


# TCCS - Data Model\_20\_SDI\_Generic


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**SPT2TS-127630 - Disclaimer:** The data model defined here is a DRAFT version, which has not been fully integrated and approved in System Pillar but is an import of already aligned and approved EULYNX import. Therefore, it is already mature and qualifies to be part of published data model collection. This model be extended by remaining EULYNX content, on request of the other domains / use cases. [ Open ]

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## 2 Package "Equipment"

**SPT2TS-127629** - The Equipment Model is a modular system that enables manufacturers to represent the specific architecture of their equipment in a way that operators can easily understand. By using parent-child relationships to detail subcomponents, the model should be developed down to the smallest exchangeable part. This structure provides operators with an organized source of diagnostic information, highlighting redundancies that help prevent lower-level failures from escalating to top-level issues. Additionally, it functions as an online inventory that includes serial numbers, allowing maintenance personnel to quickly access the correct part needed for repairs. [ Open ]

## 2.1 Header

### SPT2TS-127634 - {

```
"$schema": "ERJU meta-model.json",
"isDefinedBy": "http://ERJU/datamodel/0.1/equipment",
"name": "equipment",
"containerStruct": "generic",
"prefix": "equipment",
"intId": 6,
"version": "1.0",
"info": "Static generic data"
```

} [  Open ]

### SPT2TS-127633 - Equipment

```
{
  "enums": [
    {
      "name": "StatusTechnical",
      "info": "Technical Status of the system, that represents the aggregated status of all hierarchical lower systems. This allows to have a top level information on the status of the system which can be drilled down if the system is in any other state than Ok.",
      "enumLiterals": [
        { "intId": 0, "name": "Unknown", "info": "The status unknown is used when the state is not yet established e.g. if connection to the system is lost"},
        { "intId": 1, "name": "OK", "info": "System serves all primary functions and has no deviations, errors or failures"},
        { "intId": 2, "name": "Warning", "info": "All subsystems are working as intended, but the system detects unexpected behaviour (e.g. deviation from expected values)."},
        { "intId": 3, "name": "FailureNonCritical", "info": "At least one error in one of the (sub)systems, but on this system level all functions are available"},
        { "intId": 4, "name": "FailureCritical", "info": "At least one function is not available; operational consequences possible"}
      ]
    }
  ],
}
```

```

{
  "name": "EquipmentReplaceabilityStatus",
  "info": "Indicates when the equipment requests a replacement. The decision to act on this
indication is up to the operator, in accordance with the equipment manual.",
  "enumLiterals": [
    { "intId": 0, "name": "Unknown", "info": "The status unknown is used when the state is
not yet established e.g. if connection to the system is lost" },
    { "intId": 1, "name": "ReplacementNotNeeded", "info": "Equipment does not need to be
replaced" },
    { "intId": 2, "name": "ReplaceableAtOperation", "info": "Equipment could be replaced
during operation" },
    { "intId": 3, "name": "ReplaceableMaintenance", "info": "Equipment should be replaced
during maintenance" },
    { "intId": 4, "name": "ReplaceableRevalidation", "info": "Equipment should be replaced
during revalidation" }
  ]
},
{
  "name": "ControllerOperationStatus",
  "info": "Indicates the general operation status of the controller",
  "enumLiterals": [
    { "intId": 0, "name": "Unknown", "info": "The status unknown is used when the state is
not yet established e.g. if connection to the system is lost" },
    { "intId": 1, "name": "Bootng", "info": "Controller is bootng up and is not ready" },
    { "intId": 2, "name": "InOperation", "info": "Controller is in regular operation" },
    { "intId": 3, "name": "Fallback", "info": "Controller is in the fallback mode" }
  ]
},
{
  "name": "CoolingFanStatus",
  "info": "Indicates the current status of the cooling fan",
  "enumLiterals": [
    { "intId": 0, "name": "Unknown", "info": "The status unknown is used when the state is
not yet established e.g. if connection to the system is lost" },
    { "intId": 1, "name": "Normal", "info": "Functioning according to specifications" },
    { "intId": 2, "name": "Degraded", "info": "Functioning with reduced performance" },
    { "intId": 3, "name": "Failure", "info": "Not functioning" }
  ]
},
{

```

```

    "name": "TemperatureStatus",
    "info": "Indicates the temperature status of the CPU",
    "enumLiterals": [
      { "intId": 0, "name": "Unknown", "info": "The status unknown is used when the state is
not yet established e.g. if connection to the system is lost" },
      { "intId": 1, "name": "Normal", "info": "Temperature of the CPU is normal" },
      { "intId": 2, "name": "TooHigh", "info": "Temperature of the CPU is too high" }
    ]
  },
  {
    "name": "CpuHealthStatus",
    "info": "Indicates the health status of the CPU",
    "enumLiterals": [
      { "intId": 0, "name": "Unknown", "info": "The status unknown is used when the state is
not yet established e.g. if connection to the system is lost" },
      { "intId": 1, "name": "Normal", "info": "Functioning according to specifications" },
      { "intId": 2, "name": "Degraded", "info": "Functioning with reduced performance" },
      { "intId": 3, "name": "Failure", "info": "Not functioning" }
    ]
  },
  {
    "name": "CpuLoadStatus",
    "info": "Indicates the load status of the CPU",
    "enumLiterals": [
      { "intId": 0, "name": "Unknown", "info": "The status unknown is used when the state is
not yet established e.g. if connection to the system is lost" },
      { "intId": 1, "name": "Normal", "info": "CPU load is normal" },
      { "intId": 2, "name": "High", "info": "CPU load is high" },
      { "intId": 3, "name": "Critical", "info": "CPU load is critical" }
    ]
  },
  {
    "name": "RamHealthStatus",
    "info": "Indicates the health status of the RAM",
    "enumLiterals": [
      { "intId": 0, "name": "Unknown", "info": "The status unknown is used when the state is
not yet established e.g. if connection to the system is lost" },
      { "intId": 1, "name": "Normal", "info": "Functioning according to specifications" },
      { "intId": 2, "name": "Degraded", "info": "Functioning with reduced performance" },

```

```

    { "intId": 3, "name": "Failure", "info": "Not functioning" }
  ]
},
{
  "name": "BootingLastReason",
  "info": "Indicates the type of the latest reset (The reason for the reset).",
  "enumLiterals": [
    { "intId": 0, "name": "Unknown", "info": "The status unknown is used when the state is
not yet established e.g. if connection to the system is lost" },
    { "intId": 1, "name": "OnSite", "info": "CPU load is critical" },
    { "intId": 2, "name": "RemoteMdm", "info": "CPU load is critical" },
    { "intId": 3, "name": "InternalMaintenanceOk", "info": "CPU load is critical" },
    { "intId": 4, "name": "InternalMaintenanceFailure", "info": "CPU load is critical" },
    { "intId": 5, "name": "InternalFailure", "info": "CPU load is critical" }
  ]
},
{
  "name": "WearStatus",
  "info": "Wear status of the flash memory",
  "enumLiterals": [
    { "intId": 0, "name": "Unknown", "info": "The status unknown is used when the state is
not yet established e.g. if connection to the system is lost" },
    { "intId": 1, "name": "Ok", "info": "Wear status of the flash memory is okay" },
    { "intId": 2, "name": "Warning", "info": "Wear status of the flash memory is at a warning
level" },
    { "intId": 3, "name": "Nok", "info": "Wear status of the flash memory is not okay" }
  ]
},
{
  "name": "PhysicalNetworkInterfaceOperationalStatus",
  "info": "can be replaced?",
  "enumLiterals": [
    { "intId": 0, "name": "Unknown", "info": "The status unknown is used when the state is
not yet established e.g. if connection to the system is lost" },
    { "intId": 1, "name": "NotAvialableNotConnected", "info": "Physical network interface is
neither available nor connected" },
    { "intId": 2, "name": "AvailableNotConnected", "info": "The physical hardware for the
connection is not disabled" },
    { "intId": 3, "name": "Connected", "info": "The first 2 layers of PoS-Signalling are
running" },

