

# Orion Capsule Repair Manual

Mission Control Guide

## **Introduction**

Although everything possible is done beforehand to limit the possibility of the spacecraft being damaged during a mission, it is still a scenario that both the crew of the spacecraft and Mission Control must be prepared for. This manual has been written to assist Mission Control in guiding the astronauts through the progress of diagnosing and fixing issues that may arise with the Orion capsule.

## **Time**

First and foremost, it is of the utmost importance that problems be fixed in a timely manner. In a situation in which a second can mean the difference between mission success and failure, diagnosing and fixing issues is a matter of extreme urgency. In short: time is of the essence! In an emergency situation, all astronauts will be relayed the remaining window to fix all issues with the spacecraft before the mission must be aborted. The crew and Mission Control must therefore communicate quickly and effectively. However, although members of the crew and Mission Control must act quickly, they must also act cautiously, as taking the wrong action could further jeopardize the mission!

## **System Modules**

Throughout the interior of the Orion capsule, several panels can be found. Each one interfaces with a different essential system in the spacecraft and can be used to detect and fix problems. Many of these panels are virtual, and can be found on the main control screens. The propulsion system's panels, however, are not virtual and can be found elsewhere in the capsule. They are marked with yellow and black stripes on their exterior. Should any problems arise, it is imperative that the astronauts make an exhaustive search of the capsule interior for panels with an error status. All surfaces of the capsule should be thoroughly searched. Each panel has a title on the top indicating which system it is connected to and a status indicator on the top-right consisting of a two-character display that conveys information about the state of the connected system through the code it displays. Below the title and status indicator is the system interface, which contains elements allowing astronauts to interact with the system in order to repair it. If the system is repaired or progress is made, this may be deduced from the status code. Thus, it is important for the astronauts to relay the status code of a given panel and any changes thereto to Mission Control, so that they may identify any essential information carried by it using this manual.

## **Panel Usage**

This section details the operation and functionality of each type of panel present in the interior of the Orion capsule. To diagnose and fix issues with a given panel, consult the corresponding subsection and follow the instructions given.





## Propulsion System

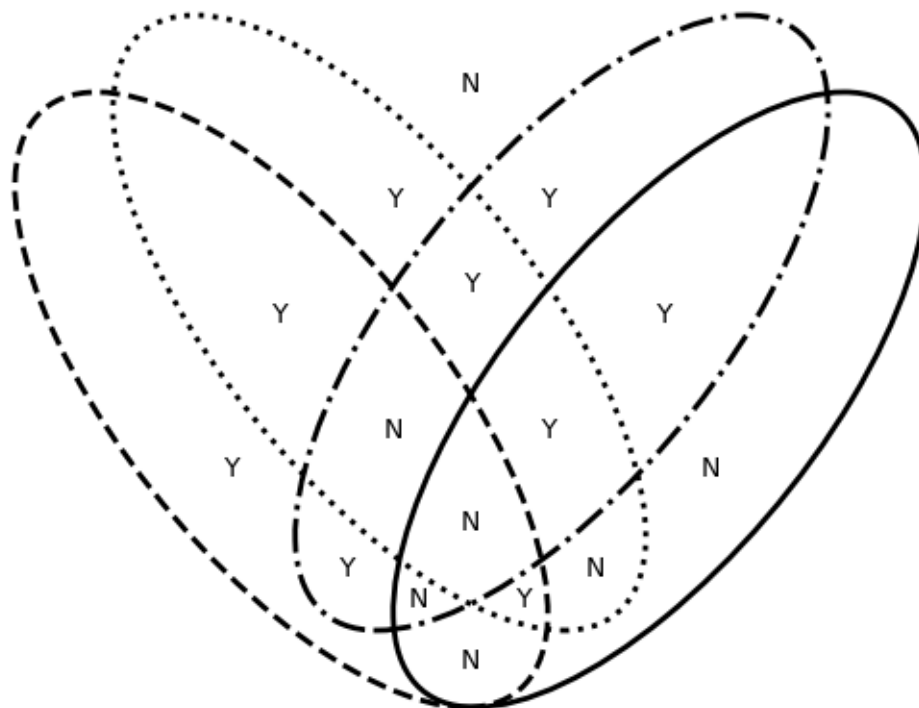
### Overview

In order for the propulsion system to work properly, it is important to ensure that all of the electrical components involved are correctly connected. In the event of a propulsion system failure, the wires must be checked and reconnected so that the correct configuration is achieved for the launch sequence.

### Repair Instructions

On the panel, there are two rows of sockets, each with eight sockets each. Above each socket in the upper row, there is a button that can be toggled between green and red, denoting the socket connection being activated and deactivated, respectively. At the bottom of the panel there is a submit button. Observe the Venn diagram and accompanying legend below. Each ellipse corresponds to a property of the wires on the panel. For each wire, determine which region the wire falls in. The unique letter in that region corresponds to whether the corresponding connection needs to be activated (Y) or deactivated (N).

	Blue present on wire
	Upper socket is directly above lower socket
	Upper socket is in left half of panel
	Red present on wire



Once you have activated and deactivated the connections appropriately, click the submit button to apply the new configuration. If the configuration is correct, the status indicator will show the code BB to indicate that the propulsion system is working properly and no further action is required. Take care when reconfiguring the propulsion system, as applying an improper configuration will further jeopardize the mission and shrink the window of time available before the mission must be called off.



orion	orbit, their, soyuz, right
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Once all rounds have been completed, the status indicator will show the code BB to signal that no more rounds of reconfiguration and the heat shield has returned to proper functionality.

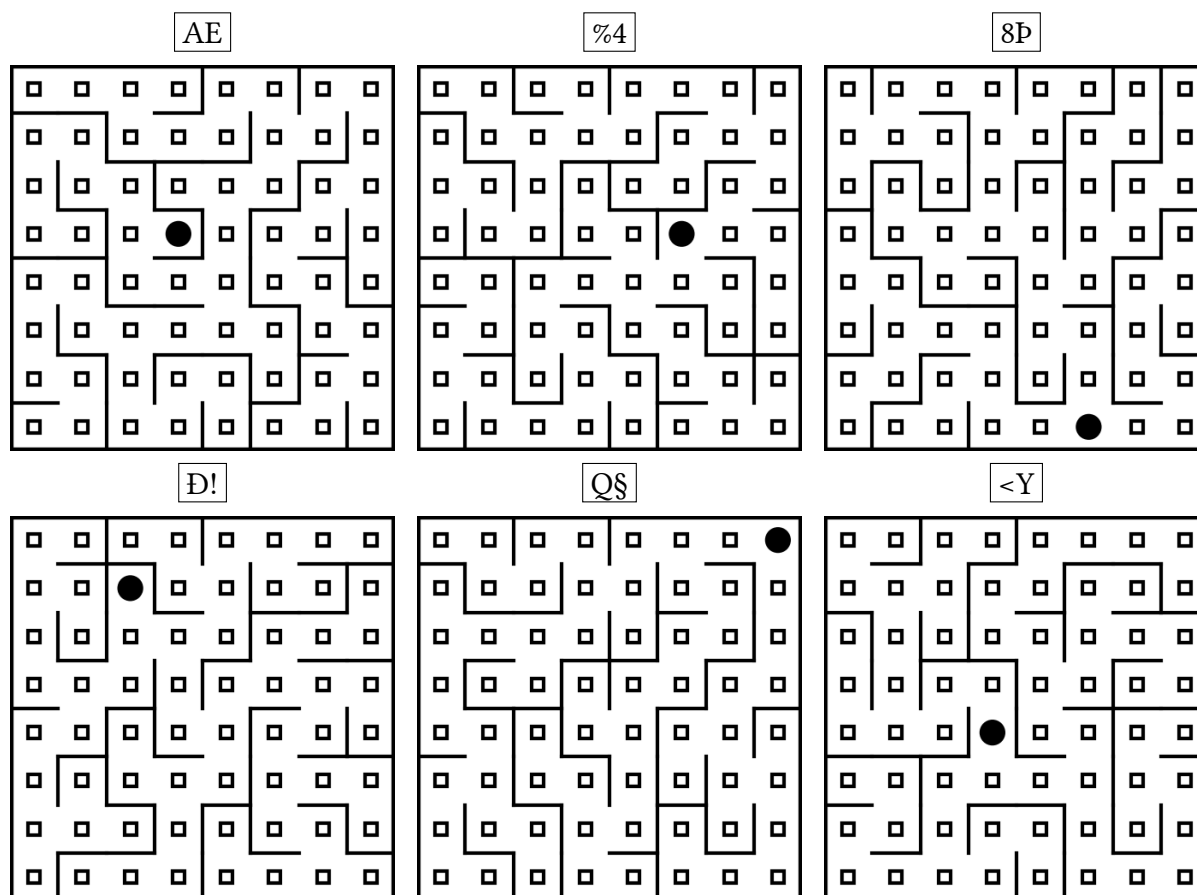
## Radiation Protection System

### Overview

Due to the extreme forces incurred by the spacecraft during flight, the radiation control filters may become misaligned. When this happens, it is necessary to realign them to ensure complete protection from radiation in the Van Allen Belt.

### Repair Instructions

On the control panel, a grid is displayed with four buttons below it, each with an arrow facing a different direction. There is also a Submit button below these. One square in the grid will be highlighted; this square represents the current orientation of the control filter. Use the panel status to determine the layout of the filter space according to the diagram below. The target position of the filter in each layout is marked with a dot. The lines between the spaces represent the movement constraints of the filter; they can be treated as barriers that the filters path cannot cross.



