




# Lessons Learned About the Teach-In Function

Emergency lights must illuminate when required for aircraft evacuations. If maintenance is not performed correctly, this can compromise the availability of the emergency lights.



If all of the Emergency lights do not illuminate when they are most needed, especially if the cabin is dark or filling with smoke, the most efficient evacuation path to exit the aircraft may not be clearly visible when it is most critical. Passengers and crew may also need to see the cabin emergency lights to help them regain their orientation or situational awareness in an emergency.

Correctly setting-up the Emergency Lighting System during maintenance and performing regular checks to detect any defects are key to ensuring safe cabin operations. It is important to be aware of the correct use for the “Teach-In” function of the Emergency Power Supply Units (EPSU) and avoid system test or fault monitoring set-up errors. “Teach-In” is a configuration tool, but is not designed for troubleshooting.

### **No Lights May Mean NO-GO**

When critical cabin emergency lights are not illuminating, it may lead to a NO-GO condition. If these faults remain undetected due to incorrect system monitoring set-up, some of cabin emergency lights may not illuminate when required. There is a risk that the aircraft could be dispatched with a NO-GO condition. If it is the case that faulty lights or components are hidden from the system test or monitoring, then only a complete visual check will identify all of the emergency lights which are not illuminating. It is important for cabin crew to perform a thorough visual inspection of all emergency lights, as described by the Cabin Crew Operating Manual's Ground Check, as well as visual checks by maintenance personnel during troubleshooting.

## **EPSU SYSTEM TEST AND TEACH-IN**

### **TWO DIFFERENT FUNCTIONS**

#### **System Test Function**

The Emergency Light System Test is triggered either centrally from Multifunction Control Display Unit (MCDU on A320/A330/A340 family aircraft), Onboard Maintenance Terminal (OMT for A350XWB/A380) or locally on the EPSU itself **(fig. 1)**. The EPSU starts a test routine that includes a self-test and a test of all the electrical components connected to it, including its battery and the emergency lights.

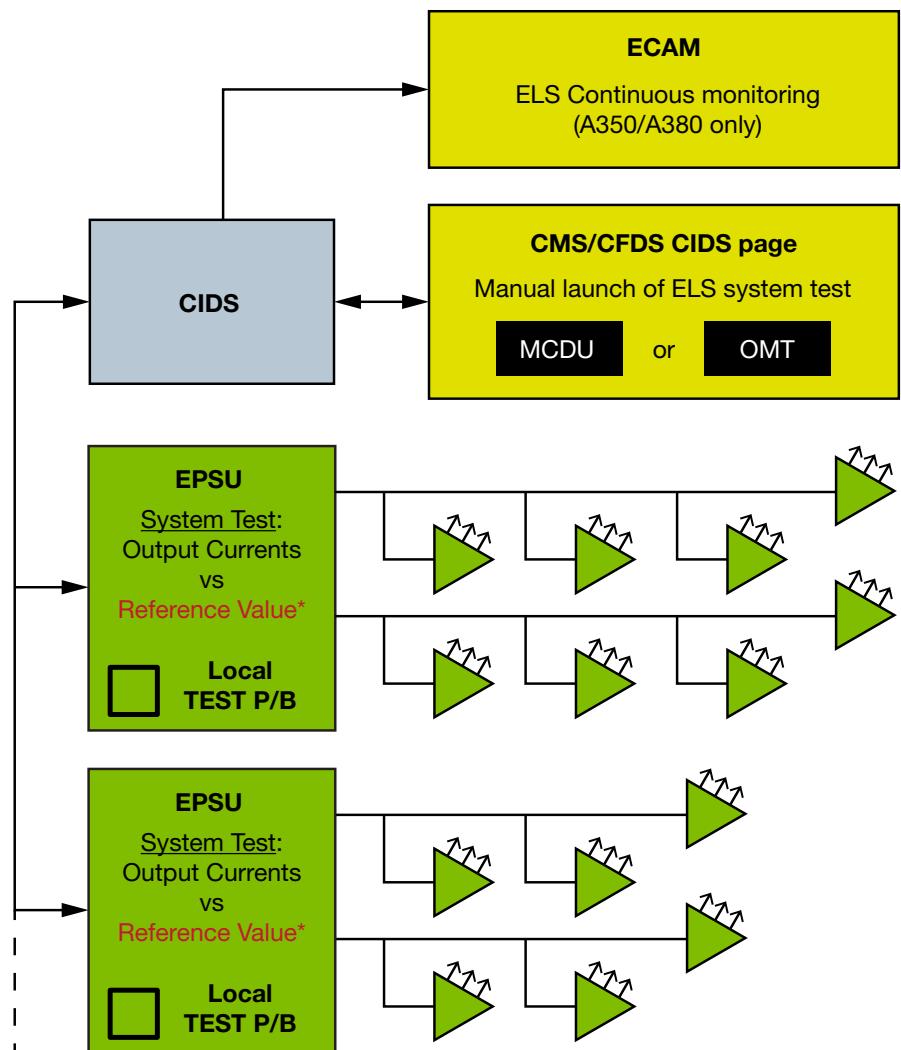
This test is a measurement of the actual current on each output compared with a reference value that is stored in the memory of the EPSU. If the tests detects differences in these values outside of pre-defined limits, this will generate a fault indication. In the case of a short circuit, an EPSU internal fuse will disconnect the output. The EPSU on A320/A330/A340 family aircraft is a thermal fuse, which requires removal of the unit to replace the fuse in a repair center. An EPSU installed on A350XWB and A380 aircraft has a resettable solid state fuse.