```

```

    { "intId": 4, "name": "NotConnectedDisturbed", "info": "Physical network interface is
disturbed and not connected" }
  ]
},
{
  "name": "VoltageStatus",
  "info": "Voltage status of the CPU",
  "enumLiterals": [
    { "intId": 0, "name": "Unknown", "info": "The status unknown is used when the state is
not yet established e.g. if connection to the system is lost" },
    { "intId": 1, "name": "NotUsed", "info": "Voltage is not used" },
    { "intId": 2, "name": "Undervoltage", "info": "Voltage is under nominal threshold" },
    { "intId": 3, "name": "Nominal", "info": "Voltage is nominal" },
    { "intId": 4, "name": "Overvoltage", "info": "Voltage is over nominal threshold" }
  ]
},
{
  "name": "HighLow",
  "info": "Digital value of the physical channel",
  "enumLiterals": [
    { "intId": 0, "name": "Unknown", "info": "The status unknown is used when the state is
not yet established e.g. if connection to the system is lost" },
    { "intId": 1, "name": "High", "info": "Physical channel is digital high" },
    { "intId": 2, "name": "Low", "info": "Physical channel is digital low" }
  ]
},
{
  "name": "OutputValue",
  "info": "can be replaced?",
  "enumLiterals": [
    { "intId": 0, "name": "Unknown", "info": "The status unknown is used when the state is
not yet established e.g. if connection to the system is lost" },
    { "intId": 1, "name": "On" },
    { "intId": 2, "name": "Off" }
  ]
},
{
  "name": "InputValue",
  "info": "can be replaced?",

```

```

    "enumLiterals": [
      { "intId": 0, "name": "Unknown", "info": "The status unknown is used when the state is
not yet established e.g. if connection to the system is lost" },
      { "intId": 1, "name": "On" },
      { "intId": 2, "name": "Off" }
    ]
  },
  {
    "name": "InputSwitchPosition",
    "info": "can be replaced?",
    "enumLiterals": [
      { "intId": 0, "name": "Unknown", "info": "The status unknown is used when the state is
not yet established e.g. if connection to the system is lost" },
      { "intId": 1, "name": "Position1" },
      { "intId": 2, "name": "Position2" },
      { "intId": 3, "name": "Position3" }
    ]
  }
],
"structs":
[
  {
    "name": "Equipment",
    "belongsToSubPackage": "equipment",
    "info": "May be used to define responsibilities for diagnostic information.",
    "attrs": [
      { "intId": 1, "name": "id", "dataType": "string", "key": "global"},
      { "intId": 2, "name": "statusTechnical", "enumType": "StatusTechnical", "info": "General
technical status of the equipment."},
      { "intId": 3, "name": "statusTechnicalManufacturerSpecificMessage", "dataType":
"string", "multiplicity": "*", "info": "Must be used by the supplier to describe the reasons for a
StatusTechnical != OK, that cannot be explained by existing datapoints (NOT including IM and
manufacturer specific diagnostic messages). This Information MUST be provided from the
supplier. This should provide flexibility for future uses. Multiple states can be indicated at the
same time if multiple diagnosis have not been included in the model during the design phase.
The supplier specific reason may not overlap with reasons already covered in other attributes."},
      { "intId": 4, "name": "manufacturer", "dataType": "string"},
      { "intId": 5, "name": "manufacturerModel", "dataType": "string"},
      { "intId": 6, "name": "serialNumber", "dataType": "string"},
      { "intId": 7, "name": "hardwareRevision", "dataType": "string"},

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    { "intId": 8, "name": "softwareRevision", "dataType": "string"},
    { "intId": 9, "name": "replaceabilityIndication", "enumType":
"EquipmentReplaceabilityStatus"},
    { "intId": 10, "name": "manufacturingDateTime", "dataType": "timestamp"},
    { "intId": 11, "name": "label", "dataType": "string"},
    { "intId": 12, "name": "isTimeSynchronised", "dataType": "boolean"},
    { "intId": 13, "name": "subEquipments", "composition": "Equipment", "multiplicity": "0..*",
"ordered": "byKey"},
    { "intId": 14, "name": "controllers", "composition": "Controller", "multiplicity": "0..*",
"ordered": "byKey"},
    { "intId": 15, "name": "physicalNetworkInterfaces", "composition":
"PhysicalNetworkInterface", "multiplicity": "0..*", "ordered": "byKey"},
    { "intId": 16, "name": "storageMediaFlash", "composition": "StorageMediumFlash",
"multiplicity": "0..*", "ordered": "byKey"},
    { "intId": 17, "name": "powerSupplies", "composition": "PowerSupply", "multiplicity":
"0..*", "ordered": "byKey"},
    { "intId": 18, "name": "physicalDigitalOutputs", "composition": "PhysicalDigitalOutput",
"multiplicity": "0..*", "ordered": "byKey"},
    { "intId": 19, "name": "physicalAnalogOutputs", "composition": "PhysicalAnalogOutput",
"multiplicity": "0..*", "ordered": "byKey"},
    { "intId": 20, "name": "physicalSeparatedOutputs", "composition":
"PhysicalSeparatedOutput", "multiplicity": "0..*", "ordered": "byKey"},
    { "intId": 21, "name": "physicalDigitalInputs", "composition": "PhysicalDigitalInput",
"multiplicity": "0..*", "ordered": "byKey"},
    { "intId": 22, "name": "physicalAnalogInputs", "composition": "PhysicalAnalogInput",
"multiplicity": "0..*", "ordered": "byKey"},
    { "intId": 23, "name": "physicalSeparatedInputs", "composition":
"PhysicalSeparatedInput", "multiplicity": "0..*", "ordered": "byKey"},
    { "intId": 24, "name": "inputSwitches", "composition": "InputSwitch", "multiplicity": "0..*",
"ordered": "byKey"},
    { "intId": 25, "name": "inputButtons", "composition": "InputButton", "multiplicity": "0..*",
"ordered": "byKey"}
  ]
},
{
  "name": "Controller",
  "belongsToSubPackage": "equipment",
  "info": "Controller",
  "attrs": [

