

**Research & Vehicle Technology**

**“Infotainment Systems Product Development”**

**Feature – Power Flow Display Client v3**

**APIM Infotainment Subsystem Part Specific Specification (SPSS)**

Version 1.0

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**Version Date: August 29, 2018**

**FORD CONFIDENTIALF**

**Revision History**

|  |  |  |  |
| --- | --- | --- | --- |
| **Date** | **Version** | **Notes** | |
| **August 29, 2018** | **1.0** | **Initial Release** |  |
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# Architectural Design

## EVPFI-SV-REQ-320742/A-Power Flow Display System

Internal Block Diagram



## EVPFI-CLD-REQ-320743/A-Power Flow Display Client

The power flow display client outputs power flow information to the user based on data received from the power flow display server1 and power flow display server2. Please refer to the relevant specifications for information on display format/rules.

## PowerFlowDisplayClient Interface

### EVPFI-IIR-REQ-320744/A-PowerFlowDisplayClient\_Tx

This class does not transmit any signals. However, it provides output to the user.

### EVPFI-IIR-REQ-320745/A-PowerFlowDisplayClient\_Rx

#### MD-REQ-320746/A-PowerFlow1\_St

Message Type: Status

This signal communicates power flow display information.

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Literals** | **Value** | **Description** |
| PlugStatus | - | - | Status of vehicle plug |
|  | Off\_Plug | 0x0 |  |
|  | On\_Plug | 0x1 |  |
| PwrFlowBatt | - |  | Direction and destination of power flow in and out of the high voltage battery |
|  | NoFlow\_PathOff | 0x0 |  |
|  | FlowFromBattToRearWhls | 0x1 |  |
|  | FlowFromRearWhlsToBatt | 0x2 |  |
|  | FlowFromBattToFrontWhls | 0x3 |  |
|  | FlowFromFrontWhlsToBatt | 0x4 |  |
|  | FlowFromBattToAllWhls | 0x5 |  |
|  | FlowFromAllWhlsToBatt | 0x6 |  |
|  | FlowFromWallToBatt | 0x7 |  |
|  | Unused | 0x8 |  |
|  | Unused | 0x9 |  |
|  | Unused | 0xA |  |
|  | Unused | 0xB |  |
|  | Unused | 0xC |  |
|  | Unused | 0xD |  |
|  | Unused | 0xE |  |
|  | Unused | 0xF |  |
| PwrFlowFuel | - |  | Fuel/Engine power flow destination |
|  | NoFlow\_PathOff | 0x0 |  |
|  | FlowFromFuelToRearWhls | 0x1 |  |
|  | FlowFromFuelToFrontWhls | 0x2 |  |
|  | FlowFromFuelToAllWhls | 0x3 |  |
|  | Unused | 0x4 |  |
|  | Unused | 0x5 |  |
|  | Unused | 0x6 |  |
|  | Unused | 0x7 |  |
| PwrFlowFuelBatt | - |  | Engine Charging HV Battery |
|  | NoFlow\_PathOff | 0x0 |  |
|  | FlowFromFuelToBatt | 0x1 |  |
| TextDisplay | - | - | Text label for power flow display |
|  | No\_Text | 0x0 |  |
|  | Disp\_Hyb\_Drive\_Txt | 0x1 |  |
|  | Disp\_Charg\_HV\_Batt\_Txt | 0x2 |  |
|  | Disp\_Idle\_Txt | 0x3 |  |
|  | Disp\_Idle\_with\_Chrg\_Txt | 0x4 |  |
|  | Disp\_Elec\_Drv\_Txt | 0x5 |  |
|  | Disp\_Eng\_Drv\_Txt | 0x6 |  |
|  | Disp\_Remote\_Start\_Txt | 0x7 |  |
|  | Disp\_Charge\_Cmplt\_Txt | 0x8 |  |
|  | Disp\_Fast\_Charge\_Cmplt\_Txt | 0x9 |  |
|  | Disp\_Fast\_Charge\_Txt | 0xA |  |
|  | Dsply\_Rgen\_Chrg\_Txt | 0xB |  |
|  | Disp\_12 | 0xC |  |
|  | Disp\_13 | 0xD |  |
|  | Disp\_14 | 0xE |  |
|  | Disp\_15 | 0xF |  |

