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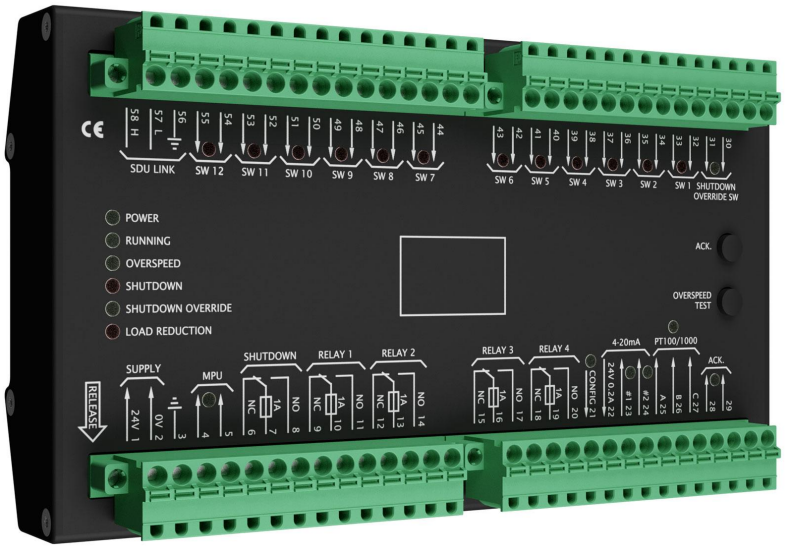
User Manual

Marine Pro.

400 Series

SDU 404 Safety Shutdown Unit, P/N 1006418
SDU 420 Safety Shutdown Unit, P/N 1500158



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1 Preface

1.1 About this Manual

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

Work on the low-voltage circuit should only be carried out by qualified and experienced personnel.

Installation or work on the shore power equipment must only be carried out by electricians authorized to work with such installations.

1.2 Responsibilities

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

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

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

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

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

1.3 Revisions

This User Manual is valid for the following firmware version of the SDU 404 and SDU 420.

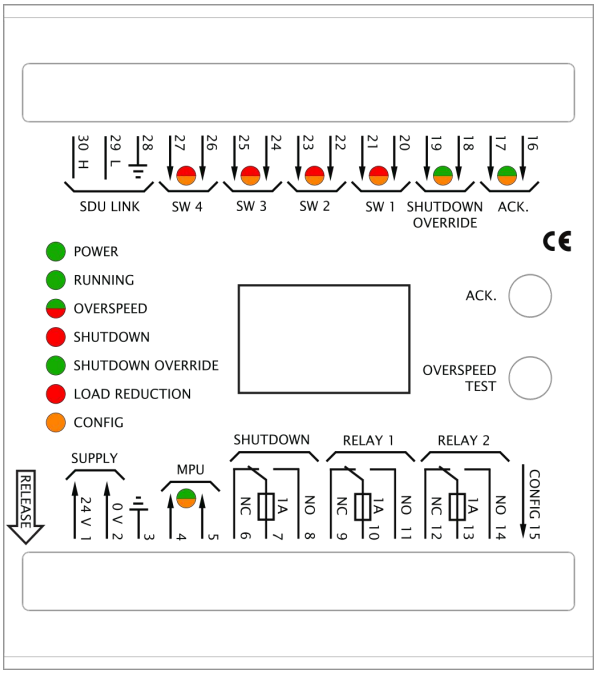
Firmware Version	Release Date
1.4	Jan 2022