```



```

    { "intId": 1, "name": "id", "dataType": "string", "key": "global"},
    { "intId": 2, "name": "statusTechnical", "enumType": "StatusTechnical", "info": "General
technical status of the equipment."},
    { "intId": 3, "name": "statusTechnicalManufacturerSpecificMessage", "dataType":
"string", "multiplicity": "*", "info": "Array of manufacturer-specific status codes."},
    { "intId": 4, "name": "systemDescription", "dataType": "string"},
    { "intId": 5, "name": "operatingSystem", "dataType": "string"},
    { "intId": 6, "name": "operationStatus", "enumType": "ControllerOperationStatus"},
    { "intId": 7, "name": "coolingFanStatus", "enumType": "CoolingFanStatus"},
    { "intId": 8, "name": "temperatureStatus", "enumType": "TemperatureStatus"},
    { "intId": 9, "name": "cpuHealthStatus", "enumType": "CpuHealthStatus"},
    { "intId": 10, "name": "cpuLoadStatus", "enumType": "CpuLoadStatus"},
    { "intId": 11, "name": "ramSize", "dataType": "uint64"},
    { "intId": 12, "name": "ramHealthStatus", "enumType": "RamHealthStatus"},
    { "intId": 13, "name": "bootingLastDateTime", "dataType": "timestamp"},
    { "intId": 14, "name": "bootingLastReason", "enumType": "BootingLastReason"},
    { "intId": 16, "name": "label", "dataType": "string"}
  ]
},
{
  "name": "PhysicalNetworkInterface",
  "belongsToSubPackage": "equipment",
  "info": "PhysicalNetworkInterface",
  "attrs": [
    { "intId": 1, "name": "id", "dataType": "string", "key": "global"},
    { "intId": 2, "name": "statusTechnical", "enumType": "StatusTechnical", "info": "General
technical status of the equipment."},
    { "intId": 3, "name": "statusTechnicalManufacturerSpecificMessage", "dataType":
"string", "multiplicity": "*", "info": "Array of manufacturer-specific status codes."},
    { "intId": 4, "name": "macAddress", "dataType": "string"},
    { "intId": 5, "name": "operationStatus", "enumType":
"PhysicalNetworkInterfaceOperationalStatus"},
    { "intId": 6, "name": "nominalBandwidth", "dataType": "uint32"},
    { "intId": 7, "name": "label", "dataType": "string"}
  ]
},
{
  "name": "StorageMediumFlash",
  "belongsToSubPackage": "equipment",
  "info": "StorageMediumFlash",

```

```

    "attrs": [
      { "intId": 1, "name": "id", "dataType": "string", "key": "global"},
      { "intId": 2, "name": "statusTechnical", "enumType": "StatusTechnical", "info": "General
technical status of the equipment."},
      { "intId": 3, "name": "statusTechnicalManufacturerSpecificMessage", "dataType":
"string", "multiplicity": "*", "info": "Array of manufacturer-specific status codes."},
      { "intId": 4, "name": "memorySize", "dataType": "uint32"},
      { "intId": 5, "name": "temperatureStatus", "enumType": "TemperatureStatus"},
      { "intId": 6, "name": "label", "dataType": "string"},
      { "intId": 7, "name": "wearStatus", "enumType": "WearStatus"}
    ]
  },
  {
    "name": "PowerSupply",
    "belongsToSubPackage": "equipment",
    "info": "PowerSupply",
    "attrs": [
      { "intId": 1, "name": "id", "dataType": "string", "key": "global"},
      { "intId": 2, "name": "statusTechnical", "enumType": "StatusTechnical", "info": "General
technical status of the equipment."},
      { "intId": 3, "name": "statusTechnicalManufacturerSpecificMessage", "dataType":
"string", "multiplicity": "*", "info": "Array of manufacturer-specific status codes."},
      { "intId": 4, "name": "inputVoltageStatus", "enumType": "VoltageStatus"},
      { "intId": 5, "name": "outputVoltageStatus", "enumType": "VoltageStatus"},
      { "intId": 6, "name": "outputPower", "dataType": "uint32"},
      { "intId": 7, "name": "outputPowerLimit", "dataType": "uint32"},
      { "intId": 8, "name": "temperatureStatus", "enumType": "TemperatureStatus"},
      { "intId": 9, "name": "label", "dataType": "string"},
      { "intId": 10, "name": "inputVoltage", "dataType": "float"},
      { "intId": 11, "name": "inputCurrent", "dataType": "float"}
    ]
  },
  {
    "name": "PhysicalDigitalOutput",
    "belongsToSubPackage": "equipment",
    "info": "PhysicalDigitalOutput",
    "attrs": [
      { "intId": 1, "name": "id", "dataType": "string", "key": "global"},
      { "intId": 2, "name": "statusTechnical", "enumType": "StatusTechnical", "info": "General

```

```

technical status of the equipment."},
    { "intId": 3, "name": "statusTechnicalManufacturerSpecificMessage", "dataType":
"string", "multiplicity": "*", "info": "Array of manufacturer-specific status codes."},
    { "intId": 4, "name": "label", "dataType": "string"},
    { "intId": 5, "name": "physicalOutputValue", "enumType": "HighLow"},
    { "intId": 6, "name": "outputVoltage", "dataType": "float"},
    { "intId": 7, "name": "outputCurrent", "dataType": "float"}
  ]
},
{
  "name": "PhysicalAnalogOutput",
  "belongsToSubPackage": "equipment",
  "info": "PhysicalAnalogOutput",
  "attrs": [
    { "intId": 1, "name": "id", "dataType": "string", "key": "global"},
    { "intId": 2, "name": "statusTechnical", "enumType": "StatusTechnical", "info": "General
technical status of the equipment."},
    { "intId": 3, "name": "statusTechnicalManufacturerSpecificMessage", "dataType":
"string", "multiplicity": "*", "info": "Array of manufacturer-specific status codes."},
    { "intId": 4, "name": "label", "dataType": "string"},
    { "intId": 5, "name": "voltage", "dataType": "float"},
    { "intId": 6, "name": "current", "dataType": "float"}
  ]
},
{
  "name": "PhysicalSeparatedOutput",
  "belongsToSubPackage": "equipment",
  "info": "PhysicalSeparatedOutput",
  "attrs": [
    { "intId": 1, "name": "id", "dataType": "string", "key": "global"},
    { "intId": 2, "name": "statusTechnical", "enumType": "StatusTechnical", "info": "General
technical status of the equipment."},
    { "intId": 3, "name": "statusTechnicalManufacturerSpecificMessage", "dataType":
"string", "multiplicity": "*", "info": "Array of manufacturer-specific status codes."},
    { "intId": 4, "name": "label", "dataType": "string"},
    { "intId": 6, "name": "outputValue", "enumType": "OutputValue"}
  ]
},
{
  "name": "PhysicalDigitalInput",

