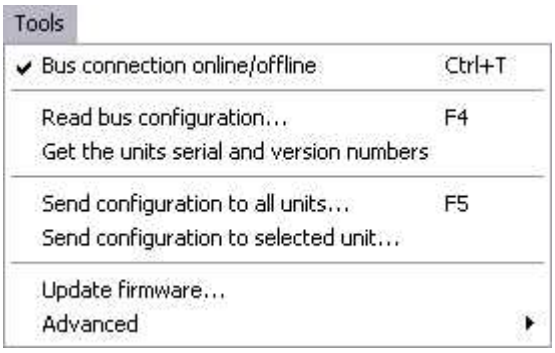
Read bus configuration...
Display the read configuration dialog used to read configuration or armament from the bus. You must be online to perform this task.

Get the units serial and version numbers
Read the unit serial id and the version number of the selected unit. You must be online to perform this task.

Send configuration to all units...
Display the send configuration dialog used to send the unit configuration in the active EmpirBus project to the units on the bus. All units will be initially selected. You must be online to perform this task.

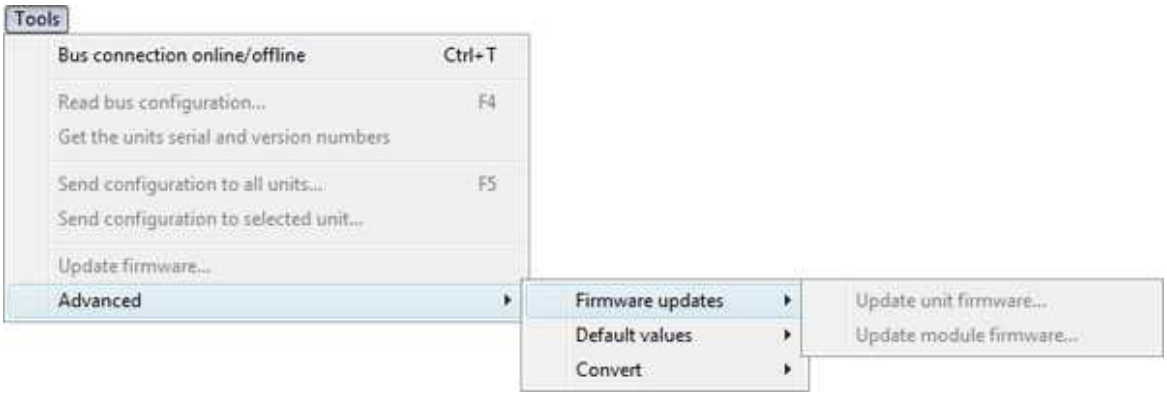
Send configuration to selected unit...
Display the send configuration dialog used to send the unit configuration in the active EmpirBus project to the units on the bus. Only the unit selected in the bus layout will be initially selected. You must be online to perform this task.

Update firmware...
Display the multiple unit update dialog used to update the firmware of multiple units on the bus. You must be online to perform this task.

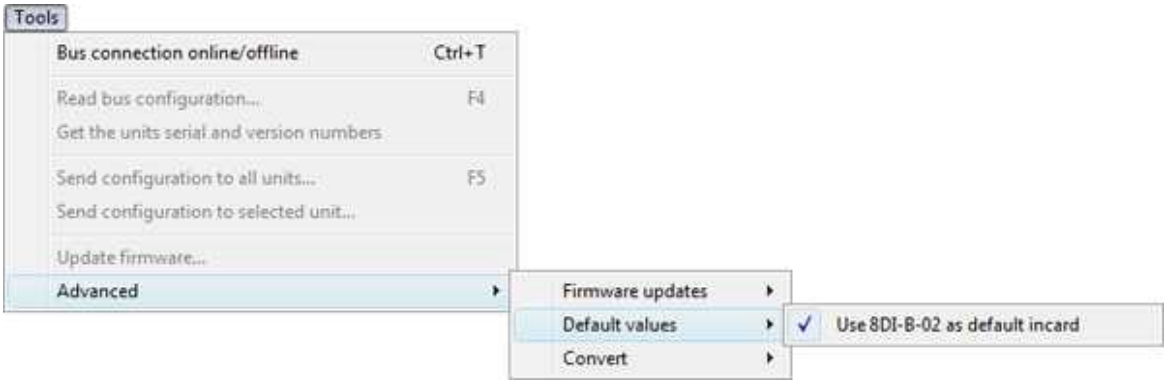


Advanced/Firmware updates/Update unit firmware...
Update the firmware of the selected unit. You must be online to perform this task.

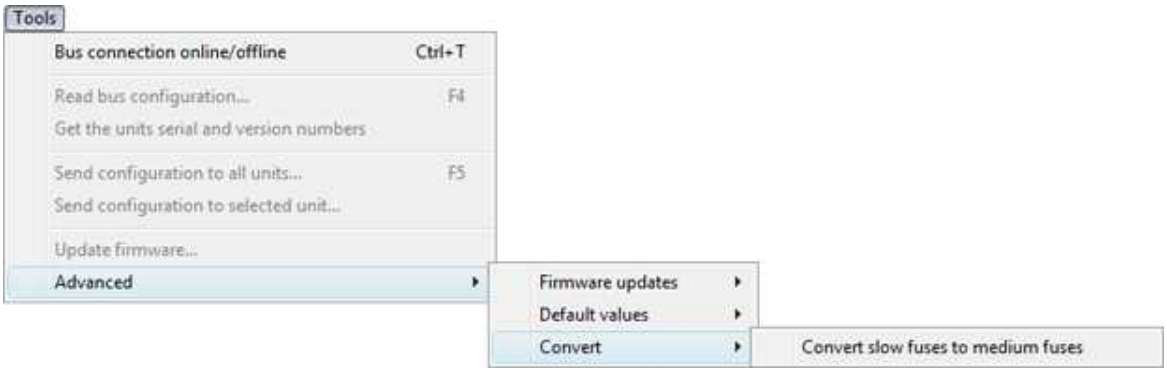
Advanced/Firmware updates/Update module firmware...
Update the firmware of the selected module. You must be online to perform this task.



Advanced/Default values/Use 8DI-B-02 as default incard
Check this option to get units equipped with input card 8DI-B-02, if unchecked: units will be equipped with 8DI-B-01.



Advanced/Convert/Convert slow fuses to medium fuses
Convert all outputs with fuse type slow in project to fuse type medium.



3.3.5 Window menu

New window
Displays a new window for the active EmpirBus Config project. This is useful in large projects for displaying different parts of the layout at the same time.

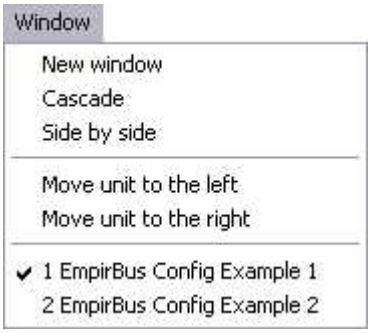
Cascade
Organizes the project windows in a cascading style.

Side by side
Organizes the project windows side by side.

Move unit one position to the left
Change the order of the units in the bus layout.

Move unit one position to the right
Change the order of the units in the bus layout.

Opened files
Access opened projects.



3.3.6 Help menu

Help
Opens the help function.

About EmpirBus Config
Displays the version information dialog.

4 Getting started

Preparing

Creating a new project

Adding units

Adding modules

4.1 Preparing

When you are planning to use EmpirBus the best way is to start by planning the physical installation.
The logical functions, which switches controls which consumers should be done when the physical layout has been decided.

To get the most out of the system you need to position the units as close to the consumers and switches as possible.

In a typical small powerboat installation you would have one unit in the engine room, one unit by the navigation seat and one unit at the bow.

When planning for serial production the build process should also be considered. If parts of the installation is built separately, one unit can be placed to serve that part. Then only the power supply and the bus cables need to be connected when assembling the installation.

4.2 Creating a new project

When EmpirBus Config is opened a new project is automatically created.

You can create new projects at any time by using the function buttons or the file menu.

A new project is always blank and you need to add units to it.

Previously open projects are not closed and can always be accessed through the window menu.

4.3 Adding units

There are two ways to add units to the system. Adding empty units or adding predefined units. Both these functions can be found on the toolbar or by right clicking on the white area next to the units.

The membrane panel can only be added using the add predefined unit function.

We recommend adding predefined units since this lets you choose from the predefined units that are available from our resellers. Custom configured units will be more expensive to buy.

There are four different units, here is a list of available units and their article number:

EB-B-0000**-UTS**
EB-B-0000**-ITS**

EB-B-0000**-UTF**
EB-B-0000**-ITF**

U represents a unisolated unit.
I represents a isolated unit.
T represents that the unit will be equipped with terminals.
S represents a unit without extra fuses.
F represents a unit whit extra fuses.

In a regular installation the unit should be an **-UTS**
In a installation with needs for ABYC compliance the unit should be an **-UTF** (American regulations)
Both units above could be ordered in a isolated or unisolated variant.

When in need of an isolation between two different power sources the unit should be an isolated unit.
Using for instance one battery pack 12VDC and one battery pack 24VDC on a boat and using a common negative would NOT require a isolated unit.
Using for instance one battery pack 12VDC and one battery pack 24VDC without a common negative instead the two systems will be entirely separated (galvanically isolated from each other). This case requires a isolated unit.
Not all units needs to be isolated.
For instance if using one unit connected to the 12VDC battery pack and three units connected to the 24VDC battery pack, only the unit connected to the 12VDC system needs to be isolated to prevent a connection between the two battery packs.
.
The biggest difference between an isolated and unisolated unit except for the price is the idle power consumption. An unisolated master unit consumes about 200 µAmpere while an isolated unit consumes about 30 mAmpere. For this reason the isolated units should be avoided.

The 0 in the article number is representing the modules equipped in the unit, to equip the units with modules see chapter: Adding modules

There are no options for the membrane panel, and the article number of the membrane panel is 8MS-B-01

For more information on how to order units or just more information please contact your local representative.

Distributors

4.4 Adding modules

If you have added empty units to the bus or you simply want to add extra modules to an existing unit simply right click in an empty slot and add the type of module that you need. If you add output modules from the bottom of the unit (slot D) and input modules from the top of the unit (slot A) you will have units that can be ordered with a predefined armament. If equipping the unit with other modules then input and output cards they should be equipped as described further on in this chapter.

Here is a list of available modules and the number representing the module when mounted in a unit:

1 =	8DI-B-01	8 digital inputs (potential free signals only)
2 =	8DO-B-01/-02	8 digital outputs
3 =	DU-B-01	Dimmer module for running indications (notice this module is not needed

for dimming outputs)

4 =	4IS-B-01	4 window wipers
5 =	8RO-B-01	8 potential free relays (12VDC)
6 =	8RO-B-02	8 potential free relays (24VDC)
7 =	8DI-B-02	8 digital inputs (plus, minus or potential free signals)

Here are a couple of examples on how to equip units if using other modules then input and output carrds combined with input and output cards.

EB-B-7422-UTS
EB-B-7742-UTS
EB-B-4422-UTS
EB-B-7622-UTS
EB-B-7522-UTS
EB-B-7466-UTS
EB-B-1345-UTS

The output modules with prefix 2 are representing both 8DO-B-01 and 8DO-B-02.
8DO-B-01 is a regular output card.
8DO-B-02 is a output card with extra fuses.
Depending on the prefix for the unit it self the card will be either 8DO-B-01 or 8DO-B-02.

Example:
EB-B-7222-UTF
The output modules in this unit will BE 8do-b-02 with extra fuses.

EB-B-7222-UTS
The output modules in this unit will be 8DO-B-01 without extra fuses.

For more information on how to order units or just more information please contact your local representative.

Distributors

5 Physical installation

Power supply

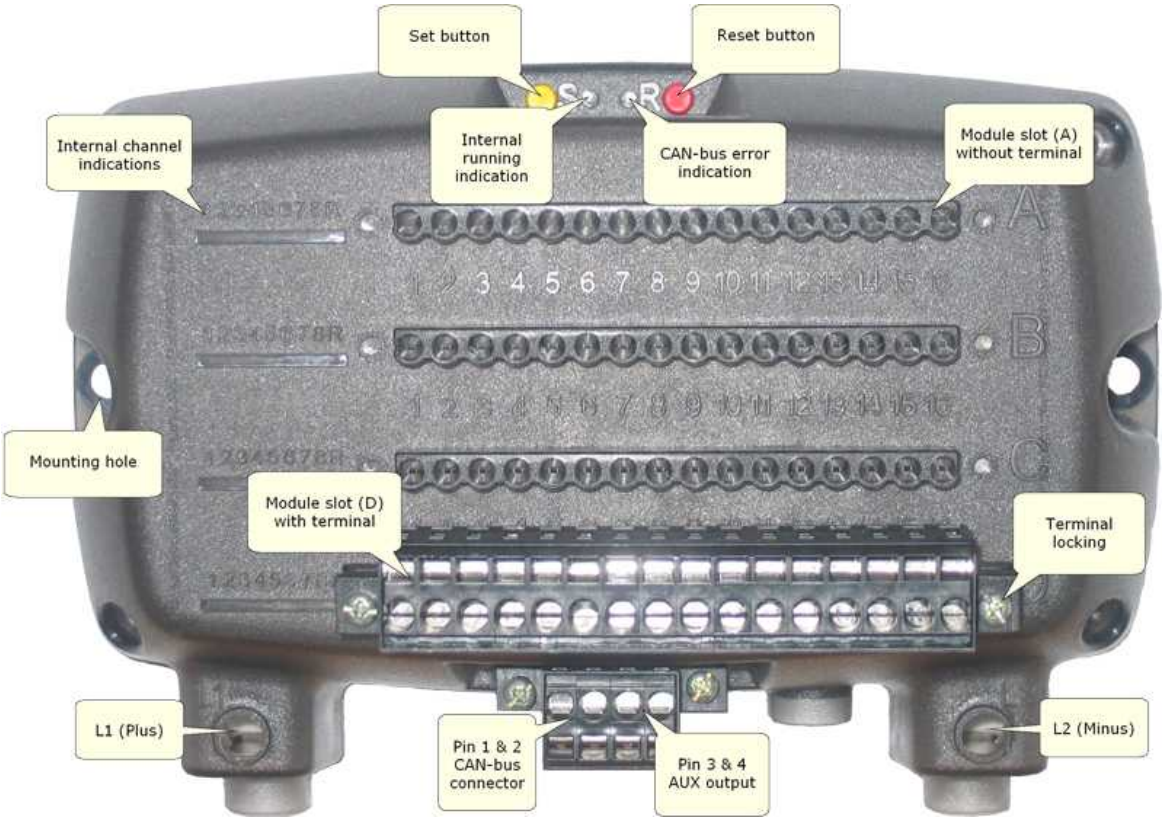
CAN-bus

Input channels

Output channels

Window wiper channels

S (set) and R (reset) buttons



5.1 Power supply

Power supply
The unit should be considered just like a traditional distribution central and have a traditional fuse. The maximum current that one unit can distribute is 100 Ampere, if the unit is intended to supply that current the unit should have a 100 Ampere fuse on the power supply.

The maximum current that one output module can distribute simultaneously is 40 Ampere. The maximum current a output channel can supply is 8 Ampere, when connecting a bigger consumer outputs can be connected in parallel, maximum four outputs can be connected in parallel. The biggest possible consumer can consume 32 Amperes.

Connect cables
The power supply is connected to L1 and L2 on each unit.

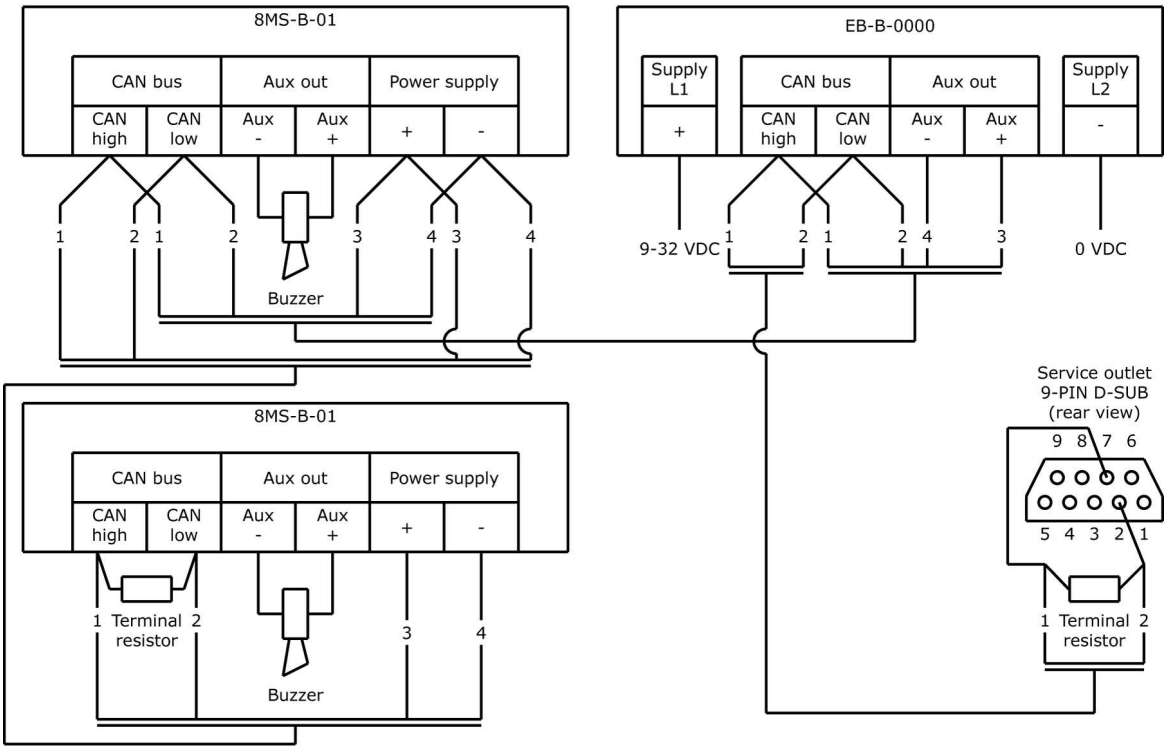
The maximum cable area that can be connected to the power supply is 16mm².

On the membrane panel the power supply is connected to pin 5 and 6 of the six pin terminal.
It is recommended to connect the power supply cables of a membrane panel to the AUX output of a unit.
The maximum number of panels that can be supplied from one units AUX output is six, if there is need to supply more than six membrane panels the AUX output can be paralleled between two units. See the connection example in this chapter.

Parallelling
When parallelling the power supply of several units 16mm² cables can be used.

A complete description of all connections on the unit can be found on the physical installation page.

Connection example



* 120 ohm terminal resistor must be connected at both ends of the bus
* Power supply of the panel could also be connected to the battery via a fuse

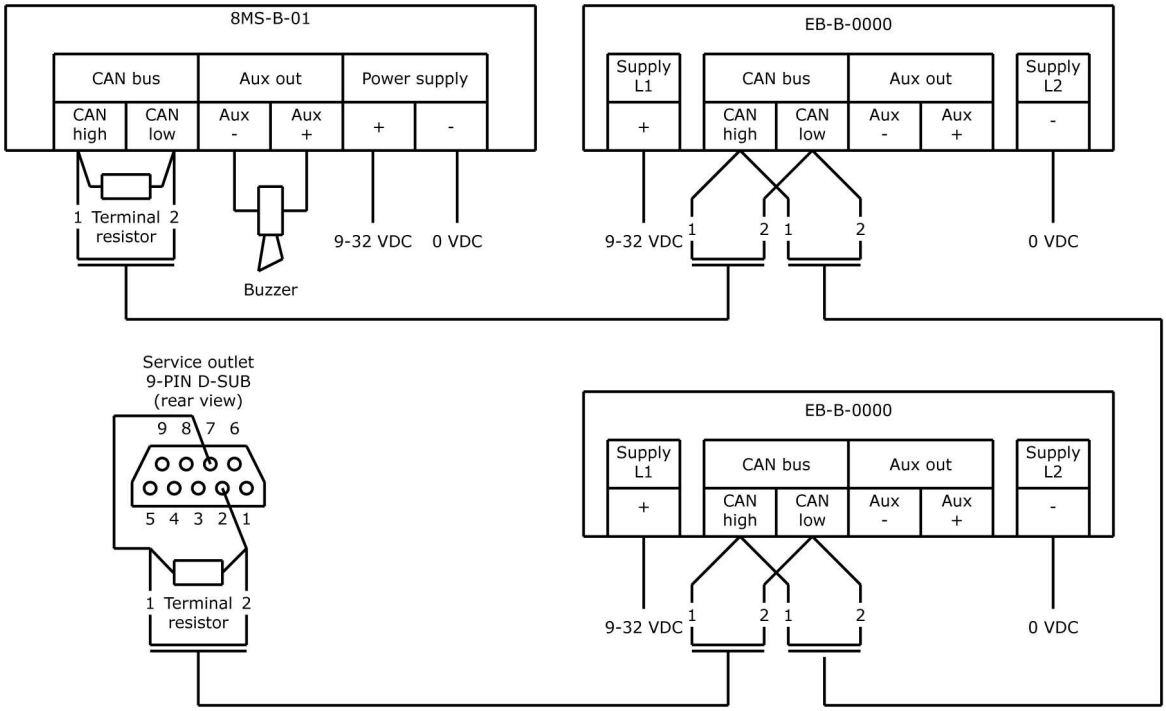
5.2 CAN-bus

Wiring
The CAN-bus is connected to pin 1 and 2 of the four pin terminal on each unit.
On a membrane panel the CAN-bus is connected to pin 1 and 2 of the six pin terminal.
The bus cable is connected to pin 1 on unit 1 to pin 1 on unit 2 etc.

Terminal resistors
A 120Ω terminal resistor must be connected parallel over the CAN-bus on both ends of the bus.
When measuring the resistance over pin 1 and 2 on any unit the resistance should be 60Ω, be sure to measure the resistance in a unaffected state when the units are idle.

Service outlet (9-pin D-Sub)
On most installations a service outlet should be mounted to allow easy access to the CAN-bus. Attach pin 1 from the CAN-bus terminal to pin number 7 on the D-Sub. Attach pin 2 from the CAN-bus terminal to pin number 2 on the D-Sub.

Connection example



Connecting the interface

The interface is available in both RS232 and USB models. When using the USB model you only need to connect the USB cable between the PC and the configuration interface. When using a USB interface you will need to install a driver for the interface.

5.3 Input channels

Connect cables
The cables are connected to the terminals by pressing a small screw driver into the square hole next to the round cable hole.

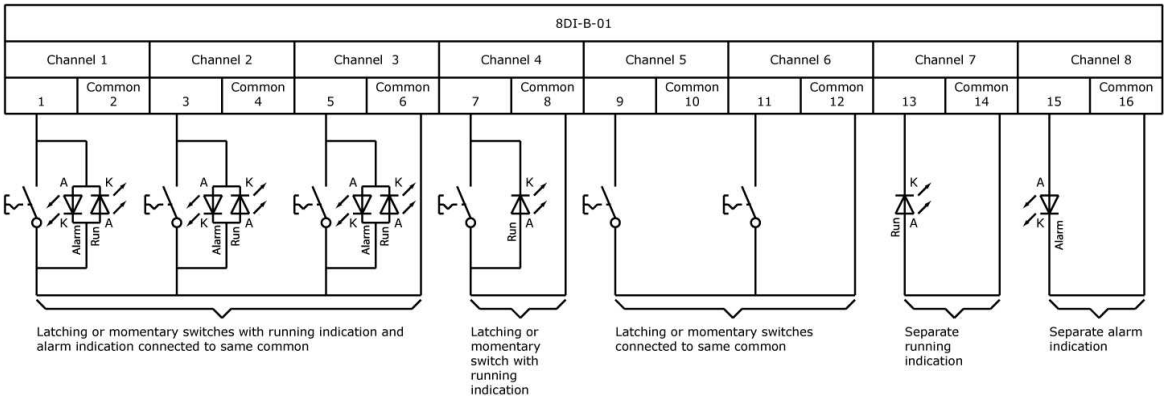
Cable area
The maximum current on an input is 20mA. Therefore 0,25 mm² is enough.
Always pay attention to any rules or regulations that might have other demands for minimum areas.

Paralleling
All common (even) pin are internally connected so one common is enough when connecting several inputs at the same location.
When paralleling, only connect signal (odd) pins.

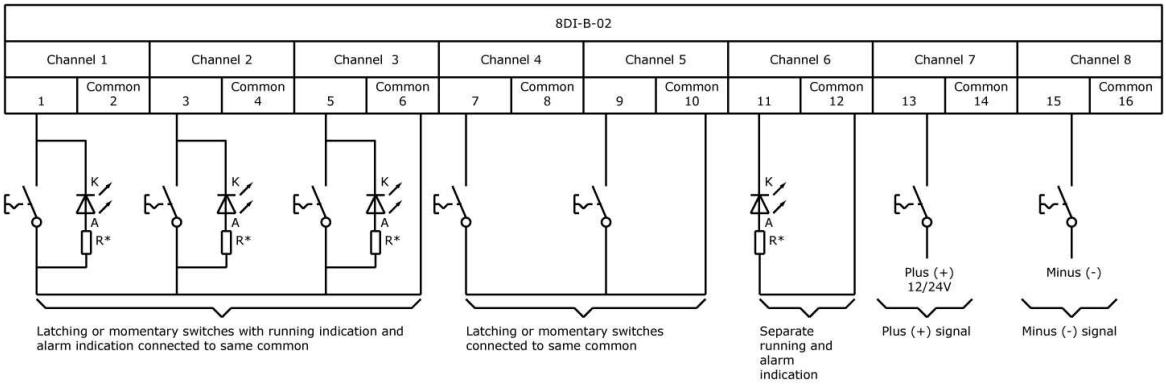
Running indications and alarms
To connect a running indication LED, parallel it over the input and connect anode to common and cathode to channel input
To connect an alarm LED, parallel it over the input and connect cathode to common and anode to channel input.
The system will select function by switching the current direction.

A complete description of all connections on the unit can be found on the physical installation page.

Connection example



Connection example



*** Current Limit Resistor**

R = Voltage supply – LED forward voltage / 0,020A

Voltage supply, 12V system is about 14V when charging. 24V around 28V
LED voltage forward (Vf) = Nominal 1,7 – 2,2V

12V System Example
14V – 2,0V = 12V
12 / 0,020 = 600Ω minimum

24V System Example
28V – 2,0V = 26V
26V / 0,020 = 1300Ω minimum

5.4 Output channels

Connect cables

The cables are connected to the terminals by pressing a small screw driver into the square hole next to the round cable hole.

Cable area

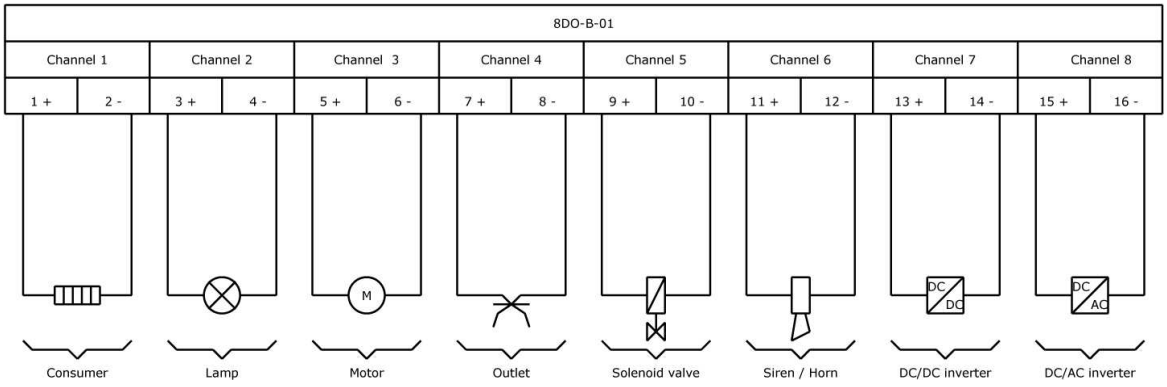
The maximum cable area that can be connected to each output channel is 2,5mm².
Using solid core cables allows up to 4mm²

Paralleling

Plus and minus can be parallel connected. The channels will load share internally.
For heavy consumers, parallel the cable before connecting them to the terminal. Jumpers can be reduced down to 0,5mm2

A complete description of all connections on the unit can be found on the physical installation page.

Connection example



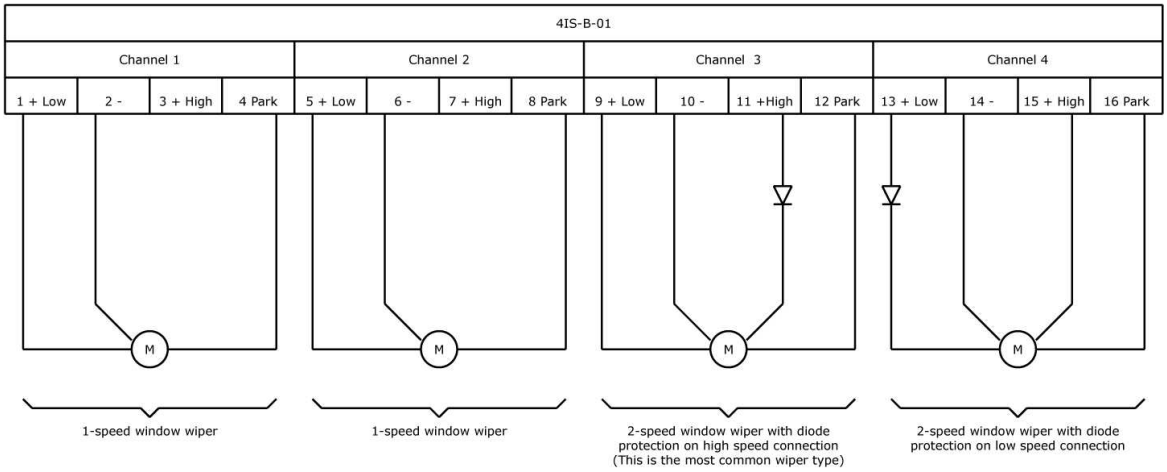
5.5 Window wiper channels

Connect cables
The cables are connected to the terminals by pressing a small screw driver into the square hole next to the round cable hole.

Cable area
The maximum cable area that can be connected to each output channel is 2,5mm².
Using solid core cables allows up to 4mm²

A complete description of all connections on the unit can be found on the physical installation page.

Connection example



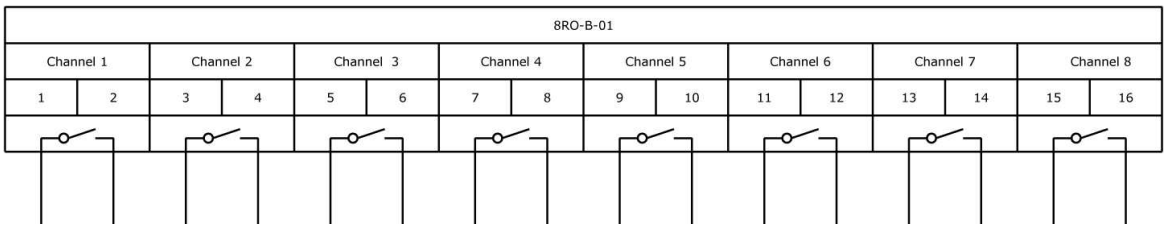
5.6 Relay Channels

Connect cables
The cables are connected to the terminals by pressing a small screw driver into the square hole next to the round cable hole.

Cable area
The maximum cable area that can be connected to each relay channel is 2,5mm².
Using solid core cables allows up to 4mm²

A complete description of all connections on the unit can be found on the physical installation page.

Connection example



5.7 S (set) and R (reset) buttons

Each unit has a yellow S button and a red R button.

These switches are used to manually set and reset fuses on the unit.

The set button (yellow) will allow stepping through the available output channels on each unit. The selected output channel is indicated by a flashing red LED indication. Each channel fuse can then manually be set or reset by pressing the R button.

To quit this function step through all outputs until no LED indications are flashing or press both the S and R buttons at the same time.

Manually disabling output channels is a good way to make sure no power is distributed before working with equipment in a particular area.

A complete description of all connections on the unit can be found on the physical installation page.

The following instruction is also delivered on a sticker with each unit:

Fuse reset instructions

Tripped fuses are indicated by red lights on the unit.

Press the YELLOW (S) button repeatedly until the flashing position indicator is at the position of the tripped fuse.

Press the RED (R) button to reset the fuse.

Press both the YELLOW (S) button and the RED (R) button at the same time when you are finished.

6 Configuration

CAN-bus / Project

Units

Inputs (Switches)

Outputs (Consumers)

Window wipers

Relays

Dimmer module for running indications

Membrane panels

Membrane panel switches

Functions and dialogs

6.1 CAN-bus / Project

Project name
Defines the name of the project. This information will be stored in the units. This is commonly used to store the boat model.

Internal running indication
Sets the state of the internal running indications to on or off. When set to on the green LED on the unit will flash green continuously. When set to off they will only flash when the unit is receiving or sending CAN messages.
The power consumption of the units are affected by this setting.
It is recommended to have this setting as "Off".

Burglar alarm delay
The burglar alarm delay is used in two places. It defines the amount of seconds that must pass before the burglar alarm is actually active after being activated. It also defines the amount of seconds that must pass before a delayed burglar alarm sensor triggers the burglar alarm. This delay is usually set to about 30 seconds to allow any PIR-detectors to stabilize.

Read more about the burglar alarm functions and how to configure a burglar alarm.

Project serial number
Defines the serial number for the project. This information will be stored in the units. This is commonly used to store the serial number of the boat.

Internal channel indications
Sets the state of the internal input channel indications to on or off. When set to on a green LED indication will be activated for each corresponding input on the unit. When set to off no LED indications will be activated on the input modules. The LED indications on the output cards are not affected by this setting, they can not be turned off.
The power consumption of the units are affected by this setting.

Security code

Defines the security code that can be used to secure burglar alarm communication between the EmpirBus units. When set, a foreign unit will not be able to send a burglar alarm deactivate message to the system.

Read more about the burglar alarm functions and how to configure a burglar alarm.

PIN code
Defines the PIN code that will be programmed into the units. The button will display the PIN code dialog. When a PIN code is entered and downloaded to the system the system will be locked and the configuration in the units cant be altered without the original file containing the PIN code.

Configuration Interface version
Displays the version information for the EmpirBus configuration interface.

File saved
Displays the last save date for the open project.

Units with subscriptions to missing units & Missing subscriptions
When reading configuration from selected units on the bus and these units have subscriptions to other units that are not present in the EmpirBus project the missing subscriptions and units will be displayed in these lists.
These lists should always be empty. If they are not you will need to load the missing units.

6.2 Units

Unit name
The name of the unit. A good practice is to name the unit according to placement.

Base addr.
All units must have a base address. The address must be an integer value between 1 and 99.
To change the base address of a unit you need to set the serial id of the unit you want to change in the S/N field.
When downloading to the bus the base address will be changed accordingly.
All new units have base address 0 and can not be used until a valid base address has been set.

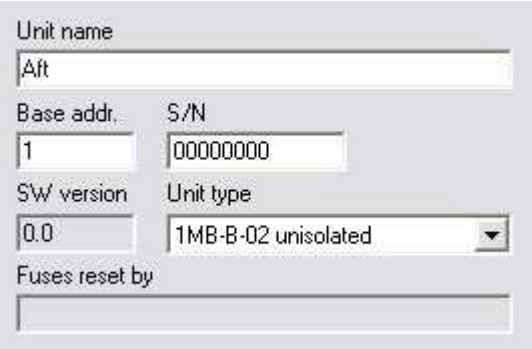
S/N
All units are delivered with a serial id that is printed on the unit. The first time a unit is configured the serial id should be assigned in the EmpirBus Config project.
The serial id is not saved with the EmpirBus Config project. When the units have a valid base address the serial id will not need to be changed.
Whenever you read or write information to a unit the serial id will be read and presented in this field.

SW version
Displays the unit software version information. If this field is set to 0.0 you can read the information from the unit using the get the units serial and version numbers button on the toolbar.

Unit type
Displays the unit type.

1MB-B-01 isolated
1MB-B-02 unisolated
1MB-B-03 isolated, extra fuse
1MB-B-04 unisolated extra fuse

Fuses reset by
Displays a reference to the input channel that is used to reset the fuses of this unit. If this field is empty no channel has been configured. Only one input channel can be configured to reset fuses for one unit and a maximum of 8 units can be reset by a single input channel. To reset more than 8 units from one switch several input channels needs to be parallelled.



6.3 Inputs (Switches)

Channel name
The name of the input channel. A good practice is to be very specific. Example: "Switch Roof Lights Saloon"

Switch type
Defines the physical characteristics of the switch.
When using input channel functions activate, deactivate, alarm reset, dimmers and fuse reset the switch type must be set to pulse switch. The application will give you a warning if you fail to do this.

Signal
Defines the physical connection, only available on 8DI-B-02.

• Minus Signal /Common Terminal
The input is connected either to a minus signal or traditionally to the common of the input card.

• Plus Signal
The input is connected to a plus signal.

Notice that running indication is only available with common terminal connection.

Input channel type
Defines the function of the input channel.

Normally open and normally closed defines if the normal (inactive) state of the switch is an open or a closed circuit. The most common switch type is"normally open".
The dimmer function requires normally open switches.

All the available input channel types are thoroughly explained in the input channel types section.

Available input channel types
• Normal
• Activate
• Deactivate
• Interlock
• Main switch
• Alarm reset
• Dimmer increase
• Dimmer decrease
• Dimmer increase/decrease
• Unit fuse reset
• Burglar alarm on/off
• Burglar alarm sensor
• Burglar alarm delayed sensor

Time type

• Delay
The input must be activated for a number of seconds before the signal is sent.

For input channel types normal, interlock, main switch and burglar alarm on/off the switch type must be set to fixed switch to use the delay function.
For input channel types activate, deactivate, alarm reset, unit fuse reset and burglar alarm sensor the switch type must be set to pulse switch to use the delay function.

• Auto off
This function can be used to lock certain inputs and outputs and only allow a temporary unlock. This is commonly used for windlass and bow thrusters. This function is only available with main switch.

Time (s)
Specifies the delays for the delay function selected in time type.

Block on burglar alarm
Indicates weather this input channel should be blocked on burglar alarm.

• Off
The input channel will not be blocked on burglar alarm.

• Block on alarm on/off
The input channel will be blocked as soon as the alarm is activated.

• Block on sensor
The input channel will be blocked when something triggers the alarm.