#### MD-REQ-320747/A-HEVPHEVPowerFlow\_St

Message Type: Status

This signal communicates power flow display information, and only applies to HEV / PHEV architectures. The signal includes information that was not included in *PowerFlow1\_St*.

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Literals** | **Value** | **Description** |
| EngMsgDisplay1 | - | - | Highest priority reason engine is on |
|  | No Display | 0x0 |  |
|  | Acceleration | 0x1 |  |
|  | High Speed | 0x2 |  |
|  | Heater Setting | 0x3 |  |
|  | Neutral Gear | 0x4 |  |
|  | Engine Cold | 0x5 |  |
|  | Batt Charging High Voltage | 0x6 |  |
|  | Low Gear | 0x7 |  |
|  | Normal Operation | 0x8 |  |
|  | Oil Maintenance | 0x9 |  |
|  | Fuel Maintenance | 0xA |  |
|  | Hill Decent Control | 0xB |  |
|  | Batt Temperature | 0xC |  |
|  | Drive Mode Selection | 0xD |  |
|  |  |  |  |

# Functional Definition

## EVPFI-FUN-REQ-320749/A-Power Flow Display Active

This function includes use-cases that describe the power flow display feature in an active state.

### Requirements

#### EVPFI-REQ-320750/A-Signals with Percent Values - Erroneous Values

Signals with percent definitions should always receive values within a standard percent range: *0-100%* of *-100-100%.*

Individual signal definitions may include additional values outside of this range (i.e., 100.4%, -102.1%, etc); however, these erroneous values will be treated as a faulty signal and not be processed by the display client.

#### EVPFI-REQ-320483/A-Animation to Signal Mapping



### Use Cases

#### EVPFI-UC-REQ-320751/A-Power Flow Display Selected

**Linked Elements**

EVPFI-REQ-320750/A-Signals with Percent Values - Erroneous Values

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Ignition status is equal to Run. |
| **Scenario Description** | The user selects the power flow display. |
| **Post-conditions** | The power flow display is active.  Current power flow information is displayed to the user. |
| **List of Exception Use Cases** | E1 – Absense of new Power Flow data |
| **Interfaces** | G-HMI, Vehicle System Interface |

#### EVPFI-UC-REQ-320752/A-Absence of new Power Flow data

**Linked Elements**

EVPFI-REQ-320750/A-Signals with Percent Values - Erroneous Values

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as normal use case |
| **Scenario Description** | The user selects the power flow display and there is no new/updated data being sent to this display. |
| **Post-conditions** | The display functions as defined in the relevant HMI specification. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** | G-HMI, Vehicle System Interface |

#### EVPFI-UC-REQ-320753/A-Vehicle power mode change for Power Flow Display

**Linked Elements**

EVPFI-REQ-320750/A-Signals with Percent Values - Erroneous Values

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Ignition status is equal to run.  Power Flow display is active. |
| **Scenario Description** | Ignition Status changes to a value less than run. |
| **Post-conditions** | The display functions as defined in the relevant HMI specification. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** | G-HMI, Vehicle System Interface |

### White Box View

#### Activity Diagrams

##### EVPFI-ACT-REQ-320754/A-Power Flow Display Selected

**Linked Elements**

EVPFI-SD-REQ-320755/A-Power Flow Display Selected

ActivityDiagram



#### Sequence Diagrams

##### EVPFI-SD-REQ-320755/A-Power Flow Display Selected



# Appendix: Reference Documents

|  |  |
| --- | --- |
| Reference # | Document Title |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |