# Module -- Electric Power Consumption

# High-Level Description

This module estimates the instantaneous electric power at the input of the control module and the supply current.

# Figures

## Diagram – Component Diagram

## 

# Variable Data Dictionary

|  |  |
| --- | --- |
| Module Inputs | Module Outputs |
| Vecu\_Volt\_f32 | ElectricPower\_Watt\_f32 |
| MtrVoltDax\_Volt\_f32 | SupplyCurrent\_Amp\_f32 |
| MtrVoltQax\_Volt\_f32 |  |
| MtrCurrDax\_Amp\_f32 |  |
| MtrCurrQax\_Amp\_f32 |  |

## Module Internal Variables

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variable Name | Resolution | Legal Range  (min) | Legal Range  (max) | Software Segment |
| ModInPower\_Watt\_D\_f32 | Single Precision Floating Point | -2000 | 2000 | ELEPWR\_START\_SEC\_VAR\_CLEARED \_32 |
| DropInPower\_Watt\_D\_f32 | Single Precision Floating Point | -200 | 200 | ELEPWR\_START\_SEC\_VAR\_CLEARED \_32 |

### User defined typedef definition/declaration

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Typedef Name | Element Name | User Defined Type | Legal Range  (min) | Legal Range  (max) |
| None |  |  |  |  |

# Constant Data Dictionary

## Calibration Constants

|  |
| --- |
| Constant Name |
| k\_CntlrInResist\_Ohm\_f32 |
| k\_PstcPowerLoss\_Watt\_f32 |

## Program(fixed) Constants

### Embedded Constants

#### Local

|  |  |  |  |
| --- | --- | --- | --- |
| Constant Name | Resolution | Units | Value |
| D\_SQRT3OVR2\_ULS\_F32 | Single precision Float | Float32 | 0.866025403784 |
| D\_ELECPOWERLOLMT\_WATT\_F32 | Single precision Float | Watt | (-2000.0) |
| D\_ELECPOWERHILMT\_WATT\_F32 | Single precision Float | Watt | 2000.0 |
| D\_SUPPLYCURRENTLOLMT\_AMP\_F32 | Single precision Float | Amp | (-200.0) |
| D\_SUPPLYCURRENTHILMT\_AMP\_F32 | Single precision Float | Amp | (200.0) |

#### Global

|  |
| --- |
| Constant Name |
| D\_ZERO\_ULS\_F32 |
| D\_VECUMIN\_VOLTS\_F32 |

### Module specific Lookup Tables Constants

|  |  |  |  |
| --- | --- | --- | --- |
| Constant Name | Resolution | Value | Software Segment |
| None |  |  |  |

# Functions/Macros used by the Sub-Modules

## Library Functions / Macros

The library functions / Macros that are called by the various sub modules are identified below,

## Data Hiding Functions

None

## Local Functions/Macros Used by this MDD only

None

# Software Module Implementation

## Initial Data Values

|  |  |
| --- | --- |
| Data | Value |
| Rte\_InitValue\_Vecu\_Volt\_f32 | 5.0 |
| Rte\_InitValue\_MtrVoltDax\_Volt\_f32 | 0.0 |
| Rte\_InitValue\_MtrVoltQax\_Volt\_f32 | 0.0 |
| Rte\_InitValue\_MtrCurrDax\_Amp\_f32 | 0.0 |
| Rte\_InitValue\_MtrCurrQax\_Amp\_f32 | 0.0 |
| Rte\_InitValue\_ElectricPower\_Watt\_f32 | 0.0 |

## Periodic Functions

### Per: ElePwr\_Per1

#### Design Rationale

None

#### Program Flow Start

Rte\_Call\_ElePwr\_Per1\_CP0\_CheckpointReached()

#### Store Module Inputs to Local copies

|  |  |
| --- | --- |
| Local Copy | Module Input |
| Vecu\_Volt\_f32 | Rte\_IRead\_ElePwr\_Per1\_Vecu\_Volt\_f32() |
| MtrVoltDax\_Volt\_f32 | Rte\_IRead\_ElePwr\_Per1\_ MtrVoltDax\_Volt\_f32 () |
| MtrVoltQax\_Volt\_f32 | Rte\_IRead\_ElePwr\_Per1\_ MtrVoltQax\_Volt\_f32 () |
| MtrCurrDax\_Amp\_f32 | Rte\_IRead\_ElePwr\_Per1\_ MtrCurrDax\_Amp\_f32 |
| MtrCurrQax\_Amp\_f32 | Rte\_IRead\_ElePwr\_Per1\_ MtrCurrQax\_Amp\_f32 () |

#### Calculate Modulator Input Power



#### Store Local copy of outputs into Module Outputs

|  |  |
| --- | --- |
| Local Copy | Module Output |
| ElecPower\_Watt\_T\_f32 | Rte\_IWrite\_ElePwr\_Per1\_ ElectricPower\_Watt\_f32() |
| SupplyCurrent\_Amp\_T\_f32 | Rte\_IWrite\_ElePwr\_Per1\_SupplyCurrent\_Amp\_f32 () |

#### Program Flow End

## Rte\_Call\_ElePwr\_Per1\_CP1\_CheckpointReached()

## Fault Recovery Functions

None

## Shutdown Functions

None

## Interrupt Functions

None

## Serial Communication Functions

None

# Execution Requirements

## Execution Rates for sub-modules called by the Scheduler

|  |  |  |
| --- | --- | --- |
| Function Name | Calling Frequency | System State(s) in which the function is called |
| ElePwr\_Per1 | 10 ms | All |

## Execution Requirements for Serial Communication Functions

|  |  |
| --- | --- |
| Function Name | Sub-Module called by (Serial Comm Function Name) |
| None |  |

# Memory Map Definition Requirements

## Sub Modules (Functions)

This table identifies the software segments for functions identified in this module.

|  |  |
| --- | --- |
| Name of Sub Module | Software Segment |
| ElePwr\_Per1 | RTE\_AP\_ELEPWR\_APPL\_CODE |

## Local Functions

This table identifies the software segments for local functions identified in this module.

|  |  |
| --- | --- |
| Name of Sub Module | Software Segment |
| None |  |

# Known Issues / Limitations With Design

1. None

# Revision Control Log

|  |  |  |  |
| --- | --- | --- | --- |
| **Rev #** | **Change Description** | **Date** | **Author Initials** |
| 1 | Initial AUTOSAR version (SF08 v001). | 1-Dec-12 | Selva |
| 2 | Name changed from CmElecPwr to ElePwr | 10-Dec-12 | Selva |
| 3 | Anomaly 6242 Limit Outputs | 02-Apr-14 | SB |
| 4 | Changed Vecu Initial value from 0 to 5, Changed naming for module display variables | 08-May-14 | SB |