Read more about burglar alarm

Running indication/input subscribes to
A input channel can subscribe to both output, input and membrane panel channels.
Subscriptions to output channels defines that a running indication should be displayed on the input channel when all the subscribed outputs are active.
Subscriptions to fixed normal input channels defines that a running indication should be displayed on the input channel when all the subscribed inputs are active.
Subscriptions to input and output channels can be combined.

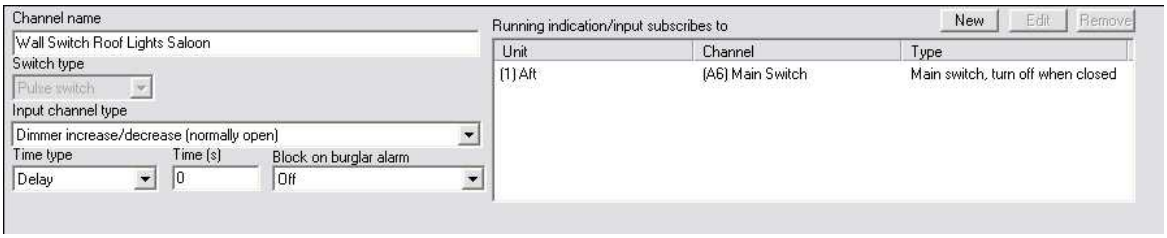
A subscription to a main switch will cause the input channel to be blocked when the main switch is turned off.

A total of 8 subscriptions can be defined for each input channel.

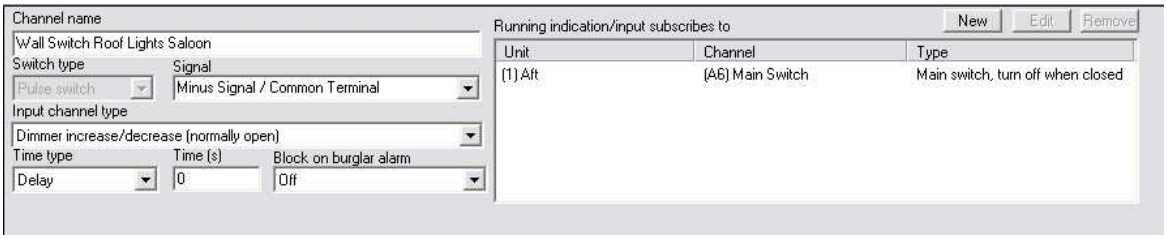
The subscription list will display unit, channel and type of each subscriptions for the selected input channel.

The edit subscriptions/indications dialog is used to add and edit subscriptions .

8DI-B-01



8DI-B-02

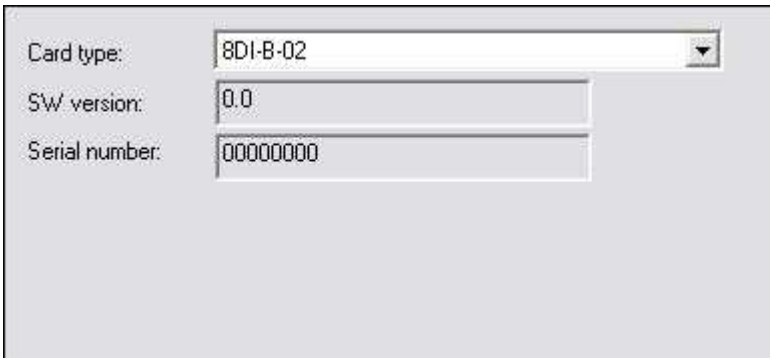


Input Card type
Mark the frame around the input card by pressing the text 8 Digital inputs to get this form.

Card type
Card type can be altered from 8DI-B-01 to 8DI-B-02.
If the unit is read from the bus this field is already correct.
When making a file from a new project this field needs to be changed to correspond with the actual unit. If it is incorrect the application will give you a warning.

SW version
Displays the modules software version information. If this field is set to 0.0 you can read the information from the unit using the get the units serial and version numbers button on the toolbar.

S/N
All modules are delivered with a serial id.
The serial id is not saved with the EmpirBus Config project.If this field is set to 00000000 you can read the information from the unit using the get the units serial and version numbers button on the toolbar.



6.4 Outputs (Consumers)

Channel name
The name of the output channel. A good practice is to be very specific. Example: "Roof Lights Saloon"

Fuse size
Defines the fuse size of the output. When parallelling outputs always use the same fuse size for all parallelled outputs.

Fuse type
Defines the fuse type of the output.

• Fast
Functions like a A-type fuse.

• Medium
Functions like a C-type fuse.

• Slow
Functions like a C-type fuse with high startup current tolerance.

When paralleling outputs always use the same fuse type for all paralleled outputs.

Each output module is limited to a current consumption of 40A. If this limit is exceeded for more than one second, the fuses for channels 5 to 8 will trip.

Under current
Indicates weather under current alarms should be sent from the output. If no under current alarm is defined the subscribing running indications will be active even if no power is consumed by the output.

Block on burglar alarm
Indicates weather this output channel should be blocked/deactivated on burglar alarm.

• Off
The output channel will not be blocked on burglar alarm.

• Block on alarm on/off
The output channel will be blocked as soon as the alarm is activated.

• Block on sensor
The output channel will be blocked when something triggers the alarm.

Read more about burglar alarm

Output channel type
Defines the type for the output channel.

• Activated at start-up
The output channel is activated as soon as the unit is powered on. The output channel can be interlocked or controlled by main switches.

• Normal
Normal function.

• Dimmer
The output can be dimmed. To dim the output channel subscribe input channels or membrane panel channels with dimmer function. A maximum of 2 output channels per output module can be dimmed. The application will give a warning if this is violated.

Dimmer min (%)
Sets the minimum level that the output channel can be dimmed to. This field is only available when the output channel type is set to dimmer. This function is commonly used when dimming electrical motors since they can be damaged if the power supply is to low.

Function
Defines the function of the output channel.

• Normal
Normal function.

• Auto-off (Time 2)
The output channel will automatically be deactivated after a specified number of seconds after activation. The number of seconds are specified in the Time 2 (s) field.

Time 1 (s)
Value used for delays defined in subscriptions.

Time 2 (s)
Value used for delays defined in subscriptions. This value is also used if the channel function is set to auto-off.

Delay function
Defines the behaviour for delay functions. This applies to delays defined in subscriptions and for the auto off-delay defined in output channel function.

• Reset on new pulse
The time delay restarts whenever a new signal is received.

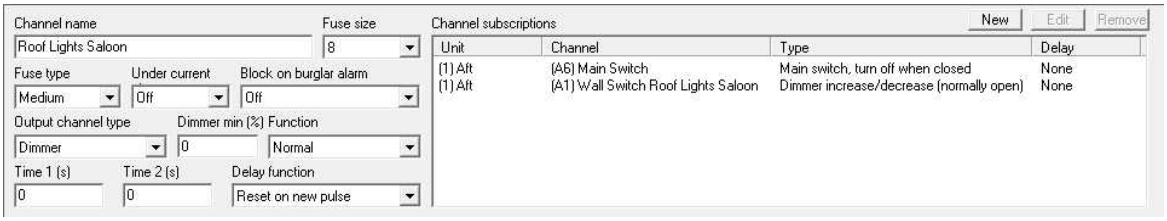
• No reset on new pulse
All new signals received will be ignored until the time delay has been completed.

Subscriptions
A output channel can only subscribe to input channels or membrane panel channels. Subscriptions defines that the output channel should listen to signals from the functions defined in the input channels or membrane panel channels it subscribes to.

A total of 8 subscriptions can be defined for each output channel.

The subscription list will display unit, channel, type and delay of each subscriptions for the selected output channel.

The edit subscriptions/indications dialog is used to add and edit subscriptions .

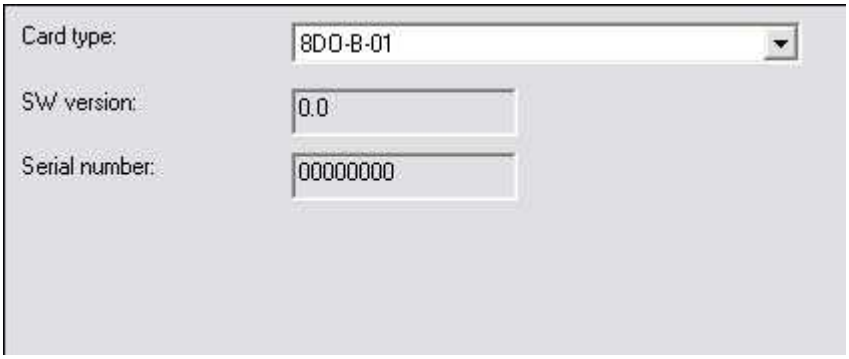


Output Card type
Mark the frame around the output card by pressing the text 8 Digital outputs to get this form.

Card type
Card type can be altered from 8DO-B-01 to 8DO-B-02.
If the unit is read from the bus this field is already correct.
When a adjustment is made to the unit type the output card will automatically be altered.
When making a file from a new project this field needs to be changed to correspond with the actual unit. If it is incorrect the application will give you a warning.

SW version
Displays the modules software version information. If this field is set to 0.0 you can read the information from the unit using the get the units serial and version numbers button on the toolbar.

S/N
All modules are delivered with a serial id.
The serial id is not saved with the EmpirBus Config project.If this field is set to 00000000 you can read the information from the unit using the get the units serial and version numbers button on the toolbar.



6.5 Window wipers

Channel name
The name of the window wiper channel. A good practice is to be very specific. Example: "Window Wipers PS"

Fuse type
Defines the fuse type of the output.

• Normal
Functions like an C-type fuse.

• Fast
Functions like a A-type fuse.

Fuse size
Defines the fuse size of the output.

Interval time (s)
Selects the interval time between start signals to the wiper. To start the wiper in interval mode a subscription needs to be defined to an input or membrane panel channel with interval mode defined in the subscription.

Parking function
If the wiper has a parking function this setting should be set to with. This will cause the wiper to be forced to stop in the parking position preventing additional revs.

Block on burglar alarm
Indicates weather this window wiper channel should be blocked/deactivated on burglar alarm.

• Off
The window wiper channel will not be blocked on burglar alarm.

• Block on alarm on/off
The window wiper channel will be blocked as soon as the alarm is activated.

• Block on sensor
The window wiper channel will be blocked when something triggers the alarm.

Read more about burglar alarm

Subscriptions
A window wiper channel can only subscribe to input or membrane panel channels.
Subscriptions defines that the output channel listens to signals from the functions defined in the input channels or membrane panel channels it subscribes to.

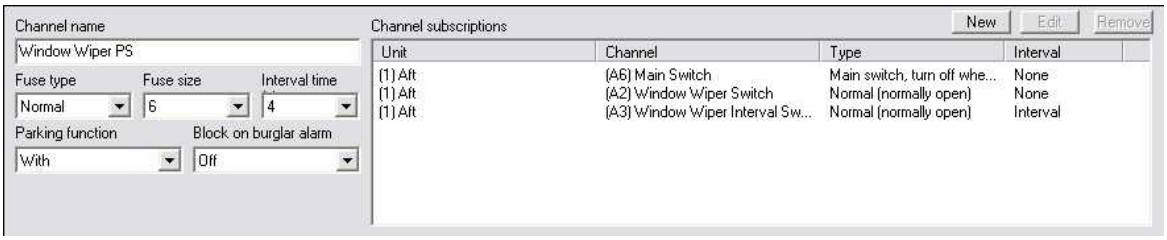
A total of 8 subscriptions can be defined for each window wiper channel.

The subscription list will display unit, channel, type and interval of each subscriptions for the selected window wiper channel.

The edit subscriptions/indications dialog is used to add and edit subscriptions .

Function
High and low speed are internally configured to not be active at the same time. If low is active and high gets a activate signal low will automatically be deactivated, if high is active and low gets a activate signal high will automatically be deactivated.
Interval have the same function if low speed is active and low speed interval gets a activate signal low speed will automatically be deactivated.

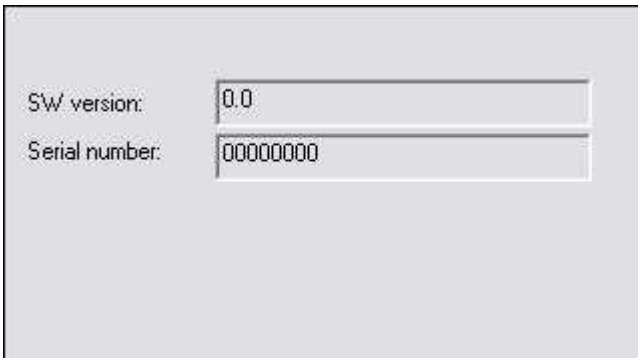
Use a window wiper channel as regular output channel
A window wiper channel can also be used as a regular output. When doing so set parking function to without.



Wiper Card type
Mark the frame around the window wiper card by pressing the text Window wiper card to get this form.

SW version
Displays the modules software version information. If this field is set to 0.0 you can read the information from the unit using the get the units serial and version numbers button on the toolbar.

S/N
All modules are delivered with a serial id.
The serial id is not saved with the EmpirBus Config project.If this field is set to 00000000 you can read the information from the unit using the get the units serial and version numbers button on the toolbar.



6.6 Relays

Channel name
The name of the relay channel. A good practice is to be very specific. Example: "Roof Hatch Control Box Open relay"

Block on burglar alarm
Indicates weather this relay channel should be blocked/deactivated on burglar alarm.

• Off
The relay channel will not be blocked on burglar alarm.

• Block on alarm on/off
The relay channel will be blocked as soon as the alarm is activated.

• Block on sensor
The relay channel will be blocked when something triggers the alarm.

Read more about burglar alarm

Output channel type
Defines the type for the relay channel.

• Activated at start-up
The relay channel is activated as soon as the unit is powered on. The relay channel can be interlocked or controlled by main switches.

• Normal
Normal function.

Function
Defines the function of the relay channel.

• Normal
Normal function.

• Auto-off (Time 2)
The relay channel will automatically be deactivated after a specified number of seconds after activation. The number of seconds are specified in the Time 2 (s) field.

Time 1 (s)
Value used for delays defined in subscriptions.

Time 2 (s)
Value used for delays defined in subscriptions. This value is also used if the channel function is set to auto-off.

Delay function
Defines the behaviour for delay functions. This applies to delays defined in subscriptions and for the auto off-delay defined in output channel function.

• Reset on new pulse
The time delay restarts whenever a new signal is received.

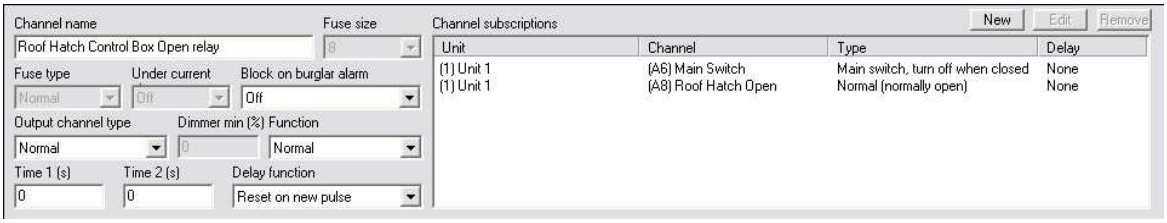
• No reset on new pulse
All new signals received will be ignored until the time delay has been completed.

Subscriptions
A relay channel can only subscribe to input channels or membrane panel channels. Subscriptions defines that the relay channel should listen to signals from the functions defined in the input channels or membrane panel channels it subscribes to.

A total of 8 subscriptions can be defined for each relay channel.

The subscription list will display unit, channel, type and delay of each subscriptions for the selected relay channel.

The edit subscriptions/indications dialog is used to add and edit subscriptions .

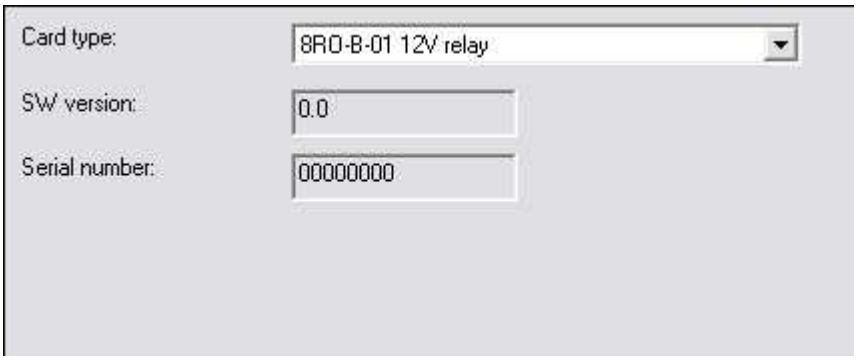


Realy Card type
Mark the frame around the output card by pressing the text 8 Digital outputs to get this form.

Card type
Card type can be altered from 8RO-B-01 (12V relay) to 8RO-B-02 (24V relay).
If the unit is read from the bus this field is already correct.
When making a file from a new project this field needs to be changed to correspond with the actual unit. If it is incorrect the application will give you a warning.

SW version
Displays the modules software version information. If this field is set to 0.0 you can read the information from the unit using the get the units serial and version numbers button on the toolbar.

S/N
All modules are delivered with a serial id.
The serial id is not saved with the EmpirBus Config project.If this field is set to 00000000 you can read the information from the unit using the get the units serial and version numbers button on the toolbar.



6.7 Dimmer module for running indications

General
The dimmer module for running indications is only used to dim the running indications (LED's) connected to inputs on an EmpirBus unit. You can use standard output modules to dim regular output channels (lights etc).

Function
Running indications can be dimmed between to set values, (min 0 and max 253).
There is no upper or lower limit for how many inputs that can be subscribed to the dimmer module for running indications.

Terminals
Only input channel 1,2 (and 3) are used during usage of the system on the dimmer module for running indications.

Connect a switch for dimmer increase to channel 1 (pin 1 & 2).
Connect a switch for dimmer decrease to channel 2 (pin 3 & 4).
Connect a switch for light test to channel 3 (pin 5 & 6).
Channel 4 Sets and resets the Max value.
Channel 5 Sets and resets the Mid value.
Channel 6 Sets and resets the Min value.

Channel 7 Not Connected.
Channel 8 Not Connected.

Usage
On the inputs which have a LED connected and also a subscription to a output to indicate, make a subscription to the dimmer module for running indications.

Channel functions
Channel 1: Increase the intensity of the LED's connected to an input and subscribed to an active output and to the dimmer module.
Channel 2: Decrease the intensity of the LED's connected to an input and subscribed to an active output and to the dimmer module.

Channel 3: Close this circuit to test the LED's connected to an input and subscribed to the Dimmer module for running indications, all LED's with these criteria's will be lit up with full intensity.

Channel 4,5 and 6: Close the circuit and there will be one flash on the indication corresponding to that input on the card, have the circuit closed for approximately 5 seconds and there will be two flashes on the indication corresponding to that input on the card.

One flash indicates that the Max, Mid or Min value have been set, two flashes indicates that the Max, Mid or Min value have been reset.

Calibration
Start one or more running indications by starting the outputs they indicate.
LED's have a non-linear curve therefore it is complicated to change the intensity of the LED.
The curve of the LED has a bend, when dimming the value around this bend the LED will tend to go from illuminated to non illuminated.
To be able to minimize this phenomenon we can calibrate a Max, Mid and Min value for the application.

Dim the LED to a value where the LED seems to be fully intensified but have the lowest possible value.
Set this point as a Max value, by following the instructions described earlier in this document.

Dim the LED to a value where the LED seems to be off but have the highest possible value.
Set this point as a Min value.

Dim the LED to a value directly below the bend.
Set this point as a Mid value.

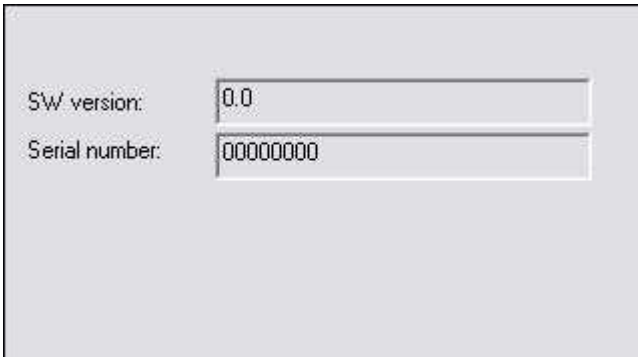
The Mid value will set a midpoint for the steps of the curve, there will be just as many steps from Min to Mid as from Mid to Max.
This way the steps from the Minpoint to the Midpoint will make larger value-steps than the steps from the Midpoint to the Maxpoint. Which will help to make a more soft transition over the bend.

Subscriptions
To subscribe a running indication to the light dimming module add a subscription to the module from the input channel.

Dimmer module for running indications Card type
Mark the frame around the output card by pressing the text 8 Digital outputs to get this form.

SW version
Displays the modules software version information. If this field is set to 0.0 you can read the information from the unit using the get the units serial and version numbers button on the toolbar.

S/N
All modules are delivered with a serial id.
The serial id is not saved with the EmpirBus Config project.If this field is set to 00000000 you can read the information from the unit using the get the units serial and version numbers button on the toolbar.



6.8 Membrane panels

Unit name
The name of the unit. A good practice is to name the unit according to placement.

Backlight

• Normal
The background lighting is activated manually.

• Activated at startup
The background lighting is activated at startup.

Base addr.
All units must have a base address. The address must be an integer value between 1 and 99.
To change the base address of a unit you need to set the serial id of the unit you want to change in the serial id field.
When downloading to the bus the base address will be changed accordingly.
All new units have base address 0 and can not be used until a valid base address has been set.

S/N
All units are delivered with a serial id that is printed on the unit. The first time a unit is configured the serial id should be assigned in the EmpirBus Config project.
The serial id is not saved with the EmpirBus Config project. When the units have a valid base address the serial id will not need to be changed.
Whenever you read or write information to a unit the serial id will be read and presented in this field.

Buzzer

• Off
The buzzer is not activated by a fuse trip or under current alarm.

• On alarm
The buzzer is activated by a fuse trip or under current alarm.

Dimmer group
Membrane panels can be grouped to dim background lighting and running indications together. When configuring a dimmer button for this feature the dimmer group is selected.

SW version
Displays the unit software version information. If this field is set to 0.0 you can read the information from the unit using the get unit version and serial number button on the toolbar.

Unit type
Unit type can be altered from 8MS-B-01 Membrane panel to 8MS-B-02 Membrane panel isolated. If the unit is read from the bus this field is already correct.
When making a file from a new project this field needs to be changed to correspond with the actual unit. If it is incorrect the application will give you a warning

Buzzer on b. sensor

• Off
The buzzer is not activated if a burglar alarm sensor is tripped.

• On
The buzzer is activated if a burglar alarm sensor is tripped.

Light sensor active
All panels have a light sensor built in, if the panels backlight is on and it is not dark in the surroundings the backlight will be turned off.
This option can be used if a number of panels are in the same dimmer group, the panel with this option checked are the master of that specific group. Other panels with this option unchecked will listen to the master of its group.
With a couple of panels in the same area its recommended to group them and use on light sensor for them all, then all these panels will start and stop their backlight simultaneously.
If the option is unchecked and there is no master in a group the backlight will never start.

Button sounds
The length of the button sound generated by the buzzer.

Push frequency
The delay between activations for the delayed buttons of this membrane panel. This is used to prevent the user from pushing one button directly after another. Use the button is delayed option on the input to delay the switch.

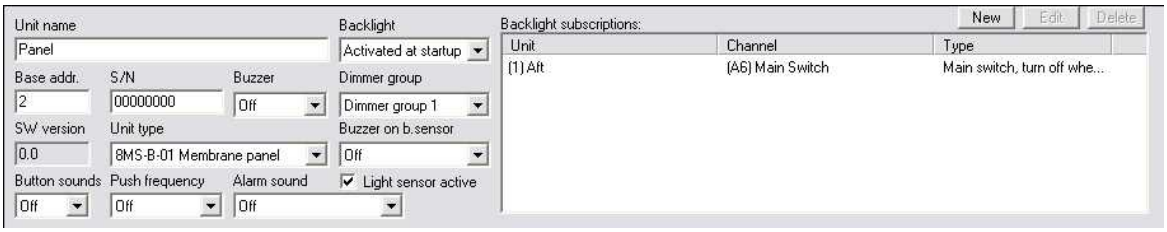
Alarm sound
The type of sound used for fuse trip or under current alarms.

Background lighting subscriptions
The background lighting can only subscribe to input channels or membrane panel channels. Subscriptions defines that the background lighting should listen to signals from the functions defined in the input channels or membrane panel channels it subscribes to.

A total of 8 subscriptions can be defined.

The subscription list will display unit, channel and type of each subscriptions for the selected output channel.

The edit subscriptions/indications dialog is used to add and edit subscriptions



6.9 Membrane panel switches

Button is delayed
Select to delay button using the push frequency defined on the membrane panel.

Channel name
The name of the membrane panel channel. A good practice is to be very specific. Example: "Switch Roof Lights Saloon"

Switch type
Defines the physical characteristics of the switch.
When using membrane panel channel functions activate, deactivate, alarm reset, dimmers and fuse reset the switch type must be set to pulse switch. The application will give you a warning if you fail to do this.
By setting the input as a fixed switch it can be used for functions like a horn etc.

Input channel type
Defines the function of the membrane panel channel.

Normally open and normally closed defines if the normal (inactive) state of the switch is an open or a closed circuit. The membrane panel switches type is"normally open".
The dimmer function requires normally open switches.
By setting the channel type as a normally closed and activate the function controlled by this input will start in an active state.

All the available membrane panel channel types are thoroughly explained in the input channel types section.

Available input channel types
• Normal
• Activate
• Deactivate
• Interlock
• Main switch
• Alarm reset
• Dimmer increase
• Dimmer decrease
• Dimmer increase/decrease
• Unit fuse reset
• Burglar alarm on/off

Input channel types only available on the membrane panel
• 8MS Dimmer increase
• 8MS Dimmer decrease
• 8MS Dimmer increase/decrease
• 8MS Lamp test

The Burglar alarm on/off input channel type is special on a membrane panel button, read more

about this in configuration instructions Burglar Alarm.

Time type

• Delay
The input must be activated for a number of seconds before the signal is sent.

For input channel types normal, interlock, main switch and burglar alarm on/off the switch type must be set to fixed switch to use the delay function.
For input channel types activate, deactivate, alarm reset, unit fuse reset and burglar alarm sensor the switch type must be set to pulse switch to use the delay function.

• Auto off
This function can be used to lock certain inputs and outputs and only allow a temporary unlock. This is commonly used with for windlass and bow thrusters. This function is only available with main switch.

Time (s)
Specifies the delays for the delay function selected in time type.

Block on burglar alarm
Indicates weather this input channel should be blocked on burglar alarm.

• Off
The input will not be blocked on burglar alarm.

• Block on alarm on/off
The input will be blocked as soon as the alarm is activated.

• Block on sensor
The input will be blocked when something triggers the alarm.

Read more about burglar alarm

Running indication

• All required
All of the subscribed output channels must be turned on for the running indication to be activated.

• At least one required
At least one of the subscribed output channels must be turned on for the running indication to be activated.

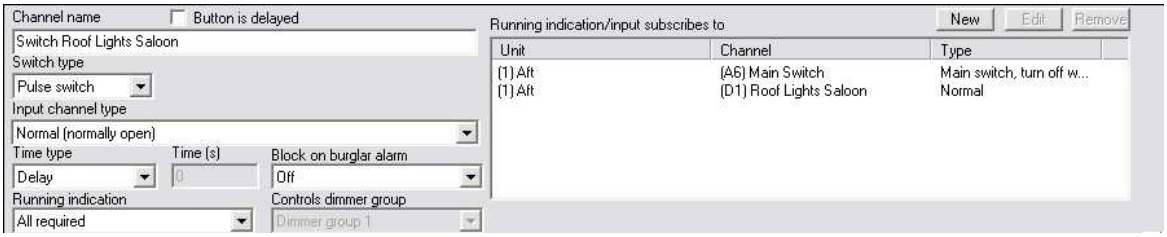
Controls dimmer group
Select the target dimmer group for the dimmer and lamp test functions of the membrane panel.

Subscriptions
A membrane panel channel can subscribe to both output, input and membrane panel channels. Subscriptions to output channels defines that a running indication should be displayed on the membrane panel channel when all or at least one of the subscribed outputs are active (configured using the running indication setting). A subscription to a main switch will cause the input channel to be blocked when the main switch is turned off.

A total of 8 subscriptions can be defined for each membrane panel channel.

The subscription list will display unit, channel and type of each subscriptions for the selected input channel.

The edit subscriptions/indications dialog is used to add and edit subscriptions .



Virtual Channels
On a membrane panel there are three virtual channels internally connected to each switch. As example button 1 has its original function on A1.
B1, C1 and D1 can be activated by checking the square next to the text Virtual channel active. The function on the virtual channels are almost the same as a original channel, except for the subscription field, it is not for running indication only main switch subscriptions. Therefore the field "Running indication: all required / at least one required" does not exist. Button is delayed is not available either but if it is checked on channel A its the same for the virtual channels on that specific channel.
The functions will happen in ascending order so if all virtual channels are active function A will be sent and then function B and then function C and then function D.

6.10 Functions and dialogs

New unit dialog

Input channel types

Edit subscriptions/indications dialog

PIN code dialog

Send configuration dialog

Read configuration dialog

Unlock PIN code dialog

Settings dialog

Language dialog

Circuit diagram wiew

Bus monitor

6.10.1 New unit dialog

Unit name
The name of the unit. A good practice is to name the unit according to the placement.

Base address
The base address of the new unit.
All units must have a base address.

The address must be an integer value between 1 and 99.

Unit type
Define the type of the new unit from a list of predefined units.
We recommend selecting a predefined type since these are available from our resellers. Custom configured units will be more expensive to buy.
The membrane panel is created from this form.

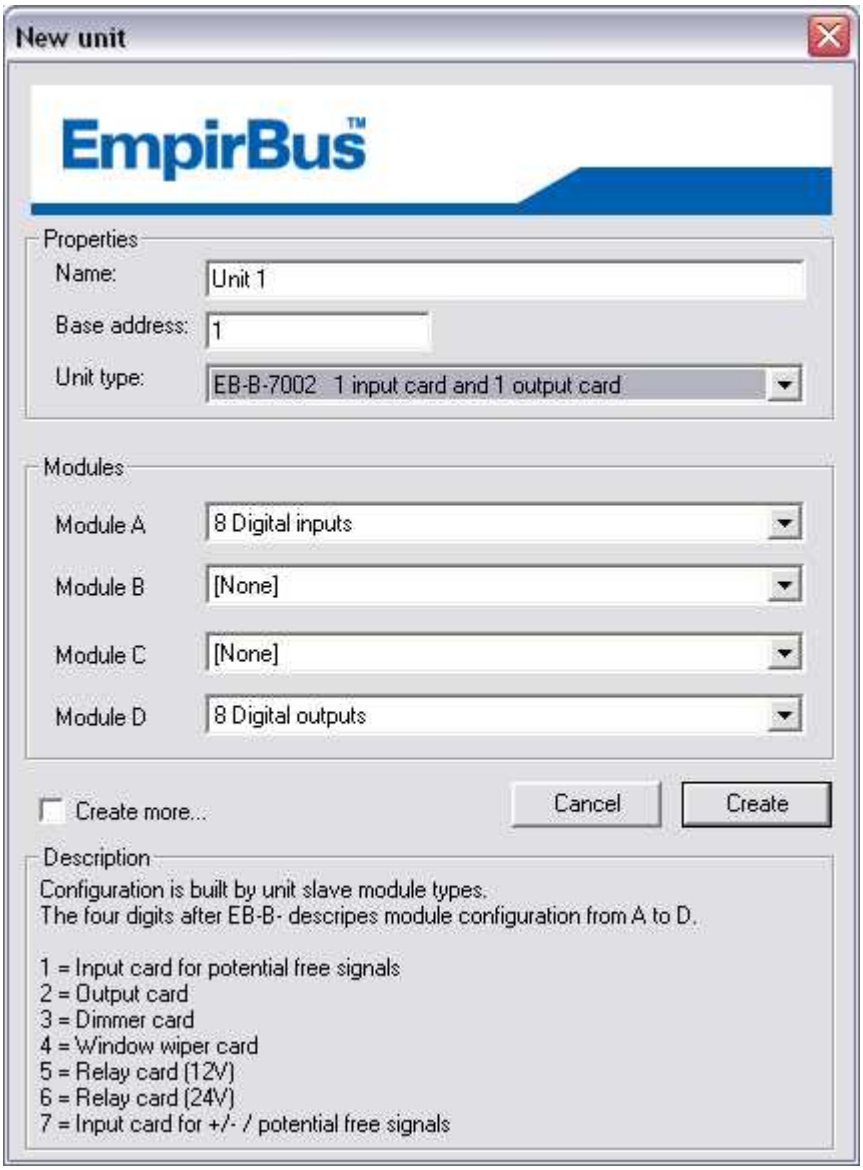
Module A
Module type for slot A of the new unit. Selecting none indicates an empty slot.

Module B
Module type for slot B of the new unit. Selecting none indicates an empty slot.

Module C
Module type for slot C of the new unit. Selecting none indicates an empty slot.

Module D
Module type for slot D of the new unit. Selecting none indicates an empty slot.

Create more...
When selecting this check box the new unit dialog will be displayed again after selecting create allowing you to create additional units.



6.10.2 Input channel types

Normal
Normal is the most commonly used input channel type. When used with a pulse switch, the subscribing output channels will be toggled when the switch is pressed. When used with a fixed switch, the subscribing output channels will be active when the switch is active. An output that is kept active by a fixed switch can not be deactivated by a pulse switch.

With fixed switch: The subscribing output channels are active when the input channel is active. Note that only main switch input channels and interlock input channels can deactivate the subscribing outputs while the fixed switch is active. You can connect several fixed switches to one output channel.
With pulse switch: The subscribing output channels are toggled by the input channel. You can connect several pulse switches to one output channel.

Activate
Activates the subscribing output channels. This function must be configured as a pulse switch.

Commonly used in mode functions when an additional input channel is parallelled and configured with a deactivate function. This allows absolute state to be set on selected output channels in the installation.

Deactivate
Deactivates the subscribing output channels. This function must be configured as a pulse switch. Commonly used in mode functions when an additional input channel is parallelled and configured with an activate function. This allows absolute state to be set on selected output channels in the installation.

Interlock
Interlock is used to block output channels from an input. All active output channels that were blocked by the interlock function will be re-activated when the interlock function is reset.

With fixed switch: Blocks the subscribing output channels when the input channel is active. Any active subscribing output channels will be re-activated when the interlock is deactivated
With pulse switch: Toggles blocking of the subscribing output channels. Any active subscribing output channels will be re-activated when the interlock is deactivated.

This function is very similar to the main switch function, the difference is that the interlock function preserves the state of the output channels.

Main switch
The main switch function is designed to replace the traditional main switch of an installation. All channels that should be controlled by the main switch should subscribe to it. The main switch function will block all subscribers preventing them from being re-activated. When releasing the main switch only output channels that has been set to start automatically or output channels controlled by active fixed switches will be active.

With fixed switch: Deactivates and blocks activation of the subscribing output channels when the input channel is activated. Input channels should also be blocked when blocking outputs controlled by pulse switches.
With pulse switch: Toggles blocking of the subscribing output channels. When the blocking is activated all subscribing output channels will also be deactivated. Input channels should also be blocked when blocking outputs controlled by pulse switches.

Main switch, turn off when closed will block when active.
Main switch, turn off when closed will block when inactive.

If you want to use a fixed main switch with running indications the input channel must be a main switch, turn off when closed.

This function is very similar to the interlock function, the difference is that the interlock function preserves the state of the output channels.

Alarm reset
When an under current alarm or a fuse trip is indicated by an input channel the alarm indication will be flashing. When subscribing the output channels to an alarm reset function the flashing indication can be reset to a steady indication for membrane panels and 8DI-B-01 for 8DI-B-02 with just one LED connected the flashing will be less intensive after resetting it. All outputs generating an alarm to the input channel must be reset to reset the indication.
On a membrane panel with a buzzer connected and turned on, the buzzer will be stopped by the alarm reset button as well.

This function will not reset the fuse. Use unit fuse reset to accomplish this.

Sends an alarm reset signal to the subscribing output channels. This function must be configured

as a pulse switch.

Dimmer increase
Sends an activate signal to the output when activated. If the input is activated for more than one second it dims the subscribing output channels up (more intensity). This function must be configured as a pulse switch. With short button presses the input will just activate the output.

Dimmer decrease
Sends an deactivate signal to the output when activated for less than one second. If the input is activated for more than one second it dims the subscribing output channels down (less intensity). This function must be configured as a pulse switch. With short button presses the input will just deactivate the output.

Dimmer increase/decrease
This is the most commonly used dimmer function. It has the ability to act as both a dimmer input and a standard pulse input. When activating the input quickly (less than 1 second) it will act as a normal pulse input. When activating and keep the circuit on the input it will start dimming the subscribing output channels down from the maximum level until it reaches the minimum level, at which point it will start dimming them up again. This behaviour will continue until the dimmer switch is released. When deactivating and reactivating the subscribing output channels the level will always be reset to the maximum level.

Unit fuse reset
When a fuse is tripped it can be reset using the unit fuse reset function. An input channel can only be configured to reset fuses for entire units, and a total of 8 units can be reset from a single channel. To reset more than 8 units from one switch several input channels needs to be parallelled . Only one input channel can be configured to reset fuses for each unit.
This function must be configured as a pulse switch.

All output channels that has not been manually deactivated will be reset to operating state. Outputs that is already in operative state will not be affected.
Output channels that has been manually deactivated will not be reset, they can only be reset with the S (set) and R (reset) buttons on the physical unit.

Burglar alarm on/off
The burglar alarm on/off function is used to activate and inactivate the burglar alarm. This function is very similar to a main switch. When the burglar alarm is in "off" state any subscribing channels is blocked. When the burglar alarm is in the "on" state any channels set to be blocked by burglar alarm is blocked. This property is found in the channel properties of both input, output, relay, window wiper and membrane panel channels.
With fixed switch: Turns on the burglar alarm when active. When using a fixed switch there can only be one burglar alarm on/off input.
With pulse switch: Toggles between burglar alarm on and off. There is no upper limit for how many burglar alarm on/off (pulse) inputs there can be in a system.

Burglar alarm on/off on a membrane panel button
When using a membrane panel input as a burglar alarm on/off the burglar alarm will be locked and secured by a PIN code. The function is as follows:
Press once and the panel will go into code mode, all green LED's will flash. Now the system requires a PIN code to be locked, the panel is supplied with PIN code "1234" in other words to unlock the system press button 1 followed by button 2 followed by button 3 and finally button 4. When the burglar alarm is active the red LED next to the button will flash.
To unlock the system press the button again and enter the PIN code one more time.
To change the PIN code press the burglar alarm on/off button once, while the LED's are flashing green press and hold down the same button for about 5 seconds. Now the LED's will change from flashing green to flashing red and green. Enter the actual PIN code, then enter the new PIN code and enter the new PIN code again. The LED's will flash red and green in between the times when

a PIN code is entered, when entering a PIN code the LED's will flash green. When the new PIN code has been entered twice the LED's will be illuminated with a solid green light.
There is no upper limit for how many burglar alarm on/off (pulse) inputs there can be in a system, panel and traditional inputs can be combined with no limit.

Read more about the burglar alarm functions and how to configure a burglar alarm.

Burglar alarm sensor
The burglar alarm sensor functions like an activate function with one difference. An input channel configured as a burglar alarm sensor will trigger the burglar alarm.
Once the burglar alarm has been triggered it can only be turned off from an input channel configured as a burglar alarm on/off channel, usually connected to a remote control or a membrane panel channel. This function must be configured as a pulse switch.

Read more about the burglar alarm functions and how to configure a burglar alarm.

Burglar alarm delayed sensor
The burglar alarm delayed sensor functions like a delayed activate function with some differences. An input channel configured as a burglar alarm delayed sensor will trigger the burglar alarm.
Once the burglar alarm has been triggered it can only be turned of from an input channel configured as a burglar alarm on/off channel, usually connected to a remote control or a membrane panel channel.
The delay for the sensor is defined by the burglar alarm delay configured on the project page. This function must be configured as a pulse switch.

Read more about the burglar alarm functions and how to configure a burglar alarm.

8MS Dimmer increase
Dims background lighting and running indications for the selected dimmer group up (more intensity) when the button is pressed. This function must be configured as a pulse switch. Only available on membrane panel buttons.

8MS Dimmer decrease
Dims background lighting and running indications for the selected dimmer group down (less intensity) when the button is pressed. This function must be configured as a pulse switch. Only available on membrane panel buttons.

8MS Dimmer increase/decrease
Dims background lighting and running indications for the selected dimmer group up and down when the button is pressed. This function must be configured as a pulse switch. Only available on membrane panel buttons.

8MS Lamp test
Flash the running and alarm indication LED, light the background light and activate the summer for all membrane panels in the selected dimmer group. Only available on membrane panel buttons. Gets the function of a fixed switch.

6.10.3 Edit subscriptions/indications dialog

General
This dialog is displayed when pressing the "New" or "Edit" "Channel subscription" or "Running indication/input subscribes to" button on an input, output, relay, window wiper or membrane panel channel.
Subscriptions can now be added for that specific channel.

Choose subscription/indication: Unit

When selecting unit the channel list will be updated displaying the channels for that specific unit.

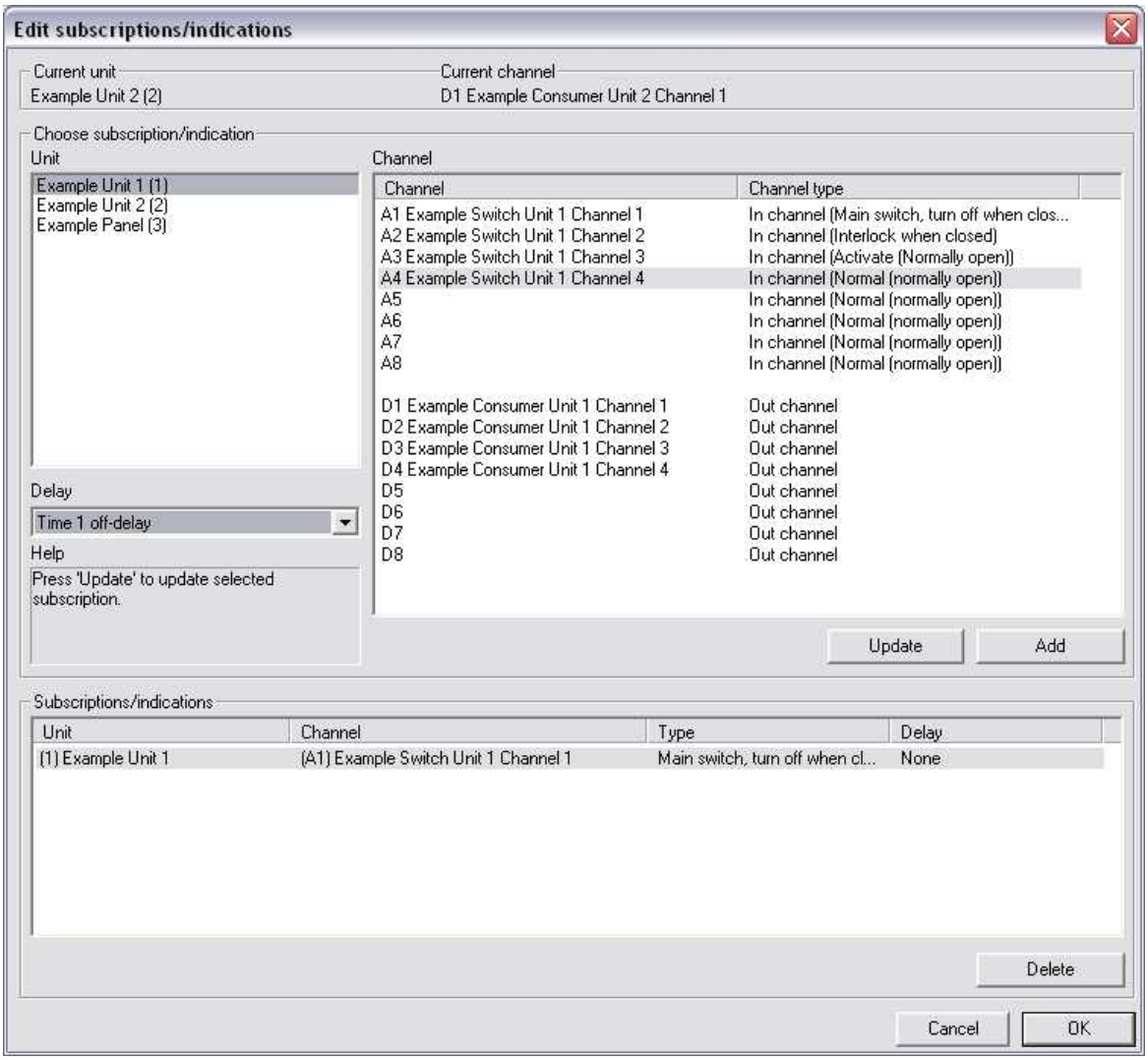
Choose subscription/indication: Channel
After selecting unit a channel can be selected.
A channel is added to the subscriptions list by pressing the add button or by double clicking the channel.

Choose subscription/indication: Delay
When defining an output channel subscription to an input channel a delay can be defined.
The delay can be either an on-delay or an off-delay. The actual time for the selected delay is specified in the time 1 or time 2 field of the output channel.
An on-delay will delay activation and an off-delay will delay deactivation.
When subscribing to input channels defined as activate functions only on-delays can be used and when subscribing to input channels defined as deactivate functions only off-delays can be used.

When using on-delays with running indications the indication will flash from the off state during the delay to indicate that the output(s) is being activated.
When using off-delays with running indications the indication will flash from the on state during the delay to indicate that the output(s) is being deactivated.

For window wiper subscriptions interval mode is defined using the delay field.

Subscriptions/indications
The subscription list will display the existing channel subscriptions. To update or delete the subscription first select it in this list and press the appropriate button.



6.10.4 PIN code dialog

Any configuration can be locked with a PIN code. To set the PIN code for a unit the PIN code needs to be specified. Whenever a configuration is downloaded to a unit this PIN code will be set. If a PIN code already exists in a unit and you want to reset it you need to use the PUK code. PUK code can be found on the box the unit was shipped in. This task is performed from the read configuration dialog.

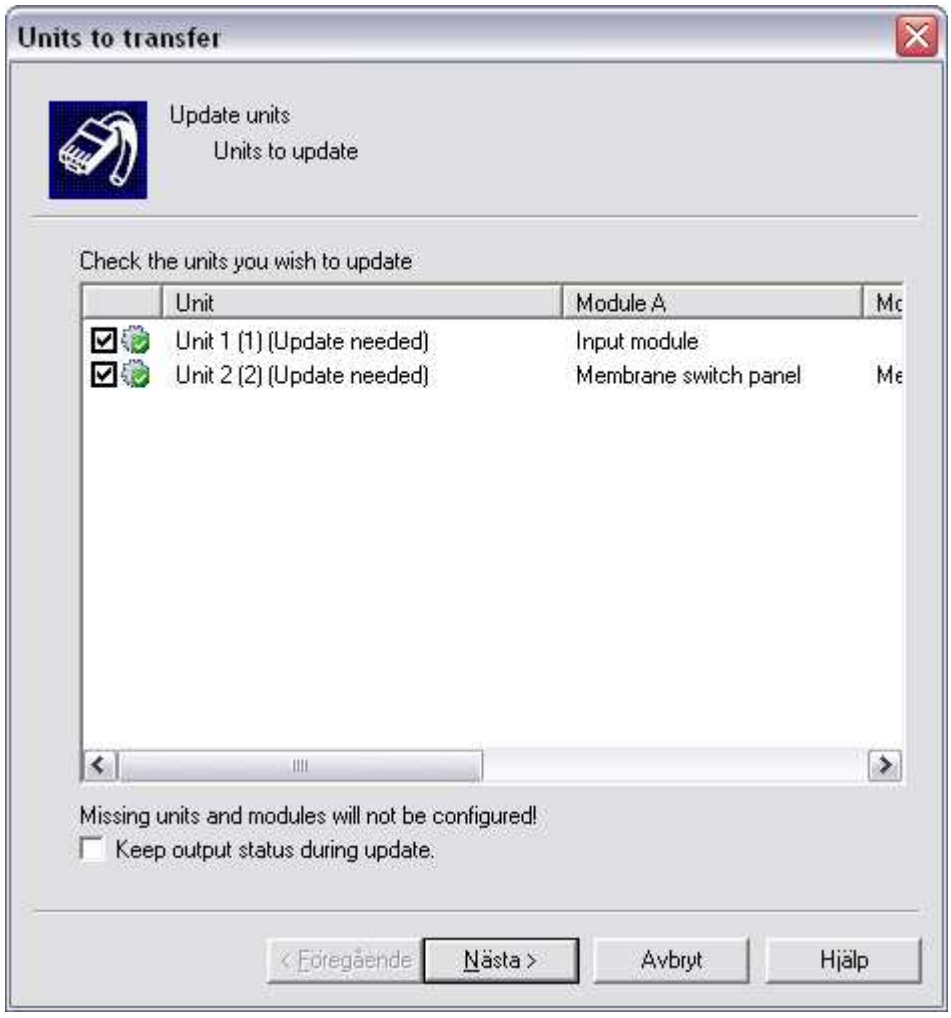
6.10.5 Send configuration dialog

Unit list
When trying to send configuration to the units on the bus all units will automatically be checked if they need to be updated.
A warning will be displayed if units that needs to be updated have not been selected for update.

The check box in front of each unit defines weather it will be updated or not.

This dialog will also display any hardware inconsistencies between the configuration in the EmpirBus Config project and the hardware present on the bus.

Keep output status during update
Select this check box if the state of all output channels should be preserved during update. If left unchecked all output channels will be deactivated during update. When the unit has been fully updated it will restart.



6.10.6 Read configuration dialog

Units on bus
Displays the units found on the bus. The check box defines if the unit should be read from the bus. The list displays Unit: Base address (Module A, Module B, Module C, Module D) S/N: Serial no.

Units
Displays the number of units found on the bus.

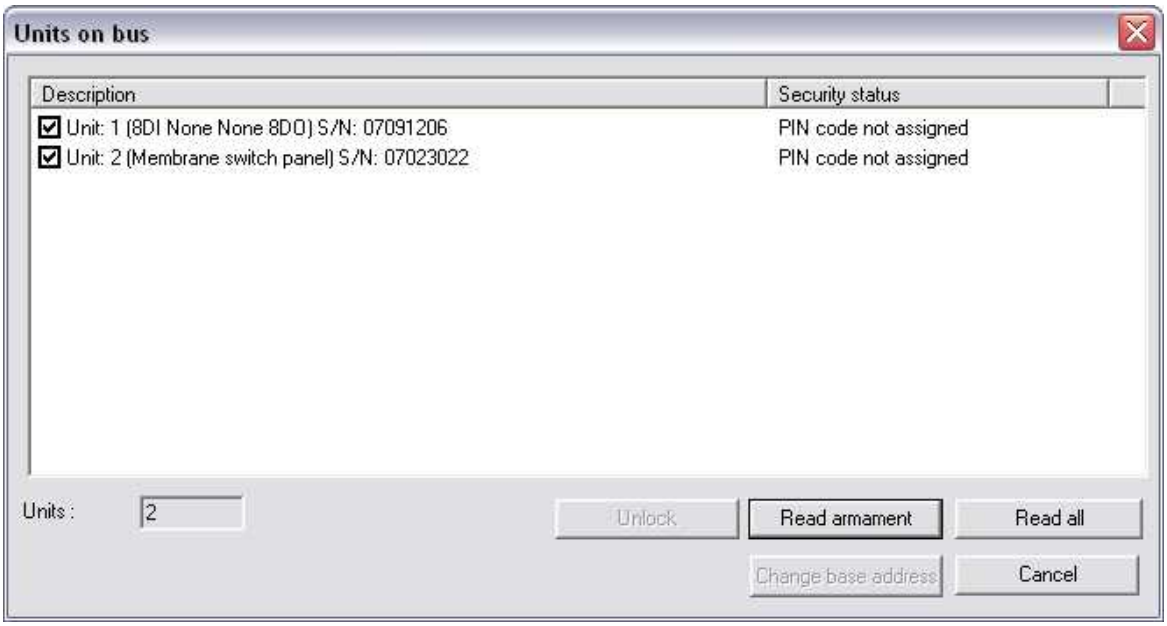
Unlock
If a PIN code has been assigned to a unit, it can be reset using the unlock PIN code function. This function will reset the PIN code and a new one can be assigned.

Read armament
This function will only read the hardware definition of the selected units from the bus. No configuration and subscriptions will be read.
If reading the units to a blank project whit intension to make a configuration and download it this is the way to go.

Read all
This function will read all configuration information from the selected units on the bus. When all information have been read from the units the file will be blocked for further downloading.

Change base address
After selecting a unit in the list the base address can be changed. This is required to be able to read units with serial no 0. The actual bus base addresses are not changed until the configuration is sent to the bus.

Cancel
Close this dialog without reading anything

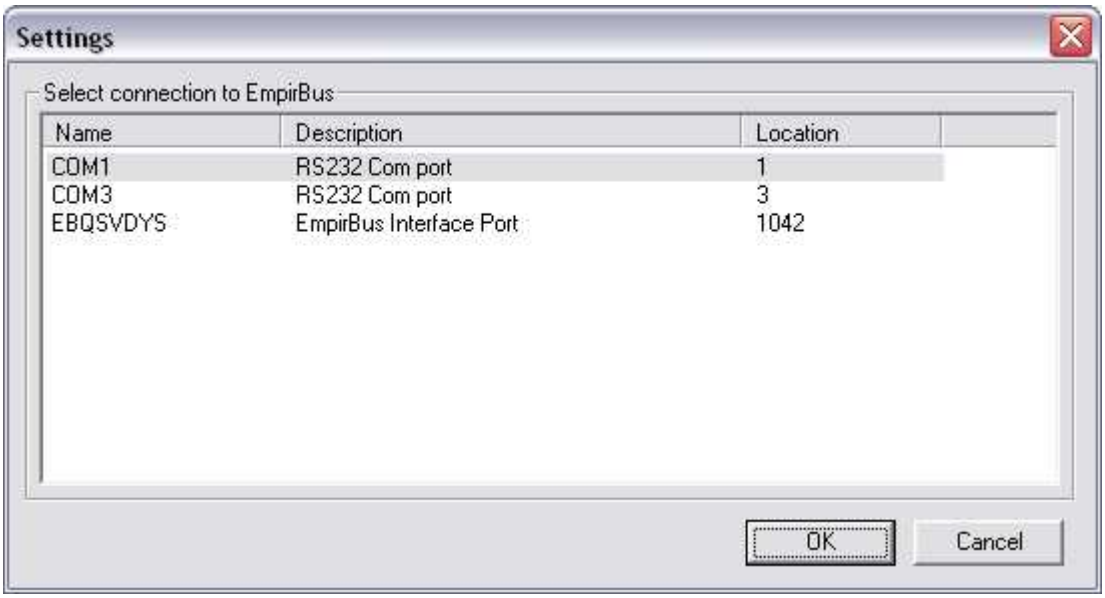


6.10.7 Unlock PIN code dialog

Enter the PUK code of the selected unit to reset the PIN code. The reset will occur immediately.

6.10.8 Settings dialog

Port list
The port list will vary depending on the ports available on the client computer. Select the port where you have connected the EmpirBus configuration interface.
If using a USB interface it will appear with the description EmpirBus Interface Port.



6.10.9 Language dialog

Language list
Displays a list of available languages. Select your language and press OK. EmpirBus Config must be restarted for the change to be affected.

6.10.10 Circuit diagram view

The circuit diagram view creates printable drawings of the current project.
All drawings can be completed with cable numbers etc.

The following pages is available

Project information page
Project number, drawing numbers etc.

EmpirBus articles specification
Delivers a complete article specification for ordering material for the current configuration.

Unit diagram (1 per unit)

Unit specification with fields for cable numbers etc.

Module diagram (1 per module)
Module specification with fields for cable numbers etc.

Edit field
This field appears every time when editing a field. Click in a grey field in the Circuit diagram view to open this form.

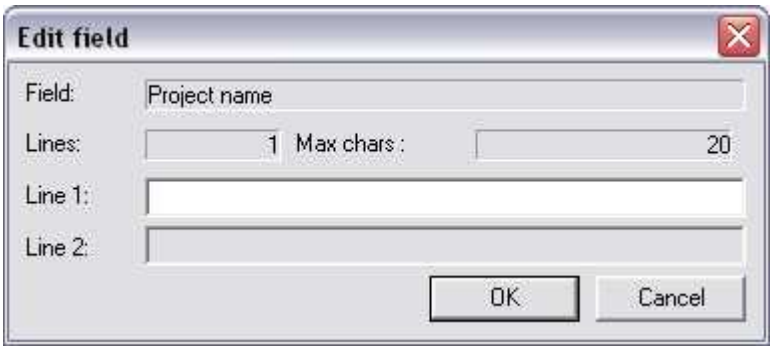
Field:
Displays the selected field.

Lines:
Displays how many lines that are available in this field.

Max chars:
Displays the number of characters that can be inserted in this field.

Line 1:
Enter the text for line 1.

Line 2:
Enter the text for line 2.



6.10.11 Bus monitor

The bus monitor is used for advanced diagnostics. This function will not be explained in this manual.

6.11 Configuration instructions

Mode Functions

Burglar Alarm

PIN Code

Main Switch Indication

6.11.1 Mode functions

One of the great advantages of EmpirBus is the ability to create mode functions.

In a yacht installation typical mode functions could be: Navigation light and anchor light.

Each of these modes will require specific output channels to be activated and deactivated. To accomplish this two input channels will be needed for each mode. These input channels should be physically parallelled and connected to one switch. One input channel will be used to activate and the other for deactivating output channels, when using a membrane panel virtual channels could be used instead.

Then simply subscribe the output channels that should be activated in a specific mode to the activate function of that specific mode and the deactivate function of the other modes.

6.11.2 Burglar alarm

The burglar alarm function of EmpirBus is designed to give you a flexible and secure system.

All switches and consumers in the system can be configured to be blocked when the burglar alarm is activated or triggered. This will render the system unusable until the burglar alarm is deactivated.

If the power to the system is cut any locked inputs or outputs will remain locked until the burglar alarm is deactivated.

To prevent the alarm system from being deactivated by a unit not belonging to this system, a security code can be entered in the CAN-bus/project page.

If using a membrane panel button as a burglar alarm on/off the system will be locked and secured by a pin code, read more about this in chapter: Input channel types Burglar alarm on/off on a membrane panel button.

To set up a burglar alarm, follow these steps

- Set the delay burglar alarm on the CAN-bus/project page. Usually about 30 seconds to allow any PIR-detectors to stabilize. This delay is also used for "Burglar alarm delayed sensors".

- Configure all burglar alarm sensors connected to the system (PIR-detectors and magnetic switches etc.) as burglar alarm sensors or burglar alarm delayed sensors (input channel type).

- Configure one input (usually a remote control input and/or a membrane panel switch) as burglar alarm on/off (input channel type).

- Configure all sensor power supplies and alarm indicators to be activated at start-up.

- Subscribe all sensor power supplies and alarm indicators (alarm outputs like sirens can be subscribed as well to stop them when turning off the alarm) to all burglar alarm on/off inputs.

- Subscribe all alarm outputs (sirens and other signals that is activated when the alarm is triggered) to all burglar alarm sensors.

- All alarm outputs (sirens and other signals that is activated when the alarm is triggered) should have a reasonable auto-off time set on the output. This prevents the siren to run without ever stopping.

6.11.3 PIN Code

A PIN code can be entered to protect the system from being altered by unauthorized persons. This function can be used as warranty protection of configuration files for yacht builders etc.

To secure the system enter a four digit PIN code in the Project.
When the PIN code is entered, download the configuration to the system to enable the protection in the units.
After this the system can not be altered without having the original PIN code, the PIN code is saved in the project.
With the original project changes can be made to the system without entering the PIN code again.

A read only file can be made from the File menu, this file can be provided to the yacht owner. This allows the yacht owner to download the original configuration to a replaced unit. The yacht owner cannot alter the configuration and thereby not delete or change vital functions in the system.
The yacht owner can use the file to monitor the system.

6.11.4 Main Switch indication

Instead of using a output to indicate something, a input set as a fixed switch can be used instead. When a fixed switch is activated as example when a normally open input is closed it will be active or when a normally closed input is open it will be active. This can be indicated on a input as a running indication.
One usage area for this function is indicating a main switch's status.
Set a input as a main switch fixed or pulse. (If its set as a pulse switch "turn off when closed" or "turn off when open" will set the startup status of the input. If using a physically normally open switch and configuring the input as a "Main switch, turn off when closed" the startup status will be not turned off, the main switch will not block its subscribers. If configured as a "Main switch, turn off when open" the startup status will be turned off, the main switch will block its subscribers. By startup means power offs and blocks by other main switches)
Subscribe the outputs and inputs that should be blocked by the main switch to it. Subscribe one empty input and set it as a "Fixed switch" "Normal (normally closed)" this input will be active all the time when it is not blocked. Then subscribe the running indication of the main switch to the input.

On a membrane panel a virtual channel can be used instead. Configure channel A as a "Main switch" (choose startup status) activate channel B and configure it as a "Fixed switch" "Normal (normally closed)". Subscribe channel B to be indicated on channel A and subscribe channel B to be blocked by channel A. This way we have a main switch with indication on just button in the system.

7 Instructions

All images containing units are examples made for this manual as guidance, your installation may differ from the images.
In some images the labels on windows and buttons are displayed in Swedish, the operating system will translate these in to the language you are using.
When referring to a unit in the instructions it could be either a unit or a membrane panel.

7.1 Connecting to EmpirBus

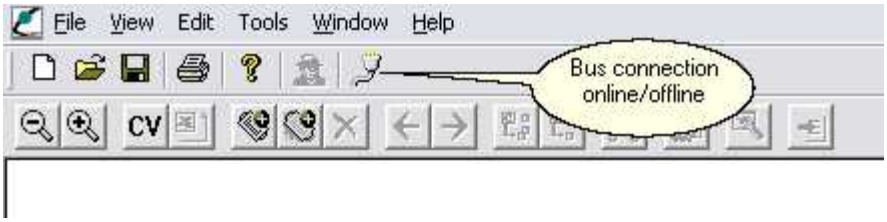
Read the complete instruction once before following the steps.

First of all install EmpirBus Config; this is free software which can be found on our website.
http://www.empirbus.com/page/1038/downloads.htm

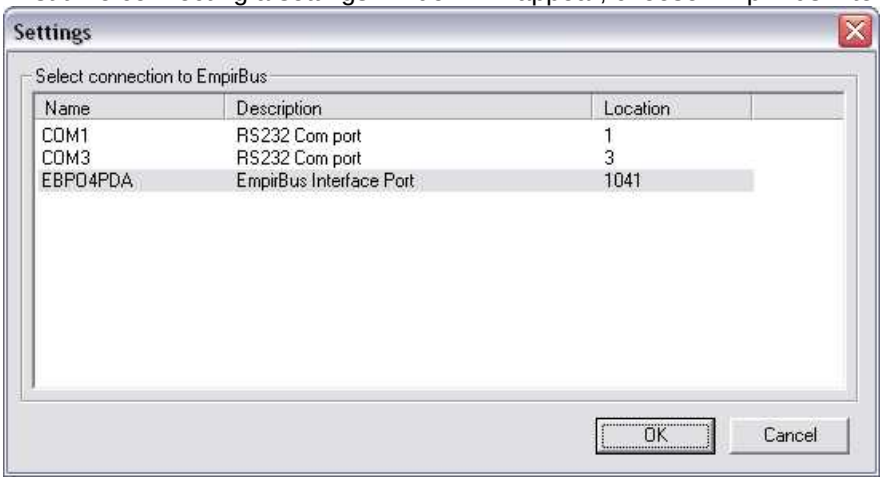
Install the program.
Open the program and open the file corresponding to your installation, or create a new file.

To connect the computer to the installation you will need an interface. The interface can be bought from one of our distributors/resellers or your boat builder.
Connect the interface via a USB cable to the computer.
The interface needs a driver to function. The driver can be found in either the folder where the installation file for the program is located or in the directory where the program has been installed. The folder is named “EmpirBus Interface Driver”.
After the driver has been installed successfully the green LED on the interface will start flashing.

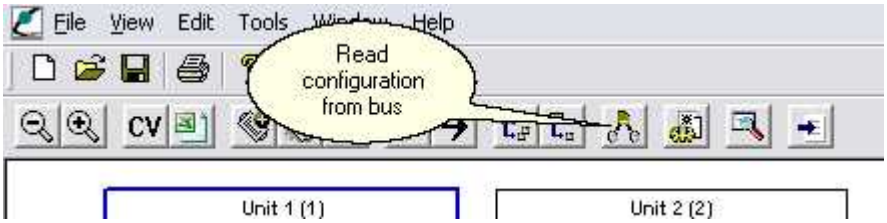
Back to EmpirBus Config; connect the computer to the system by pressing the button with this icon:



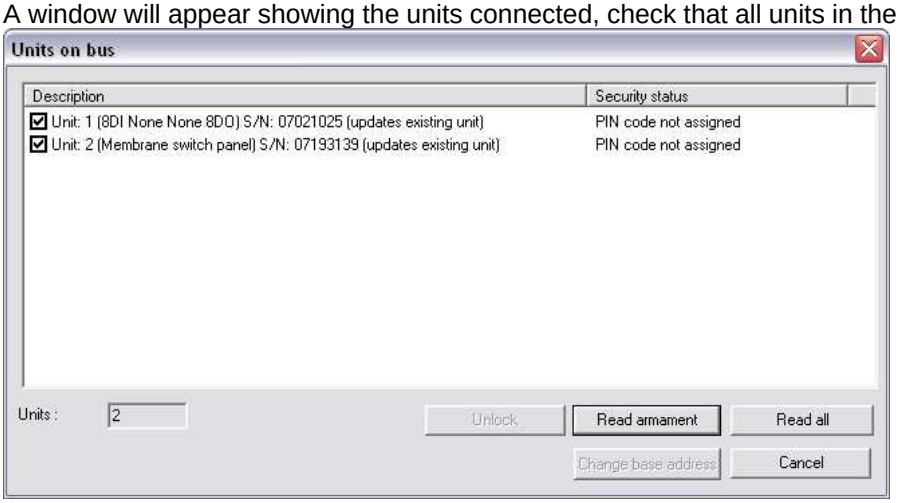
First time connecting a settings window will appear, choose EmpirBus Interface Port.



To check that you are properly connected perform a action in the system, press a switch etc. otherwise press the button with this icon:



A window will appear showing the units connected, check that all units in the system are listed.



7.2 Download a configuration

Read the complete instruction once before following the steps.

To perform these actions you need to be connected to the System, read the chapter Connecting to EmpirBus.

In a new installation the units connected does not have the correct base address assigned.
Mark the frame around the unit/panel in EmpirBus Config to get this input field.
To assign a base address to a unit enter the desired base address in the field named Base addr. see image 1 and 2 or use the base addresses pre entered by EmpirBus Config.
To be able to address the unit without having assigned a base address we will need to use the unit's serial number.
Use the serial number on the box supplied with the unit or the label on the back plane of the unit; enter the serial number in the field named S/N see image 1 and 2.:
Base addresses from 1 to 99 can be entered.

Image 1 Unit:

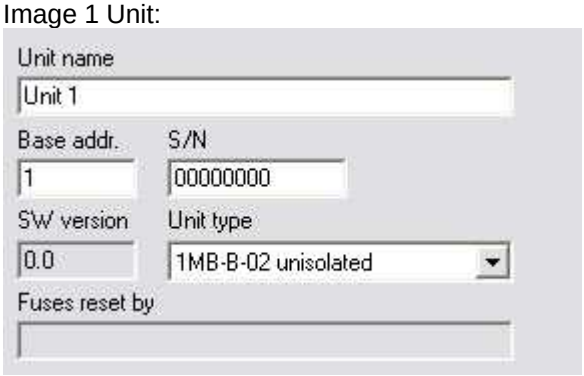
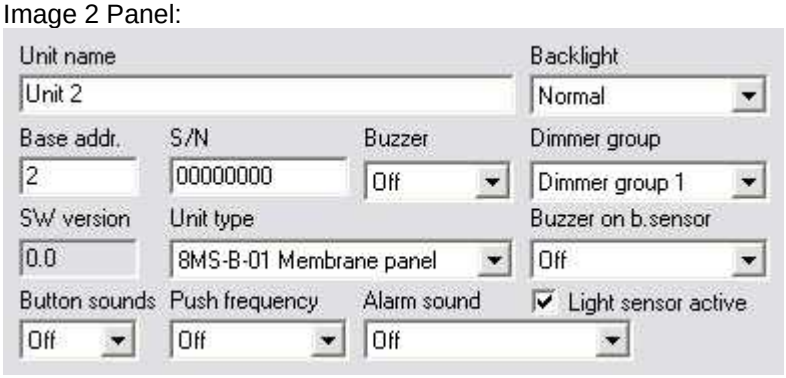
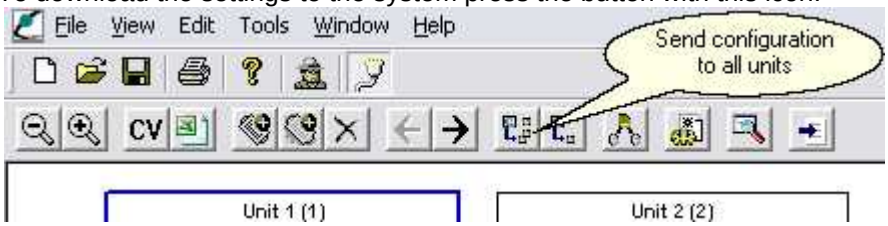


Image 2 Panel:

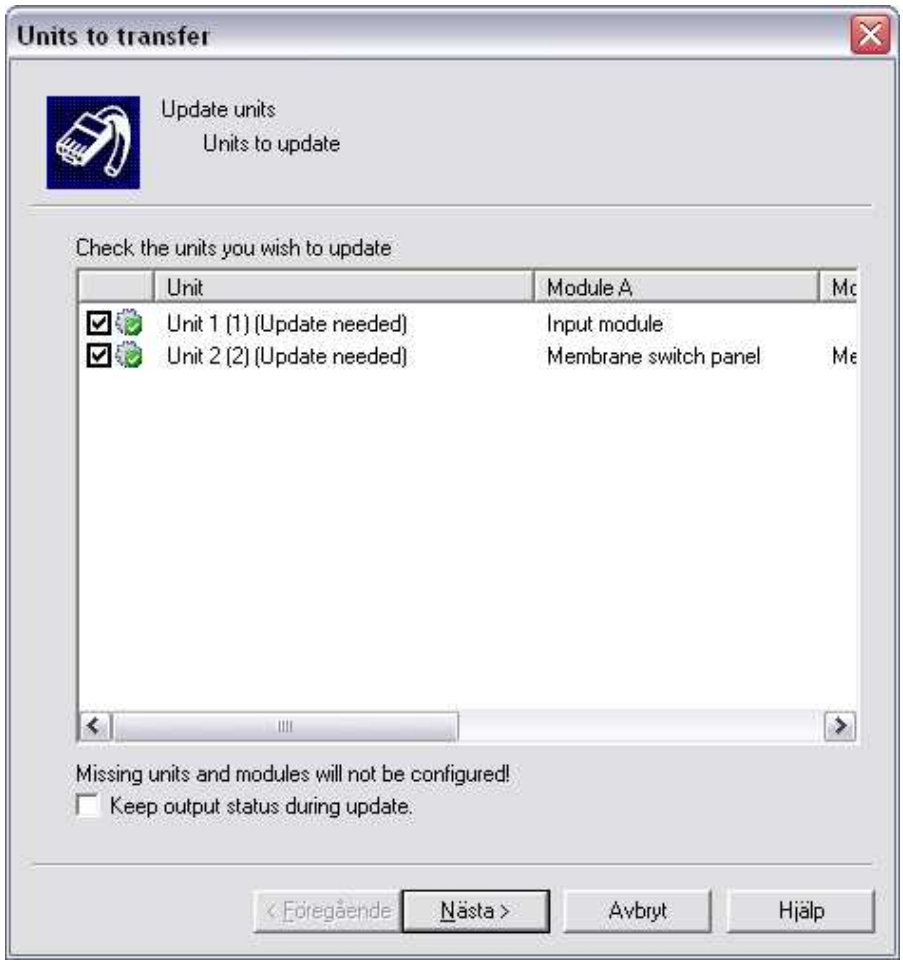


With both information of base address and serial number entered on all unit's in EmpirBus Config.

To download the settings to the system press the button with this icon:

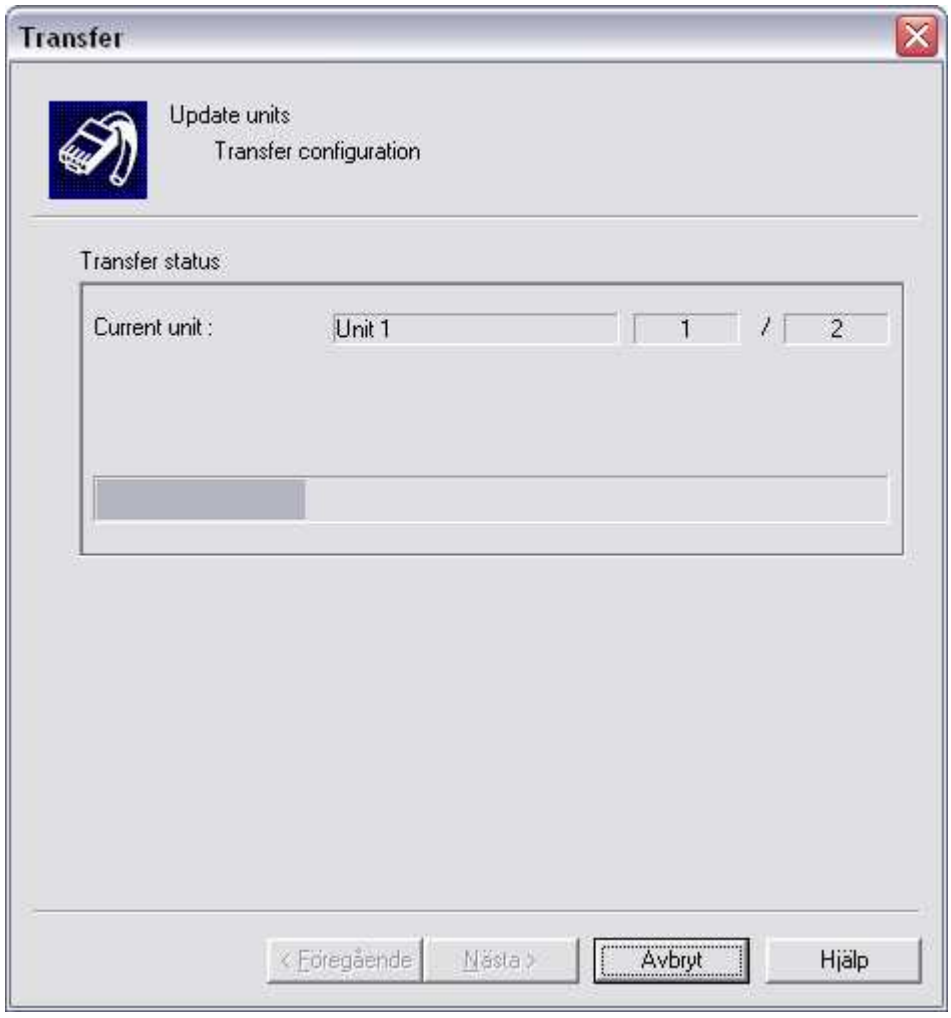


A new window will appear showing all unit's which are found both in EmpirBus Config and in the actual system:

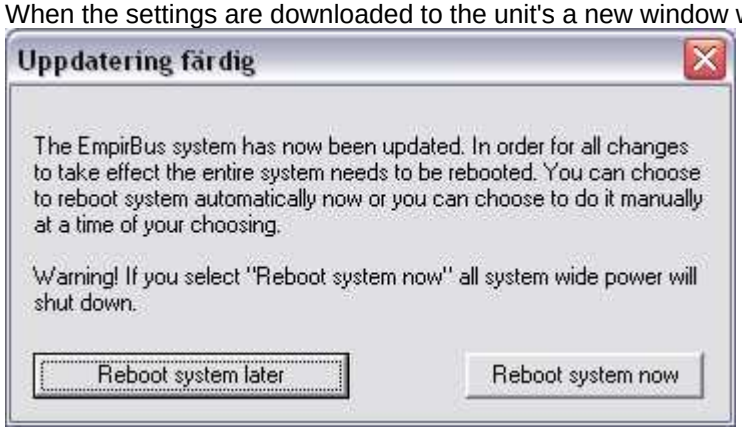


Press the button labeled next.