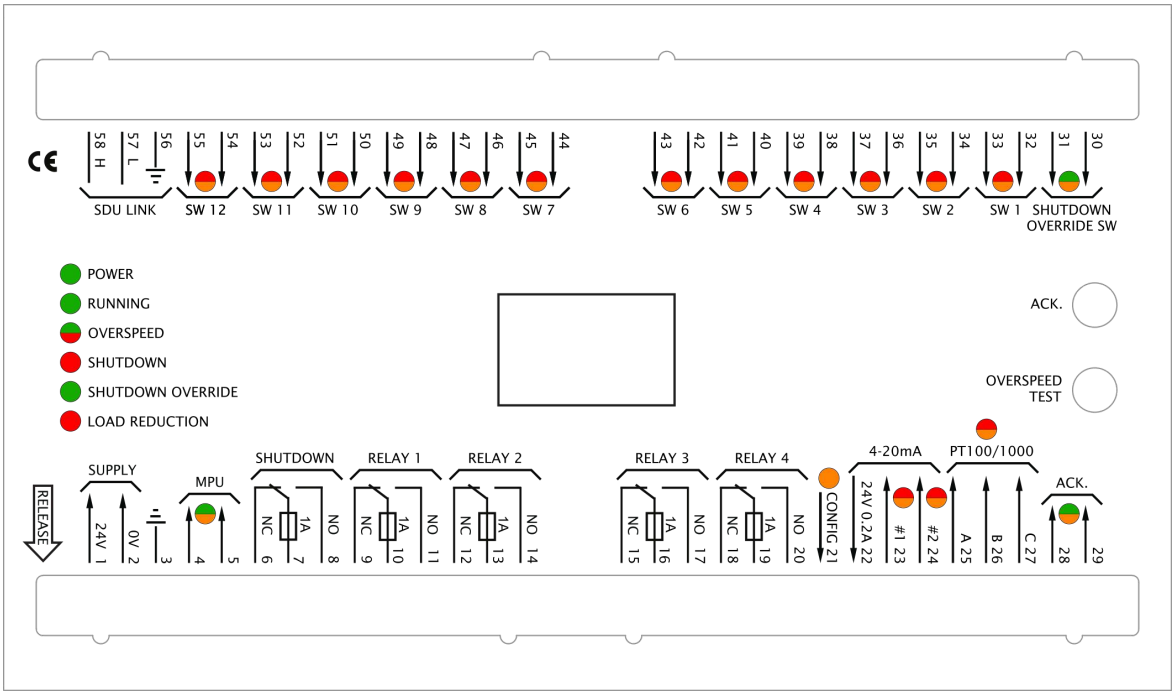
2 Ordering Information

The Marine Pro covers a wide range of compatible products within both the 200 and 400 Series. Please visit our website for more information.

http://auto-maskin.com/marine/

3 LED Overview





LED	Color	Description
Power	Green	Steady lit when power supply is OK. Flashing when below the configurable “very low threshold”.
Running	Green	Steady lit when the engine is running.
Overspeed	Red	Flashing when unacknowledged overspeed. Steady lit when acknowledged overspeed.
	Green	Test mode
Shutdown	Red	Flashing when unacknowledged shutdown. Steady lit when acknowledged shutdown.
Shutdown Override	Green	Steady lit when active.
Load Reduction	Red	Flashing when unacknowledged load reduction. Steady lit when acknowledged load reduction.
Config	Amber	Flashing when unacknowledged fault. Steady lit when acknowledged fault.
MPU	Amber	Flashing when unacknowledged fault. Steady lit when acknowledged fault.
	Green	Steady lit when MPU connected.
ACK.	Amber	Flashing when unacknowledged fault. Steady lit when acknowledged fault.
	Green	Active.
Shutdown Override Switch	Amber	Flashing when unacknowledged fault. Steady lit when acknowledged fault.
	Green	Active.
SW 1-12	Red	Flashing when unacknowledged shutdown/load reduction. Steady lit when acknowledged shutdown/load reduction.
	Amber	Flashing when unacknowledged fault. Steady lit when acknowledged fault.
4-20 mA 1-2	Red	Flashing when unacknowledged shutdown/load reduction. Steady lit when acknowledged shutdown/load reduction.

	Amber	Flashing when unacknowledged fault. Steady lit when acknowledged fault.
PT100/PT1000	Red	Flashing when unacknowledged shutdown/load reduction. Steady lit when acknowledged shutdown/load reduction.
	Amber	Flashing when unacknowledged fault. Steady lit when acknowledged fault.

4 Shutdown Channels

4.1 Switch Channels

Switch Channels are configurable for broken wire/loop monitoring and short circuit detection.

All switch channels use a two-wire layout, where both wires from the switch must be routed to the SDU.

4.1.1 Broken Wire Detection

When correctly wired and configured (see Installation Manual) this will be detected and indicated at the LED next to the switch input terminals.

4.1.2 Short CIrcuit Detection

When correctly wired and configured (see Installation Manual) this will be detected and indicated at the LED next to the switch input terminals.

4.2 Analog Channels

One PT100/PT1000 and two 4-20 mA channels are available for shutdown/load reduction configuration

4.2.1 Sensor Fault Detection

When correctly wired and configured (see Installation Manual) this will be detected and indicated at the LED next to the analog channel input terminals.

4.3 Pickup Channel

When correctly wired and configured (see installation Manual) this will indicate that the MPU is connected at the LED next to the MPU input terminals. This LED will also indicate MPU faults.

In case of an active MPU sensor a secondary pickup source must be provided to SDU over Modbus. In this case, the LED will indicate pickup mismatch.

5 Shutdown Situations

5.1 From Overspeed

If engine speed input senses an engine speed higher than the configured max setting, then the SDU will activate the common shutdown outputs.

5.1.1 Shutdown Override

The Shutdown Override input does not disable the Overspeed Shutdown.

5.1.2 Indication

The red LED OVERSPEED will be lit.

The red LED SHUTDOWN will be lit.

5.1.3 Acknowledge

When the engine has stopped, the shutdown can be reset using the Acknowledge button on the SDU.

5.2 From Switch Channels or Analog Channels

If either of the switches or analog channels indicate a shutdown, then the SDU will activate the common shutdown outputs.

5.2.1 Shutdown Override

Each channel may be configured to disregard the Shutdown Override input command.

5.2.2 Indication

The red LED for the corresponding channel will be lit.

The red LED SHUTDOWN will be lit.

5.2.3 Acknowledge

To acknowledge alarms and faults press the acknowledge button. In the case of a shutdown the shutdown state must be acknowledged once the engine has stopped (<5 RPM + 7 seconds, configurable).

6 Configurable Relays and Outputs

The configurable relays and output can be configured to any of the below functions.

Function	**Description**
SHUTDOWN	Activates for any shutdown. Stays activated until the engine has stopped, and the

	operator commands the Acknowledge button.
CRANK CUTOFF	Activates at the configured Engine Run setpoint, typically 400 rpm. Deactivates when the SDU senses that the engine has stopped (<5 RPM).
BUZZER	Activates for any new shutdown or fault. Deactivates when the operator command the Acknowledge button.
FAULT	This is the Common Fault indication. Activates for any new fault. Deactivates when all faults are acknowledged and has disappeared.
RUNNING	Activates at the configured Engine Run setpoint, typically 400 rpm. Deactivates when the SDU senses that the engine has stopped.
OVERSPEED SHUTDOWN	Activates for any overspeed shutdown. Deactivates when engine is stopped (<5 RPM, and a configurable delay), and overspeed is acknowledged.
LOAD REDUCTION	Activates for any load reduction. Deactivates when load reduction is inactive.
OVERSPEED TEST MODE	Activates when SDU is in Overspeed Test mode.
SHUTDOWN OVERRIDE	Activates when SDU is in shutdown override mode.
SHUTDOWN IMMINENT	Activates when SDU is in shutdown imminent state.
SHUTDOWN UNTIL STOPPED (FW 1.3)	Activates for any shutdown. Deactivates when engine has stopped (RPM < 5, and a configurable time).
FOLLOW SWITCH (FW 1.3)	Activates when a switch is closed.

7 Buttons and other Inputs

7.1 Buttons

Button	Description
Acknowledge	Whenever there is a flashing LED in the SHUTDOWN or FAULT section, this can be Acknowledged by the user by commanding the Acknowledge button.
Overspeed Test	Press and hold until the Overspeed Test LED flashes rapidly. The SDU is now in Overspeed Test mode, where the overspeed setpoint is reduced to 95% of the configured Nominal speed. Now, start the engine. Note! If the Overspeed Shutdown has been disabled in the configuration, then this test will NOT generate a shutdown. The Overspeed Test mode is deactivated by either: ● Performing the test, ending in an Overspeed Shutdown at 95% of the Nominal setpoint. ● Pressing the Overspeed Test button again. ● Automatic timeout after 5 minutes.

7.2 Shutdown Override

Connect a normally open (NO) switch, with a 10 kΩ ohm resistor across the two terminal inputs (SDU 404: 18 and 19, SDU 420: 30 and 31).

When activated by closing the switch, the SDU will disable all shutdown channels, unless those configured specifically to work also in Shutdown Override.

An example of the latter is Manual E-Stop, which shall always work.

7.3 Acknowledge

This input is by default an acknowledge input channel that works exactly as the Acknowledge button. However, the input channel can be configured for other functions.

Function	Description
Acknowledge (default)	Acknowledge events.
In Gear	In gear indication. Can be used to configure channels to only shutdown when in gear.

Shutdown Override #2	A secondary shutdown override. Can be used to override shutdown individually per channel similar to the normal shutdown override.

Connect a normally open (NO) switch, across the two terminal inputs (SDU 404: 16 and 17, SDU 420: 28 and 29).