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# INTRODUCTION

## Document overview

This document presents the software requirements specifications of 101 software development project.

It describes:

* Requirements of functionalities, performances, interfaces, environment …
* Tests principles and definitions of validation methods of requirements,
* The compliance of requirements to customer needs,
* The relative importance and precedence of requirements

## Abbreviations and Glossary

### Abbreviations

Add here abbreviations

### Glossary

Add here words definitions

## References

### Project References

| # | Document Identifier | Document Title |
| --- | --- | --- |
| [R1] | ID | Integrative Project |

### Standard and regulatory References

|  |  |  |
| --- | --- | --- |
| # | Document Identifier | Document Title |
| [STD1] | Tema: 1.2.1. "SPICE", "CMMI" | ISO/IEC 15504, CMMI  ISO/IEC 9899-2011  ISO/IEC 19769:2004  ISO/IEC 9899:tc2 |

## Conventions

Requirements listed in this document are constructed according to the following structure:

|  |  |
| --- | --- |
| Requirement ID | SRS-101-000 |
| Title | Title of XXX-000 requirement |
| Description | Description of XXX-000 requirement |
| Version | Version of XXX-000 requirement |

|  |  |
| --- | --- |
| Requirement ID | SRS-Power input -001 |
| Title | Main power input |
| Description | The power voltage supply must be 12 Volts DC. |
| Version | V1.0 |

|  |  |
| --- | --- |
| Requirement ID | SRS-Work load frequency range-002 |
| Title | Main work load frequency range |
| Description | The frequency work load shall be in the f = 100 Hz to f = 1 KHz, range. |
| Version | V1.0 |

|  |  |
| --- | --- |
| Requirement ID | SRS-PWM Duty Cycle-003 |
| Title | Main duty cycle |
| Description | The PWM duty cycle shall be defined after working frequency. |
| Version | V1.0 |

|  |  |
| --- | --- |
| Requirement ID | SRS-Set point (Speed)-004 |
| Title | Main set- point range |
| Description | The set point shall be defined within the range 0 to 3000 RPM |
| Version | V1.0 |

|  |  |
| --- | --- |
| Requirement ID | SRS-Display behaviour-005 |
| Title | Main information displayed |
| Description | The LCD shall display the motor speed, set point and square signal work percentage. |
| Version | V1.0 |

# REQUIREMENTS

## States

FOO software works in three states:

* Starting: the software loads its components;
* In use: all the functionalities of the software are available to the users;
* Stopping: the software is being stopped.
* Maintenance: the software is in maintenance mode

States and transitions.

## Functionalities and Performance

This is the core of the SRS. It contains the purpose of the software expressed in technical requirements.

|  |  |
| --- | --- |
| Requirement ID | SRS-VOLTAGE |
| Title | Voltage |
| Description | FOO hardware shall deliver 12V |
| Version | V1.0 |

|  |  |
| --- | --- |
| Requirement ID | SRS-SetPoint |
| Title | SetPoin |
| Description | HARDWARE\_CONFIGURATION for the SetPoint shall be defined as designed and specified in the Integrative Project document, page 6. |
| Version | V1.0 |

|  |  |
| --- | --- |
| Requirement ID | SRS-SetPoint\_Adjustment |
| Title | Setpoint\_Adjustment |
| Description | HARDWARE\_CONFIGURATION for SetPoint shall set reference values using the potentiometer as defined in the Integrative Project document, page 6 – fig 5. |
| Version | V1.0 |

|  |  |
| --- | --- |
| Requirement ID | SRS- SetPoint\_Noise\_Atenuation |
| Title | Setpoint SetPoint\_Noise\_Atenuation |
| Description | HARDWARE\_CONFIGURATION SetPoint offset value shall be defined by sampling the signal at 100ms period.  Sampling shall be average to yield offset value. |
| Version | V1.0 |

|  |  |
| --- | --- |
| Requirement ID | SRS- SetPoint\_Reference\_Value\_UART |
| Title | SetPoint\_Reference\_Value\_UART |
| Description | HARDWARE\_CONFIGURATION SetPoint offset values must be tested as defined in the Integrative Project design document, page 6 using the UART protocol.  Offset\_ updated \_messsage shall be set to 200 ms.  UART\_transmition\_velosity shall be set to 115200 bps |
| Version | V1.0 |

|  |  |
| --- | --- |
| Requirement ID | SRS-PWM |
| Title | HARDWARE\_CONFIGURATION\_PWM |
| Description | HARDWARE\_CONFIGURATION for the PWM shall be defined at a frequency of 1Khz of duty cycle. |
| Version | V1.0 |

|  |  |
| --- | --- |
| Requirement ID | SRS-PWM |
| Title | HARDWARE\_CONFIGURATION\_PWM |
| Description | HARDWARE\_CONFIGURATION for the PWM shall be sampled with in a period of 100ms. |
| Version | V1.0 |

|  |  |
| --- | --- |
| Requirement ID | SRS-PWM |
| Title | HARDWARE\_CONFIGURATION\_PWM |
| Description | HARDWARE\_CONFIGURATION for the interface shall set discreate values of RPM corresponding to percentage of signal duty cycle as defined in value table in the Integrative Project document, page 6 – table 1. |
| Version | V1.0 |

|  |  |
| --- | --- |
| Requirement ID | SRS-PWM |
| Title | HARDWARE\_CONFIGURATION\_PWM |
| Description | HARDWARE\_CONFIGURATION for the tachometer shall set discreate values of RPM corresponding to percentage of signal duty cycle as defined in value table in the Integrative Project document, page 6 – table 1. |
| Version | V1.0 |

|  |  |
| --- | --- |
| Requirement ID | SRS-PWM |
| Title | HARDWARE\_CONFIGURATION\_PWM |
| Description | HARDWARE\_CONFIGURATION shall set the output of the Hall\_effect sensor to a square signal. |
| Version | V1.0 |

## SW\_Configuration

|  |  |
| --- | --- |
| Requirement ID | SRS-Model |
| Title | Speed control |
| Description | Speed control shall compute the PWM control signal with the 100 ms parameter, with the use of the PID algorithm. |
| Version | V1.0 |

|  |  |
| --- | --- |
| Requirement ID | SRS-Model |
| Title | Speed control |
| Description | Speed control shall set the motor to the RPM, using the ACD feedback and varying voltage from SetPoint |
| Version | V1.0 |

|  |  |
| --- | --- |
| Requirement ID | SRS-Controller |
| Title | Speed control\_setpoint |
| Description | Setpoint value shall be read every 100ms. |
| Version | V1.0 |

## Human\_Machine\_Interface

|  |  |
| --- | --- |
| Requirement ID | SRS- HMI\_Display |
| Title | HMI\_Display |
| Description | HMI\_Display software shall display the following items:  **Name of the project:** Speed Control DC motor  **Duty cycle:** XXX %  **Speed:** XXXX RPM  **SW:** X.X  **HW:** CESEQ-C001 / CESEQ-P001  **Developer:** Lastname1, Name1  Lastname2, Name2 |
| Version | V1.0 |