```

```

    "belongsToSubPackage": "equipment",
    "info": "PhysicalDigitalInput",
    "attrs": [
      { "intId": 1, "name": "id", "dataType": "string", "key": "global"},
      { "intId": 2, "name": "statusTechnical", "enumType": "StatusTechnical", "info": "General
technical status of the equipment."},
      { "intId": 3, "name": "statusTechnicalManufacturerSpecificMessage", "dataType":
"string", "multiplicity": "*", "info": "Array of manufacturer-specific status codes."},
      { "intId": 4, "name": "label", "dataType": "string"},
      { "intId": 5, "name": "physicalInputValue", "enumType": "HighLow"},
      { "intId": 6, "name": "inputVoltage", "dataType": "float"},
      { "intId": 7, "name": "inputCurrent", "dataType": "float"}
    ]
  },
  {
    "name": "PhysicalAnalogInput",
    "belongsToSubPackage": "equipment",
    "info": "PhysicalAnalogInput",
    "attrs": [
      { "intId": 1, "name": "id", "dataType": "string", "key": "global"},
      { "intId": 2, "name": "statusTechnical", "enumType": "StatusTechnical", "info": "General
technical status of the equipment."},
      { "intId": 3, "name": "statusTechnicalManufacturerSpecificMessage", "dataType":
"string", "multiplicity": "*", "info": "Array of manufacturer-specific status codes."},
      { "intId": 4, "name": "label", "dataType": "string"},
      { "intId": 5, "name": "voltage", "dataType": "float"},
      { "intId": 6, "name": "current", "dataType": "float"}
    ]
  },
  {
    "name": "PhysicalSeparatedInput",
    "belongsToSubPackage": "equipment",
    "info": "PhysicalSeparatedInput",
    "attrs": [
      { "intId": 1, "name": "id", "dataType": "string", "key": "global"},
      { "intId": 2, "name": "statusTechnical", "enumType": "StatusTechnical", "info": "General
technical status of the equipment."},
      { "intId": 3, "name": "statusTechnicalManufacturerSpecificMessage", "dataType":
"string", "multiplicity": "*", "info": "Array of manufacturer-specific status codes."},

```

```

        { "intId": 4, "name": "label", "dataType": "string"},
        { "intId": 5, "name": "inputValue", "enumType": "InputValue"}
    ]
},
{
    "name": "AuxiliaryInput",
    "belongsToSubPackage": "equipment",
    "info": "AuxiliaryInput",
    "attrs": [
        { "intId": 1, "name": "id", "dataType": "string", "key": "global"},
        { "intId": 2, "name": "label", "dataType": "string"}
    ]
},
{
    "name": "InputSwitch",
    "belongsToSubPackage": "equipment",
    "info": "InputSwitch",
    "attrs": [
        { "intId": 1, "name": "id", "dataType": "string", "key": "global"},
        { "intId": 2, "name": "label", "dataType": "string"},
        { "intId": 3, "name": "inputSwitchPosition", "enumType": "InputSwitchPosition"},
        { "intId": 4, "name": "auxiliaryInput", "composition": "AuxiliaryInput", "info": "refers to
AuxiliarySwitch"}
    ]
},
{
    "name": "InputButton",
    "belongsToSubPackage": "equipment",
    "info": "InputButton",
    "attrs": [
        { "intId": 1, "name": "id", "dataType": "string", "key": "global"},
        { "intId": 2, "name": "label", "dataType": "string"},
        { "intId": 3, "name": "isPressed", "dataType": "boolean"},
        { "intId": 4, "name": "auxiliaryInput", "composition": "AuxiliaryInput"}
    ]
}
]
}

```