To realign the radiation control filter, use the buttons below the grid to plan out a path for the radiation control filter to return to the target state from the starting state. A movement in one direction will be canceled out by a movement immediately following it in the opposite direction; thus, any errors made while planning out the path can be corrected. Once the path has been planned out, click the Submit button to execute the realignment. The highlighted square will follow the designated path. If an incorrect step is encountered, an error message will appear and



the filter state will reset, allowing you to attempt the realignment again. Once the filter has been properly realigned, the panel status will change to BB to indicate that no further actions are necessary.

## Life Support System

### Overview

Due to internal malfunctions and equipment damage, the life support configuration files may become corrupted. When this happens, it is necessary for the astronaut to reconfirm the crew settings through the digital control panel.

### Repair Instructions

On the panel, there are five letter displays laid out in a row, each surrounded on the top and bottom by buttons that can be used to cycle through the available letters for that display. There may be multiple rounds of settings to be confirmed. For each round, choose letters to spell out one of the words in the table below. Only one word will be possible to spell per round.

orion	orbit	oxide	optic	admin
about	after	again	below	bezel
write	right	sound	point	there
their	world	soyuz	learn	would

Once you have spelled the word on the letter displays, click the submit button to check whether the correct input was given and move onto the next round. Once all rounds have been completed, the status indicator will show the code **BB** to signal that the settings have all successfully been restored and the life support system is in working order.

## Keypad

### Overview

### Repair Instructions

The panel contains four buttons arranged in a 2x2 grid, each bearing a unique symbol. This combination of symbols will be present in only one of the tables below.

W	ƒ	Ⓞ	Ɔ	Q
tb	lll	⌘	3	Ⓞ
Az	⌘	3	lll	tb
Ɔ	ƒ	Ɔ	3	⌘
ƒ	Ⓞ	Ɔ	ƒ	Az
3	ƒ	ƒ	ƒ	D
ƒ	tb	ω	ƒ	ω
Q	D	ǎ	Ⓞ	Ⓞ

First, identify which table contains all four symbols. Then, the astronaut must press the button in the order in which the corresponding symbols appear in the table, with the table read from top to bottom. If the buttons were pressed in the correct order, the panel status will change to BB to indicate that no further action is needed. If not, the panel will reset and the process must be repeated.