A status bar showing the progress of the download process will be displayed:



When the settings are downloaded to the unit's a new window with a question will appear:



When making adjustments to the system it is recommended to reboot the system to ensure that everything will be synchronized.
In some cases it's not possible to reboot the entire system at this moment then use the reboot system later option.

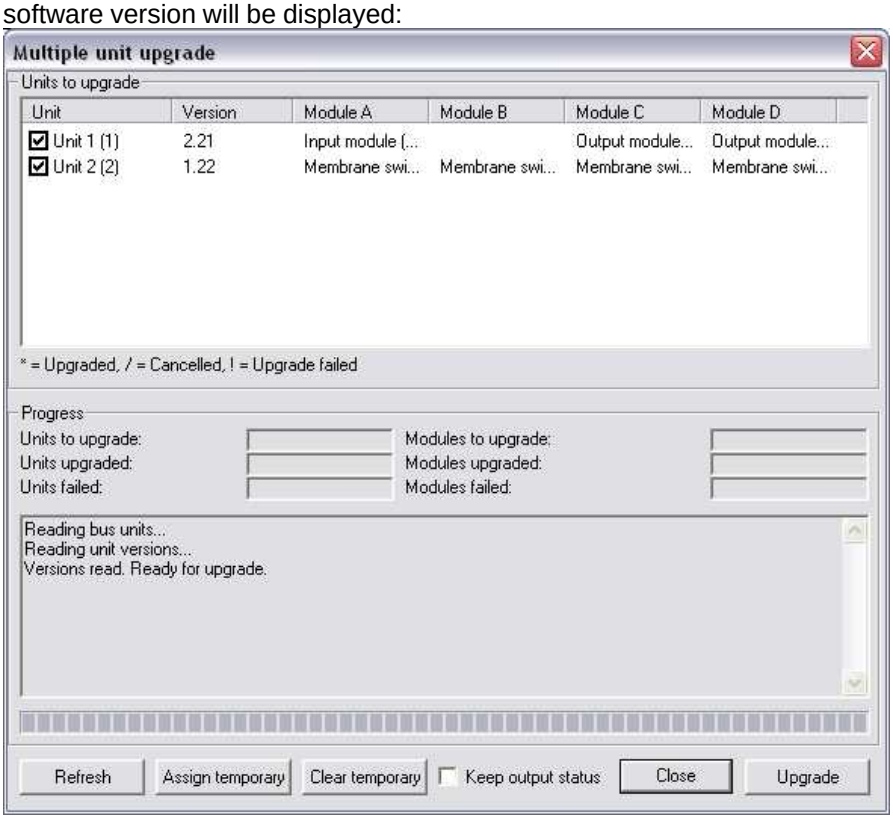
7.3 Upgrading a unit

Read the complete instruction once before following the steps.

To perform these actions you need to be connected to the System, read the chapter Connecting to EmpirBus.

Open the file corresponding to the system and check that all units are connected.
Press the button with this icon:

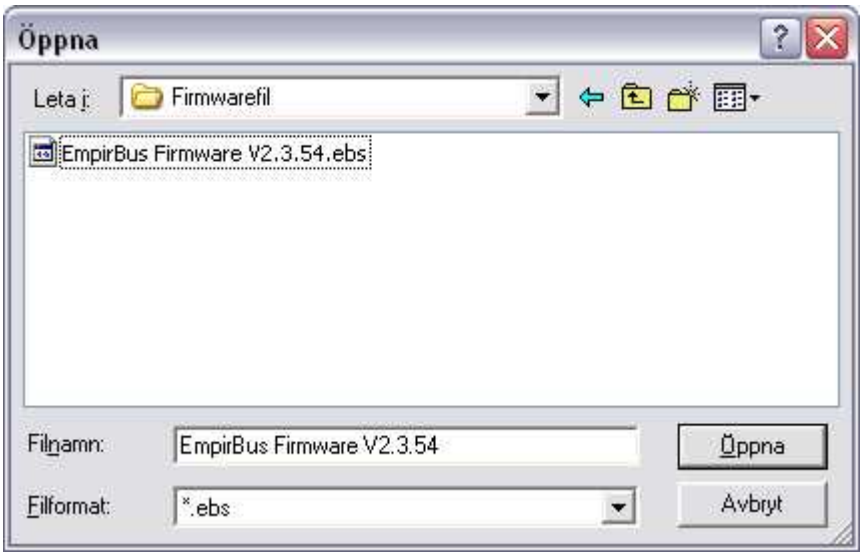
A new window will appear and a status bar will show the progress of when EmpirBus Config reads information from the units connected.
When the information has been read all units connected will appear and information about their software version will be displayed:



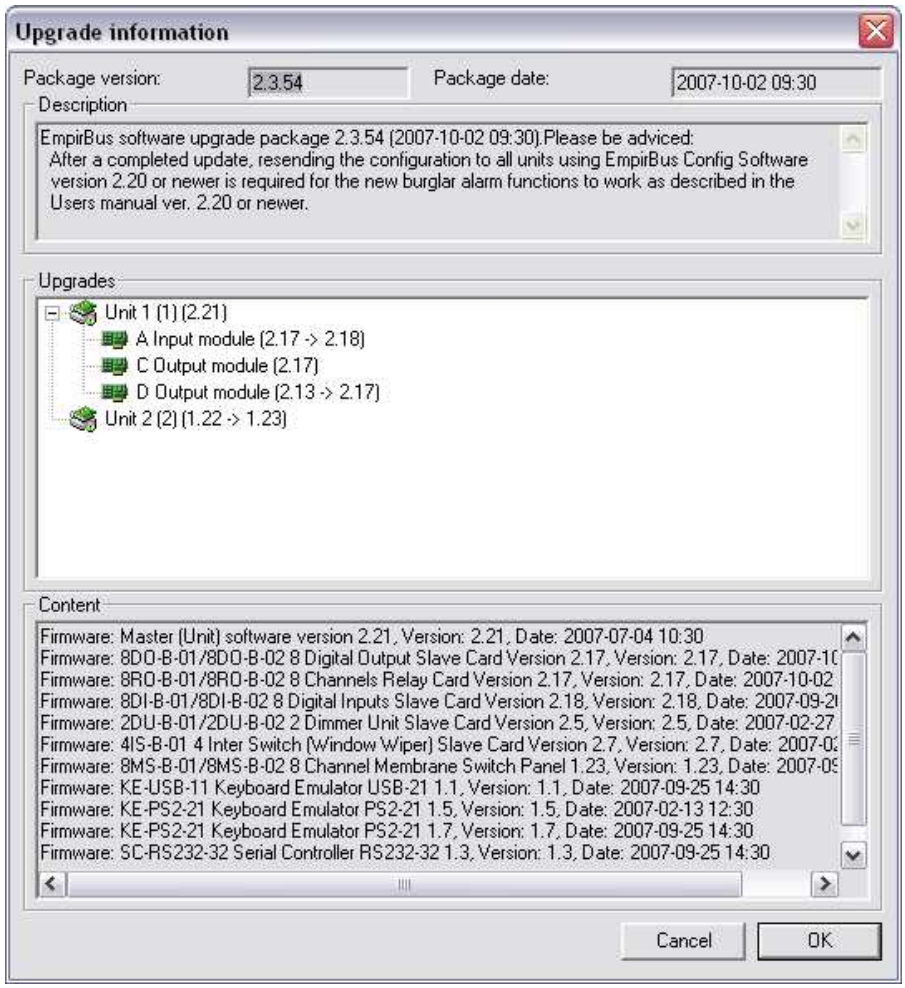
To upgrade the units with the latest firmware version press the button upgrade.

A warning message will appear, follow the message and press OK.

A open window will appear locate the firmware file, either download the latest version from our website:
http://www.empirbus.com/page/1552/empirbusfirmwaredownloadform.htm or use the version located in the installations directory of EmpirBus Config:
(C:\Program\EmpirBus Config).

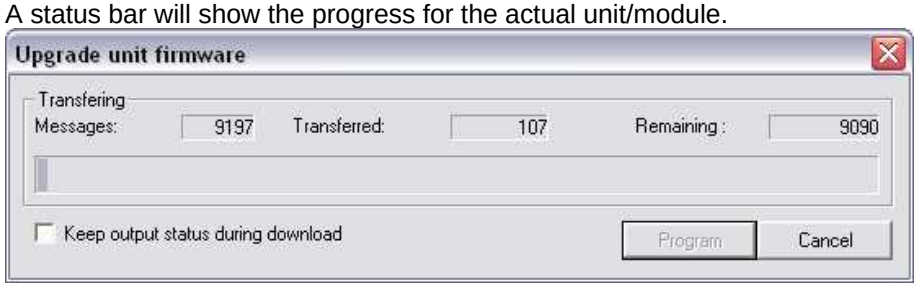


A new window will appear listing which units will be upgraded, the units already upgraded to the latest firmware will not be upgraded.



Press OK to start upgrading.

A status bar will show the progress for the actual unit/module.

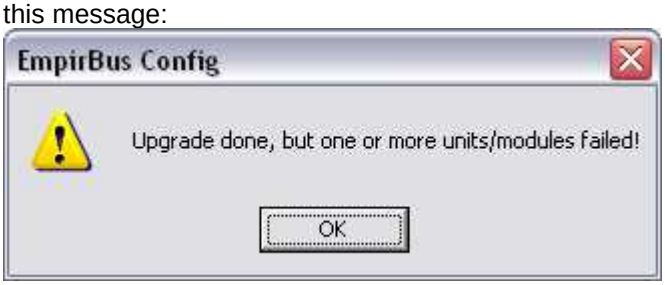


One unit equipped with four slave cards will take approximately 16 minutes to upgrade.
One unit without any modules will take approximately 5 minutes to upgrade.
One module will take approximately 2 minutes and 40 seconds to upgrade.
One membrane panel will take approximately 9 minutes to upgrade.
In between all units and modules there is a little delay so the units can restart as well.
To make an estimation of the time the upgrade will need add the time for all units and module that needs to be upgraded.

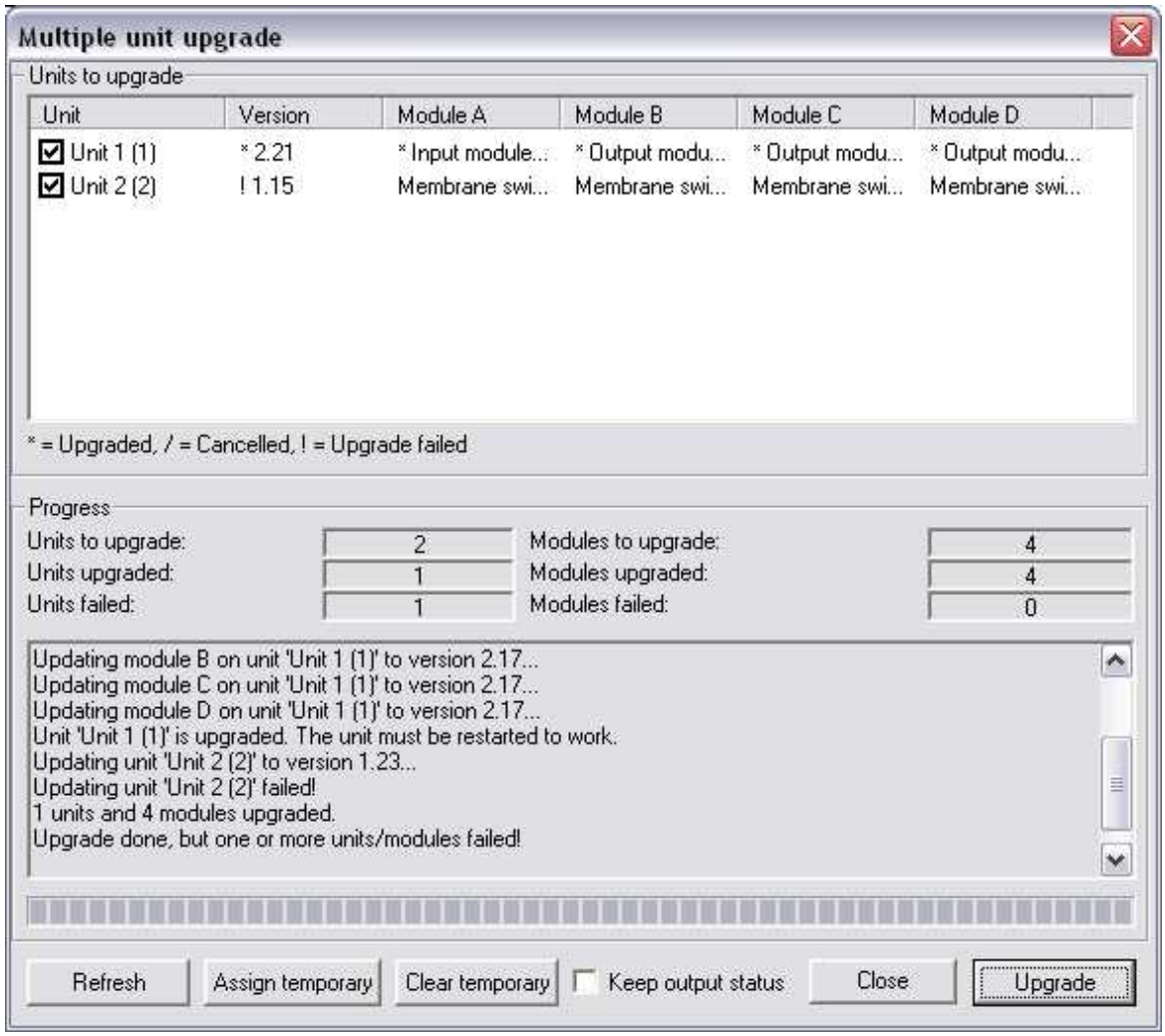
When all units/modules are upgraded a message will appear with either the text:

If this message appears just press OK, close the window with the label multiple unit upgrade and now **the upgrade is finished.**

If a message appears with the information that one or more modules/units has failed. For example this message:



Press OK, **but don't close this window:**



Restart the system by cutting the power to the entire system, press the upgrade button and do the same procedure as described earlier in this instruction.

7.3.1 Upgrading a failed unit

Read the complete instruction once before following the steps.

If a module or unit has failed during a firmware upgrade.

Module:
If a module has a red LED on position R lit, the unit is either performing a upgrade or stuck in upgrade mode. If the module is stuck in upgrade mode it's not visible in the unit, the unit will not report having a module in that position.

Unit:
If a unit is constantly flashing a RED led inside the unit, notice not the RED led in between the red and yellow button but inside of the unit. The unit is either performing an upgrade or stuck in upgrade mode. If the unit is stuck in upgrade mode it's not visible in the system, the unit will not report itself.

Panel:

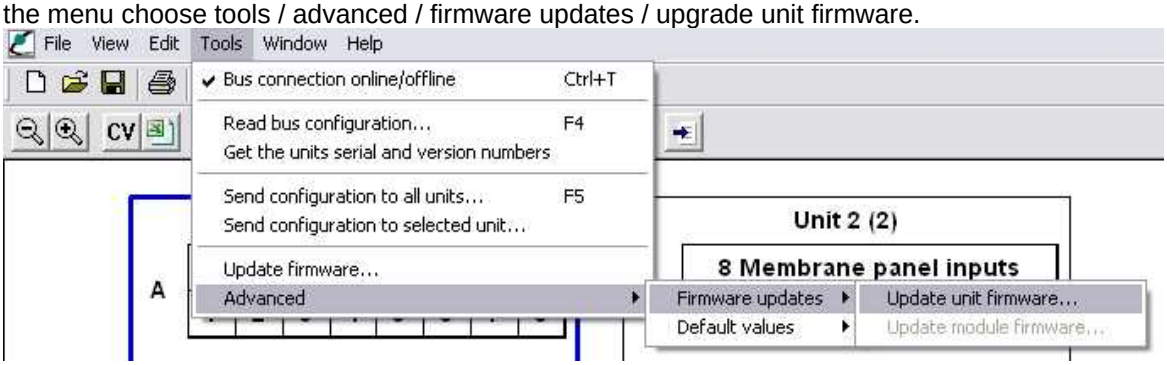
If a membrane panel is constantly flashing its red LED's in a specific pattern: Red LED number one, two, three, four, five, six, seven, eight and then starting over again on LED number one. The unit is either performing an upgrade or stuck in upgrade mode. If the unit is stuck in upgrade mode it's not visible in the system, the unit will not report itself.

To get these units/modules working again follow these steps.

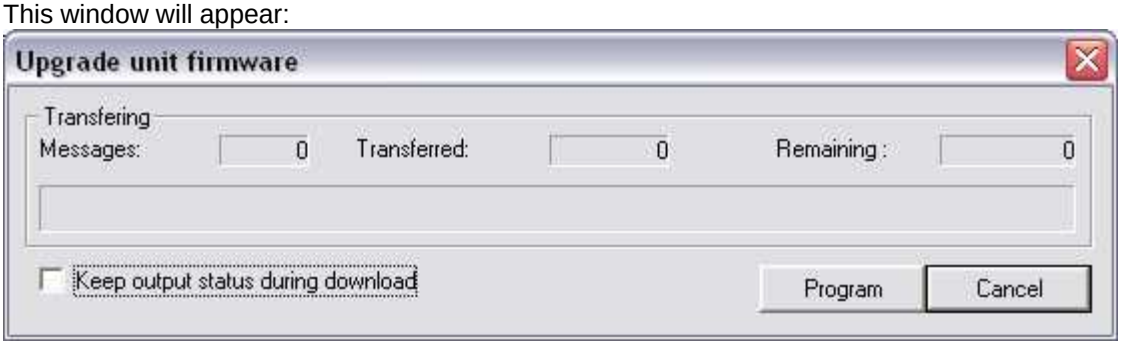
Open the file corresponding to the system.

To perform these actions you need to be connected to the System, read the chapter Connecting to EmpirBus.

Unit/Panel:
Mark the frame around the unit which cant be found and have the symptoms described earlier. In the menu choose tools / advanced / firmware updates / upgrade unit firmware.

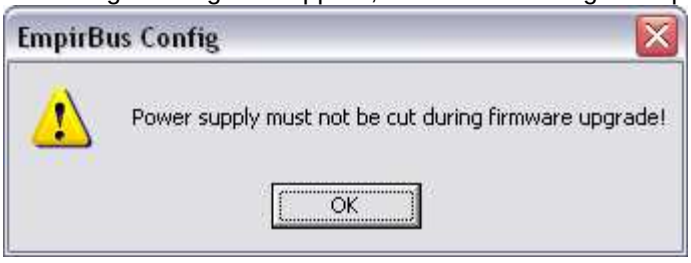


This window will appear:



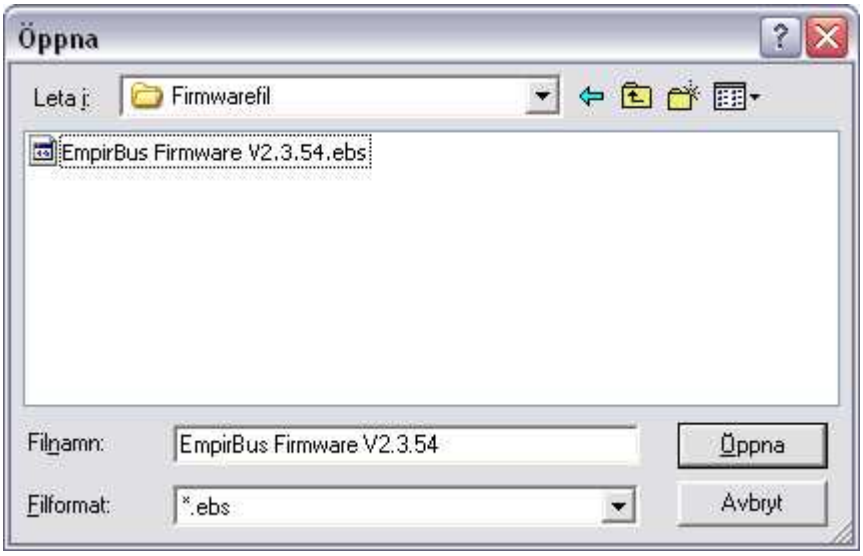
Press the button Program.

