# System description

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## 1.Flowchart

图片包含 图形用户界面

描述已自动生成

Unique identifiers

|  |  |
| --- | --- |
| Unique ID | Long Name |
| U1 | User input |
| U2 | Simulation output |
| O1 | Impact to environment |
| O2 | Impact from environment |

## 2.Table of limits

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Interaction | Symbol | Min. | Max. | Unit |
| -> U1 | | | | |
| User input |  |  |  |  |
| Motor input voltage |  | 0 | 48 | V |
| Motor input current |  | 0 | 110 | A |
| -> U2 |  |  |  |  |
| Simulation output |  |  |  |  |
| Thrust |  | 0 | 500 | N |
| Rotational speed propeller |  | 0 | 2300 | rpm |
| -> O1 |  |  |  |  |
| Impact to the environment |  |  |  |  |
| Heat |  | Will not be considered in the design | | W |
| Noise |  |  | | dB |
| -> O2 |  |  |  |  |
| Impact from environment |  |  |  |  |
| Temperature |  | Will not be considered in the design | |  |
| Humidity |  |  | | %RH |

## 

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| GENERATOR | Symbol | Min. | Max. | Unit |
| User interactions | | | | |
| Motor subsystem | | | | |
| Motor properties | *Will not be considered in the design.* | | | |
| Shaft subsystem | | | | |
| Shaft density (Exhibition, 2019) | *Will not be considered in the design.* | | | |
| Diameter |
| Length |
| Shaft torsional stiffness |
| Bearing subsystem | | | | |
| Type | *Will not be considered in the design.* | | | |
| Inner diameter |
| Outer diameter |
| Friction |
| Friction coefficient (Bearing friction coefficient, 2018) |  |  |  | - |
| Gearing subsystem | | | | |
| Gear material hardness (Hardness of general gears, 2017) | *Will not be considered in the design.* | | | |
| Diameter |
| Tooth number (Standard gear tooth number, 2019) |
| Tooth shape |
| Lubricant viscosity (Viscosity index) |
| Friction coefficient |  |  |  | - |
| Ratio |  | 0.1 | 10 | # |
| Propeller subsystem |  |  |  |  |
| Propeller blade count | - | 2 | 6 | # |
| Propeller size (diameter) |  | 0,1 | 0,5 | m |
| Propeller torque |  | 5 | 30 | Nm |
| Propeller blade surface area | *Will not be considered in the design.* | | | |
| Propeller blade coefficient |  | 0 | 1,2 | - |
| Propeller pitch (Blade pitch) | - | 35 | 39 | ° |
| Propeller coefficient (Dalian Maritime University, 2018) |  | 0 | 0.4 |  |
| J | 0 | 0.9 |  |
| User interface subsystem | | | | |
| User interface properties | *Will not be considered in the design.* | | | |
| Environmental impacts |  |  |  |  |
| Air thermal corfficient | *Will not be considered in the design.* | | | |
| Air pressure |
| Heat |
| Noise |
| Temperature |
| Humidity |

## 3.Table of properties

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| GENERATOR | Symbol | Min. | Max. | Unit |
| -> Simulation system | | | | |
| -> Propeller system | | | | |
| Propeller blade count | - | 2 | 6 | # |
| Propeller size (diameter) |  | 0,1 | 0,5 | m |
| Propeller torque |  | 5 | 30 | Nm |
| Propeller blade surface area | *Will not be considered in the design.* | | | |
| Propeller blade coefficient |  | 0 | 1,2 | - |
| (Blade pitch) | | | | |
| Propeller pitch | - | 35 | 39 | ° |
| (Dalian MaritimeUniversity, 2018) | | | | |
| Propeller coefficient |  | 0 | 0.4 |  |
|  | J | 0 | 0.9 |  |
| -> Shaft system |  |  |  |  |
| (SIMM Machinery Exhibition, 2019) | | | | |
| Shaft density |  |  |  |  |
| Shaft size (diameter) |  |  |  | m |
| Shaft length |  | 0,25 | 1 | m |
| Shaft torsional stiffness |  |  |  | Pa |
| -> Gear system | | | | |
| (Hardness of general gears, 2017) | | | | |
| Gear material hardness |  |  |  | Pa |
| Gear size (diameter) |  |  |  | m |
| (Standard gear tooth number, 2019) | | | | |
| Gear tooth number | - | 18 | 25 | # |
| Gear contact friction |  |  |  | N |
| Gear tooth shape |  |  |  |  |
| -> Gear mesh system | | | | |
| (Viscosity index) | | | | |
| Lubricant viscosity |  | 5 | 30 | Pa\*s |
| -> Bearing system |  | | | |
| Bearing type | *Bearing types can be found in table (#).* | | | |
| Bearing inner diameter |  |  |  | m |
| Bearing outer diameter |  |  |  | m |
| Bearing friction |  |  |  | N |
| (Bearing friction coefficient, 2018) | | | | |
| Bearing friction coefficient |  |  |  | - |
| -> User system |  |  |  |  |
| *Will not be considered in the design* | | | | |
| -> Environment system |  |  |  |  |
| Air thermal corfficient |  | 0.023 | 0.025 |  |
| Air pressure |  | 10330 | 10340 | pa |
| *Other properties will not be considered in the design* | | | | |
|  | | | | |

# Reference

Bearing friction coefficient. (2018/6/27). source: https://wenku.baidu.com/view/3b7e69d133d4b14e852468ff.html

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