“ Teach-In is a configuration tool, but is not designed for trouble-shooting. ”

“ In the case of a short circuit, an EPSU internal fuse will disconnect the output. ”

**(fig.1)**

Emergency Light System Test is triggered centrally from the MCDU/OMT or locally on the EPSU TEST P/B (pushbutton).



\* Reference Value measured at EPSU setup using the Teach-in function

“ Teach-In starts automatically when an EPSU is connected to an aircraft which is powered. ”

### Teach-In Function

When an EPSU is installed on the aircraft it must first learn the correct reference values. This is managed by the EPSU “Teach-In” procedure, which shall only be performed only after the assembly of the system is complete and a visual inspection to first verify the proper function of all emergency lights.

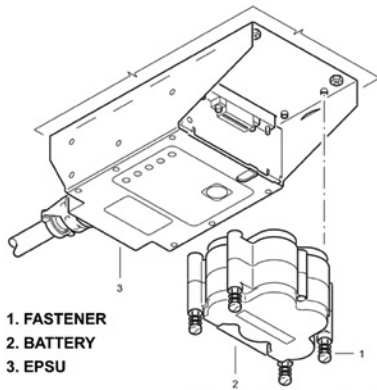
During the Teach-In procedure, all outputs are operated for a short time to capture their specific current. This value is stored in the EPSU as the reference value. It is used for comparison with the actual electrical loads, which are measured at the outputs of the EPSU during the System Test.

Teach-In starts automatically on A320/A330/A340 family aircraft, and for A380 aircraft, when an EPSU is connected to an aircraft which is powered, or when a battery pack is reconnected to the EPSU **(fig.2)**. On A350XWB aircraft, the Teach In is manually triggered by pressing the test button on the EPSU for more than 5 seconds.

### Why is there a Teach-In function on the EPSU?

Teach-In function on electronic units like the EPSU allows for common part numbers to be used across a fleet of aircraft with different models, and with their

various cabin configurations. Aircraft cabins are customized by each airline. The Emergency Lighting System must therefore be configurable to operate correctly in a customized cabin layout. It also allows for common EPSU part numbers to be used with both the older emergency light systems fitted with traditional light bulbs, and the newer systems that have LED lights requiring much less electrical current. ■



(fig.2)

EPSU with battery removed – The “Teach-In” function will activate when 28V DC power is available on the aircraft and the battery is reinstalled.

## USING TEACH-IN FUNCTION

### The Right Way and the Wrong Way

#### The Right Way to Use “Teach-In”

After any Emergency Light System configuration change, such as a cabin layout modification or replacing a system’s traditional “bulb” lights with modern LED lights, the Teach-In procedure is necessary to determine the correct reference value to store in the EPSU memory for the system test. Before starting the Teach-In, a visual inspection to verify that all lights are operative is required. The Teach-In procedure should only be done strictly in accordance with the applicable AMM/MP.

#### The Wrong Way to Use “Teach-In”

The Teach-In function is not to be used during troubleshooting of the Emergency Light System and the EPSU. Teach-In function is not a system reset function. There is NO Emergency Light fault RESET function on the EPSU.

### Consequences of Using Teach-In to Clear Faults

Initiating the EPSU Teach-In procedure in an Emergency Light System that has inoperative lights or defects present has three main consequences. To avoid these consequences, **DO NOT** clear Emergency Light System faults, with their associated ECAM message, by either disconnecting the affected EPSU’s battery, swapping EPSU positions or replacing an EPSU before first identifying and rectifying the root cause of the fault message.

#### Hidden Defects

After the Teach-In procedure is completed on the EPSU, it will no longer detect the defect is present and a fault message will not be displayed. The defect is effectively hidden from the system test because the EPSU has stored a new reference value that was measured with the defective component in the system (fig.3).

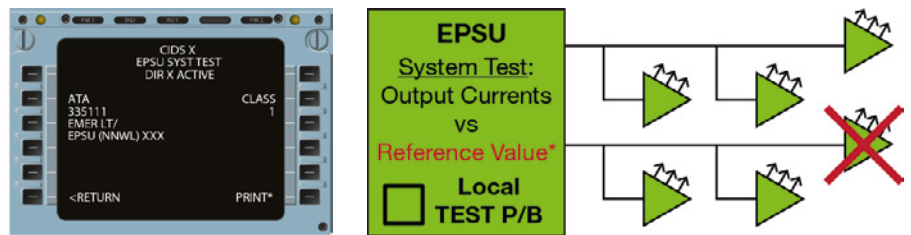
“ Teach-In function is not a system reset function. ”

“ To avoid these consequences, DO NOT clear Emergency Light System faults by disconnecting the EPSU battery, swapping positions or replacing the EPSU. ”



**(fig.3)**

Emergency Light System Fault – DO NOT USE TEACH-IN FUNCTION TO CLEAR A FAULT.



**DO NOT USE THE TEACH-IN FUNCTION TO CLEAR A FAULT!**

THIS WILL HIDE THE FAULT FROM THE NEXT TEST AND CAUSE NEW FAULT MESSAGES IF THE DEFECT IS RECTIFIED

### False Fault Message

If the defect is later detected during a visual inspection and it is then repaired, the EPSU test will display a fault message even though there is no longer a defect present in the system. This is because there will be a difference between the measured electrical loads and the false reference value captured during the Teach-In when the defect was still present. This could generate confusion for maintenance personnel and it may lead to lengthy troubleshooting with the risk of operational delays.

### Repeated Fuse Tripping

If the defect is a short circuit on the output of the EPSU on A320/A330/A340 family aircraft, then the EPSU must be replaced. If the cause of the short circuit is not repaired, this will immediately damage the fuse of the replacement unit EPSU. This fuse is only resettable on EPSU used for A350XWB and A380 aircraft. The fuse will repeatedly trip to disconnect the current at the EPSU output and this causes the fault to reappear until the defect is rectified. ■

## DETECTING FAULTS IN THE EMERGENCY LIGHT SYSTEM

An Emergency Light System fault message only indicates a Fault Isolation Number (or FIN) for the affected EPSU, but that EPSU is usually not the direct cause of the defect. It is more likely that a component or light connected to that EPSU is defective and is the reason for the fault message.

There are 3 ways to identify faults or lights not illuminating in the Emergency Lighting System:

### 1. Visual Inspection

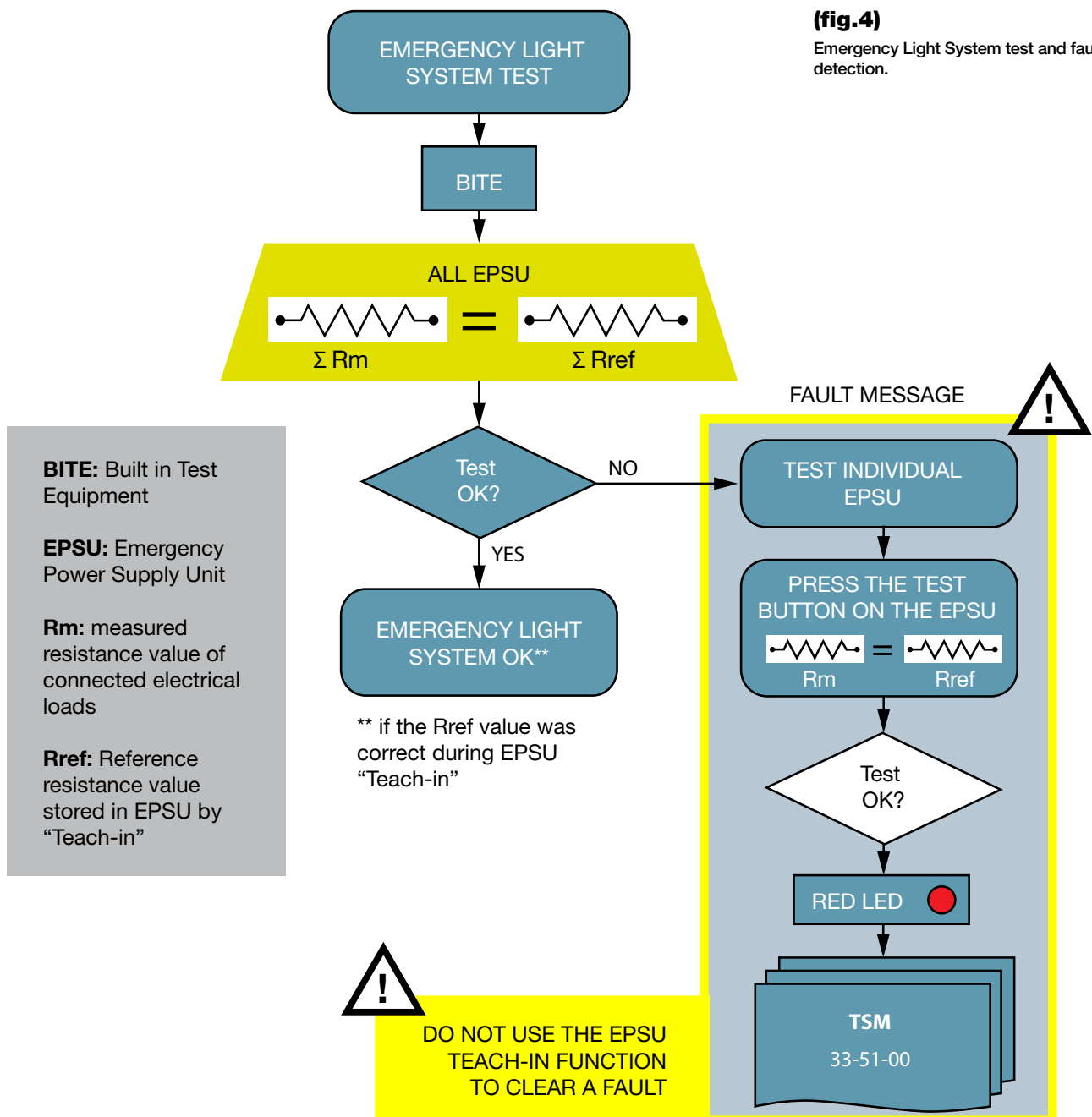
A thorough visual check of all of the emergency lights by Cabin Crew or Maintenance Personnel should find any lights that are not illuminating. These should be reported by Cabin Crew, as per the CCOM Ground Check, or recorded by maintenance for troubleshooting or replacement in accordance with TSM & AMM/MP 33-51-00.

## 2. System BITE Monitoring

On A350XWB and A380 aircraft, a continuous system monitoring compares the electrical loads at the outputs of the EPSU with a stored reference value during its previous Teach-In process. If the measured electrical load deviates from the stored reference value, a maintenance message (or “dispatch message” for A350XWB aircraft), will appear to alert Flight crew and maintenance of a defect in the aircraft’s Emergency Lighting System **(fig.4)**. In this case, refer to the Troubleshooting procedure in TSM & AMM/MP 33-51-00 and DO NOT use the EPSU Teach-In process to clear the fault.

**(fig.4)**

Emergency Light System test and fault detection.



#### 3. System Test

Emergency Light System test is carried out by maintenance personnel in accordance with AMM/MP 33-51-00. This will manually launch the system monitoring described above (for System BITE monitoring). The LED indicator on the EPSU will advise what components to check to find the cause of the fault.

The Emergency Lighting System Test can be performed locally on each EPSU by pressing the TEST button. Caution: On A350XWB pressing the test button for more than 5 seconds launches the Teach-In function for that EPSU. ■

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Teach-In function on the EPSU is not a reset function and it shall not be used to troubleshoot a fault message related to the Emergency Light System. To avoid the risk of dispatching the aircraft in a NO-GO condition, DO NOT use the Teach-In function to clear EPSU failure messages coming from a system test or monitoring. Caution also needs to be taken to ensure that the Teach-In function is not inadvertently activated. This could cause the EPSU to store an incorrect electrical load reference value, and a wrong value may hide any defective emergency lights during the system test.

A pre-requisite prior to activating the Teach-In function is to first check that all of the emergency lights connected to an EPSU illuminate. By correctly configuring the Emergency Lighting System, conducting regular visual inspections and performing scheduled system tests to find and fix defects, it will ensure that all of the aircraft's emergency lights are operational when they are most needed – for lighting the path to the nearest and safest exit for passengers and crew during an emergency cabin evacuation.

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