A warning message will appear, follow the message and press OK.

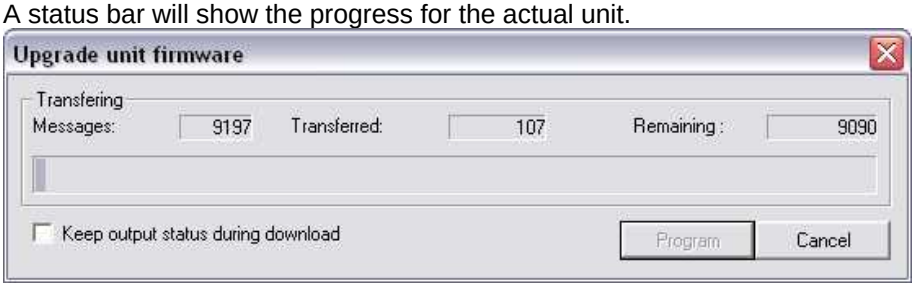


A open window will appear locate the firmware file, either download the latest version from our website:
http://www.empirbus.com/page/1552/empirbusfirmwaredownloadform.htm or use the version located in the installations directory of EmpirBus Config:

(C:\Program\EmpirBus Config).



A status bar will show the progress for the actual unit.

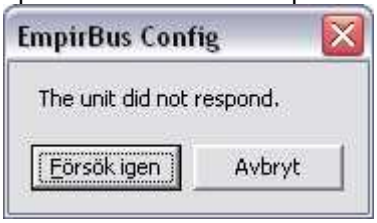


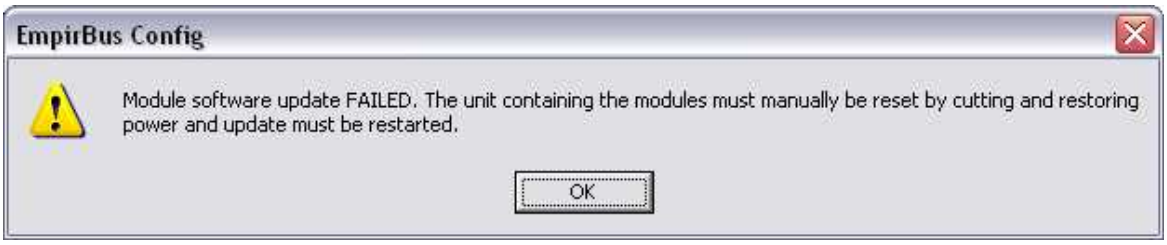
One unit will take approximately 5 minutes to upgrade.
One panel will take approximately 9 minutes to upgrade.

When the unit are upgraded a message will appear with this text:

Press OK, **the upgrade is finished.**

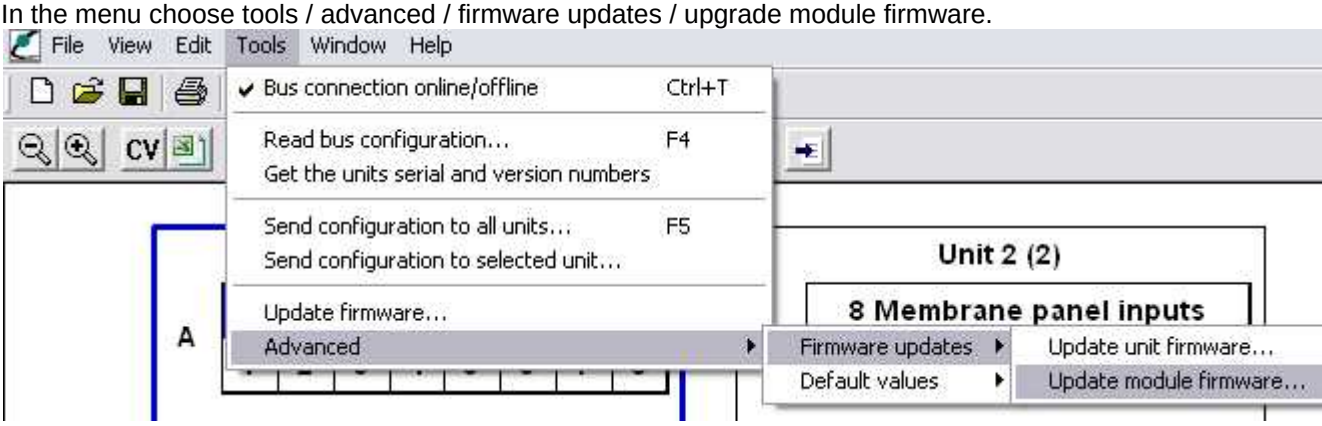
If a message appears with the information that the unit did not respond or that the module software update Failed. For example this message:



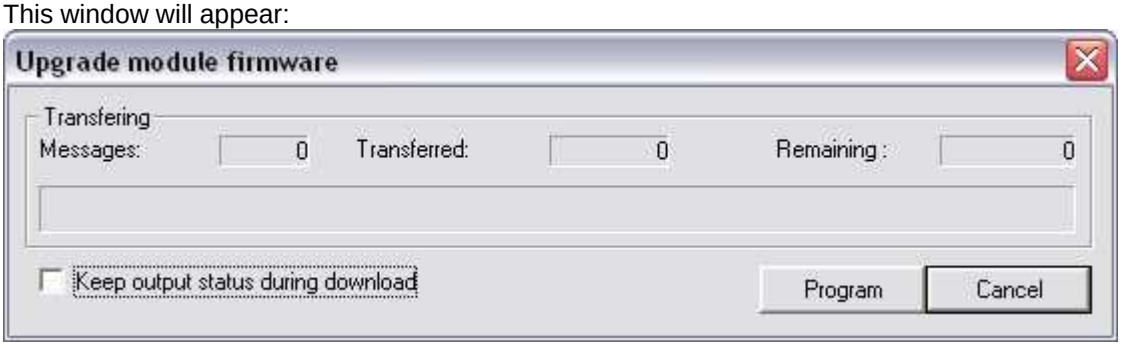


Try again, if that do not help cut the power to the unit, abort the upgrade and try again from the beginning of this chapter.

Module:
Mark the frame around the module which cant be found and have the symptoms described earlier.
In the menu choose tools / advanced / firmware updates / upgrade module firmware.



This window will appear:

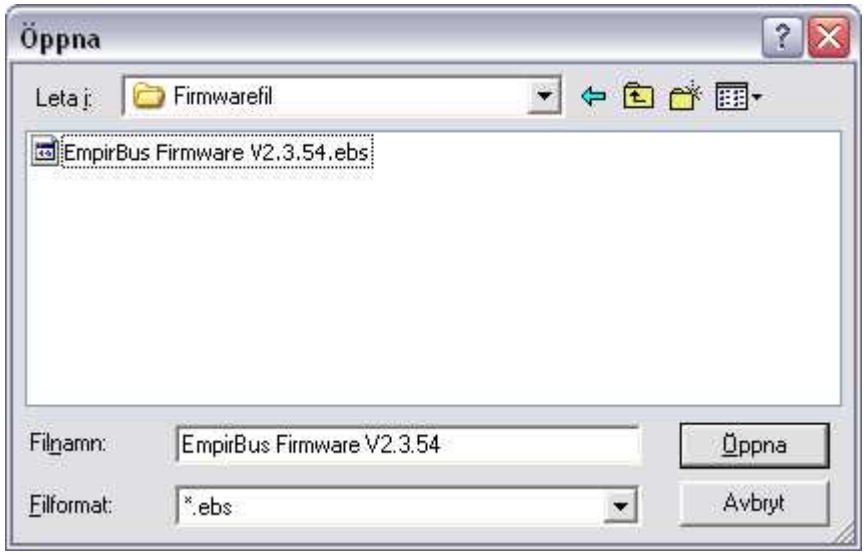


Press the button Program.

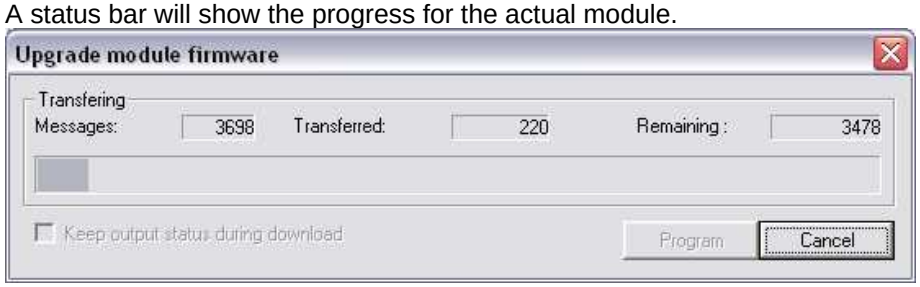
A warning message will appear, follow the message and press OK.

A open window will appear locate the firmware file, either download the latest version from our

website:
http://www.empirbus.com/page/1552/empirbusfirmwaredownloadform.htm or use the version located in the installations directory of EmpirBus Config:
(C:\Program\EmpirBus Config).

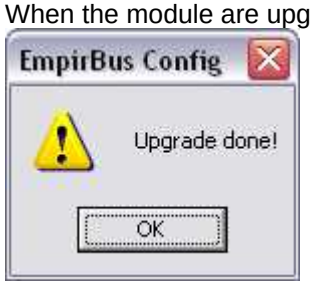


A status bar will show the progress for the actual module.



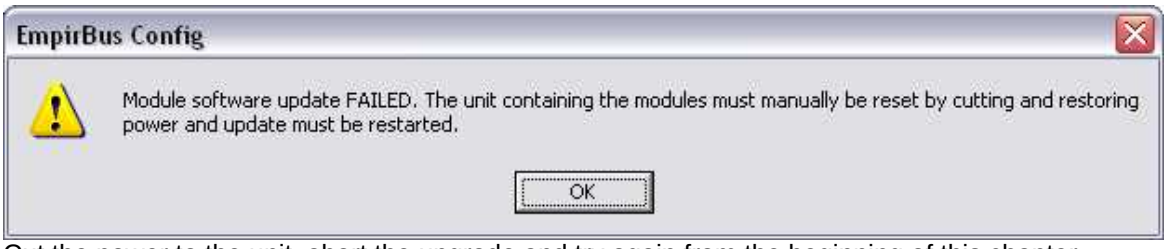
One module will take approximately 2 minutes and 40 seconds to upgrade.

When the module are upgraded a message will appear with this text:



Press OK, **the upgrade is finished.**

If a message appears with the information that the module software update Failed. For example this message:



Cut the power to the unit, abort the upgrade and try again from the beginning of this chapter, **Module**.

7.4 Replacing a unit

Read the complete instruction once before following the steps.

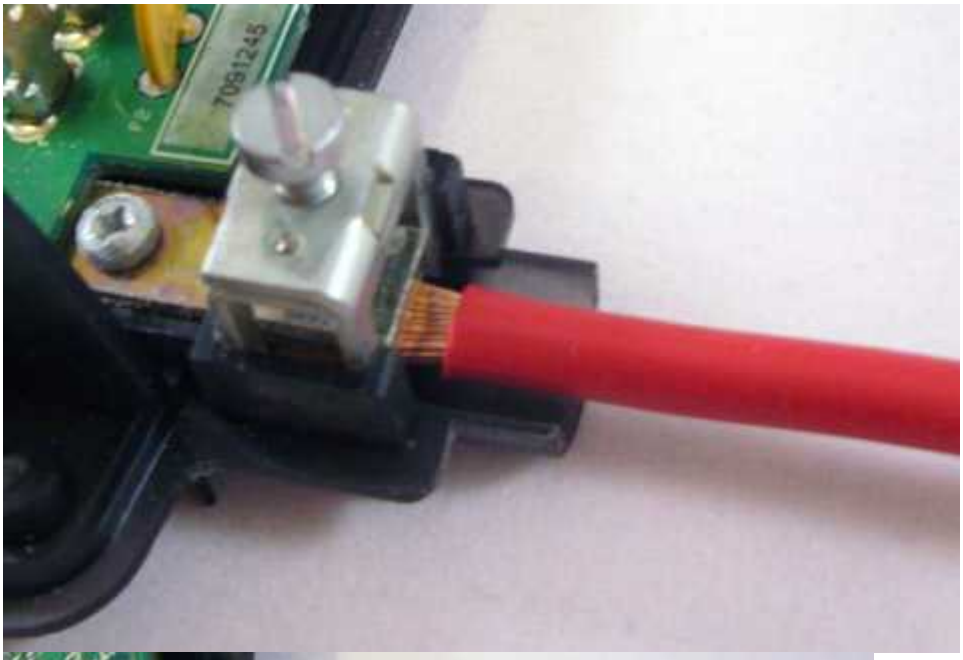
How to replace a unit in an existing installation!

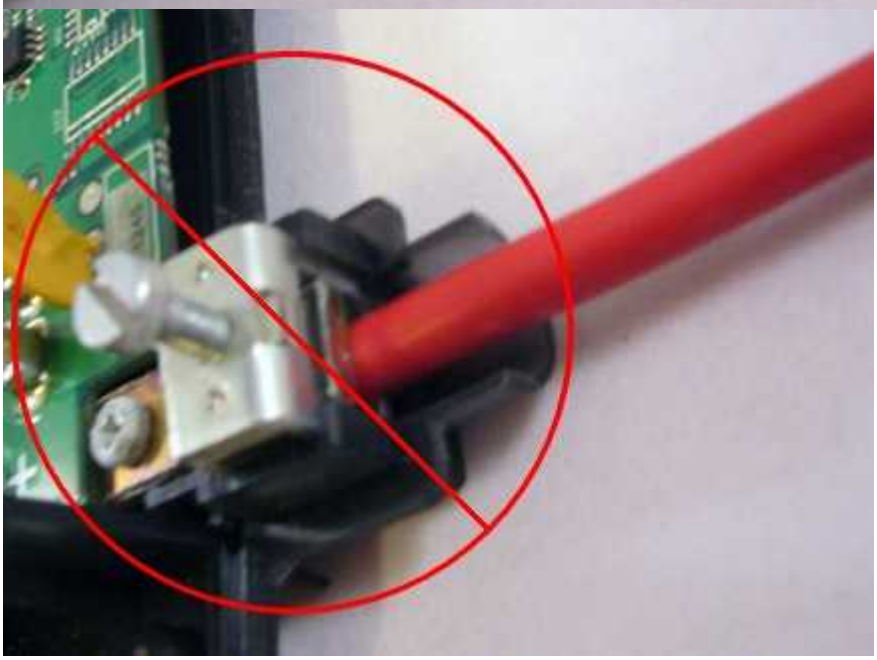
Unit
At first cut out the power to the entire system or just the unit that are going to be replaced. Unscrew the terminal blocks from the unit (Depending on how the unit is equipped there can be two till five terminal blocks, one of them is smaller than the others). There is no need of changing the connections in the terminal block. The terminals will be used for the new unit as well.

Unit with two module terminal blocks and one CAN-Bus terminal.

Remove the terminals from the unit. Mark the terminals to be able to remember on which module they were mounted.
Unscrew the power cables on the unit. Assure that the Power is cut to the unit.
Remove the power cables.
Unscrew the unit from where it is attached.
Remove the unit and replace it with the new unit.

Attach the new unit where the old unit were attached and screw it in place.
Place the power cables and screw them in place firmly, check that the peeled part of the cable are in proper contact with the contact area of the screw
clamp.





Place the terminals on the same module as they were on the old unit.
Screw the terminals back on to the new unit.
Check all connections properly on the unit, some cables could have slipped out of the spring clamp in the terminals involuntary when handled.
Restore the Power to the system.

Membrane Panel
At first cut out the power to the entire system or just the unit that are going to be replaced.
Unscrew the terminal block from the back plane of the panel; do not remove the cables from the terminal block. Assure that the Power is cut to the unit.

Panel with nuts and terminal block seen from the backside.

Unscrew the six nuts from the back plane of the panel.
Remove the panel.

Place the new panel and screw the nuts back in place.
Attach the terminal block on the panel and tighten the screws.
Check all connections properly on the terminal block, some cables could have slipped out of the screw clamp in the terminal involuntary when handled.

Restore the Power to the system.
If the new panel does not have any labels for the buttons!
Pull the labels out of the pockets on the back plane of the panel, when the panel has been removed from where it was attached.

Replace the labels in the pocket on the new panel; be sure of placing them in the right pocket and not mirrored.

The following instruction should only be performed in extreme emergencies.
Opening the unit voids warranty. Be sure of that this is the only solution to the problem; consult your boat builder before opening the unit.
After performing this action the unit needs to be replaced, contact your boat builder and arrange for a replacement of the unit.

How to replace a module in a unit!
At first cut out the power to the entire system or just the unit that are going to be replaced.
Unscrew the terminal blocks from the unit (Depending on how the unit its equipped there can be two till five terminal blocks one of them is smaller than the other). There is no need of changing the connections in the terminal block. The terminals will be used for the new unit as well.
Remove the terminals from the unit. Mark the terminals to be able to remember on which module they were mounted.
Unscrew the power cables on the unit. Assure that the Power is cut to the unit.
Remove the power cables.
Unscrew the unit from where it is attached.
Unscrew the four screws placed in the corners of the unit (holding the encapsulation together).
Carefully lift the upper part of the encapsulation from the under.
With the modules exposed use a screwdriver to lift the malfunctioning module out of the unit.
On the side of the module is a cut in the card in the same height as the plastic. Lift the module with a screwdriver pinched in the cut, bending the screwdriver on the plastic will lift the module from its position. When the module have been lift a bit it is easy to take the module by hand and lifting it out of the unit.
Place the new module at same position as the old module.
Be sure of placing the new module in the trace in the plastic on the side.
Fit the connectors on the module in the corresponding connectors on the unit.
Carefully push the card in place.
Check consistently and thorough that the terminal pins on top of the module which will be fitted into the encapsulation have not been bend.
Carefully place the top of the encapsulation back on the unit, the encapsulation should easily be fitted back to its originate position, if it does not fit a pin is bend. Do this very carefully and be sure not to bend any pins.
Screw the four screws back in each corner.

Attach the unit back to where it was placed before and screw it in place.
Place the power cables and screw them in place firmly, check that the peeled part of the cable are in proper contact with the contact area of the screw clamp.
Place the terminals on the same module as they were on the old unit.
Screw the terminals back on to the new unit.
Check all connections properly on the unit, some cables could have slipped out of the spring clamp in the terminals involuntary when handled.
Restore the Power to the system.