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English version

Space engineering - Guidelines for electrical design and interface requirements for actuators

Ingénierie spatiale - Règles de design électrique et exigences d'interfaces pour les actionneurs

Raumfahrttechnik - Richtlinien für das elektrische Design und die Schnittstellenanforderungen von Stellmotoren

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European Foreword

This document (CEN/TR 17603-20-21:2022) has been prepared by Technical Committee CEN/CLC/JTC 5 "Space", the secretariat of which is held by DIN.

It is highlighted that this technical report does not contain any requirement but only collection of data or descriptions and guidelines about how to organize and perform the work in support of EN 16602-20.

This Technical report (CEN/TR 17603-20-21:2022) originates from ECSS-E-HB-20-21A.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

This document has been developed to cover specifically space systems and has therefore precedence over any TR covering the same scope but with a wider domain of applicability (e.g.: aerospace).

Introduction

The present handbook, and the relevant standard ECSS-E-ST-20-21, have been produced in a general context to provide stable electrical interface specifications (both for the source and the load, for functional and performance aspects).

The convergence within ECSS among agencies, of Large System Integrators and of a representative group of electronic manufacturers on the identified requirement set can provide an effective way to get more recurrent products for generic use, both for the actuator electronics (power source), and for the actuators themselves, in a rather independent way from the final application.

The standard ECSS-E-ST-20-21 has therefore to be intended as a standard for product development, and the present handbook as a guideline to understand the relevant requirements, the typical issues of the actuators interfaces both at system and at equipment level.

This handbook complements ECSS-E-ST-20-21, and it is directed at the same time to power system engineers, who are specifying and procuring units supplying and containing electrical actuators, to power electronics design engineers, who are in charge of designing and verifying actuator electronics, and to electrical actuators designers.

For the system engineers, this document explains the detailed issues of the interface and the impacts of the requirements for the design of the actuator chain.

For design engineers, this document gives insight and understanding on the rationale of the requirements on their designs.

It is important to notice that the best understanding of the topic of Actuators Electrical Interfaces is achieved by the contextual reading of both the present handbook and the ECSS-E-ST-20-21.

1 Scope

In general terms, the scope of the consolidation of the electrical interface requirements for electrical actuators in the ECSS-E-ST-20-21 and the relevant explanation in the present handbook is to allow a more recurrent approach both for actuator electronics (power source) and electrical actuators (power load) offered by the relevant manufacturers, at the benefit of the system integrators and of the European space agencies, thus ensuring:

- Better quality,
- Stability of performances, and
- Independence of the products from specific mission targets.

A recurrent approach enables manufacturing companies to concentrate on products and a small step improvement approach that is the basis of a high quality industrial output.

In particular, the scope of the present handbook is:

- To explain the type of actuators, the principles of operation and the typical configuration of the relevant actuator electronics,
- To identify important issues relevant to electrical actuators interfaces, and
- To give some explanations of the requirements set up in the ECSS-E-ST-20-21.

References

EN Reference	Reference in text	Title
EN 16601-00-01	ECSS-S-ST-00-01	ECSS system - Glossary of terms
EN 16603-20-21	ECSS-E-ST-20-21	Space engineering - Electrical design and interface requirements for actuators
EN 16603-33-11	ECSS-E-ST-33-11	Space engineering - Explosive subsystems and devices
EN 16602-30-11	ECSS-Q-ST-30-11	Space product assurance - Derating – EEE components
EN 16602-40	ECSS-Q-ST-40	Space product assurance - Safety
	CSG-NT-SBU-16687- CNES Ed/Rev 01/01	Payload safety handbook