



European Network of  
Transmission System Operators  
for Electricity

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# NETWORK CODES CANONICAL EXTENSIONS SPECIFICATION

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2022-09-21

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SOC APPROVED  
VERSION 2.1

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## 1 Introduction

This document describes CIM extensions that were designed for the purpose of network codes related exchanges. The set of profiles which use these extensions could be applied for other exchanges too. Therefore, the objective is to propose these extensions for appropriate standardisation in IEC.

The Coordinated Security Analysis data exchange specification by ENTSO-E shall be used as a reference in order to understand the context, use cases and the terms and definitions considered while designing the canonical extensions.

## 2 Specification documents references

The following specification documents, in whole or in part, are referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

- ENTSO-E Coordinated Security Analysis data exchange specification;

## 3 Network codes extensions

### 3.1 General

This package contains the extensions defined for the need of Network codes (NC) data exchanges.

### 3.2 ExtNetworkCodesCIMVersion root class

The version information assigned to the extensions defined for the need of network codes data exchanges.

Table 1 shows all attributes of ExtNetworkCodesCIMVersion.

**Table 1 – Attributes of ExtNetworkCodes::ExtNetworkCodesCIMVersion**

name	mult	type	description
date	0..1	Date	(const=2022-05-31) Date of the last canonical model update. Form is YYYY-MM-DD. For example, for 5 January 2009 it is 2009-01-05.
version	0..1	String	(const=2.1) European namespace URI. The last two elements in the URI ( <a href="http://iec.ch/TC57/CIM100-EuropeanExtension/yy/zzz#">http://iec.ch/TC57/CIM100-EuropeanExtension/yy/zzz#</a> ) indicate major and minor versions where: - yy - indicates a major version; - zzz - indicates a minor version.

### 3.3 Package ExtArea

#### 3.3.1 General

This package contains the extensions related to the areas.

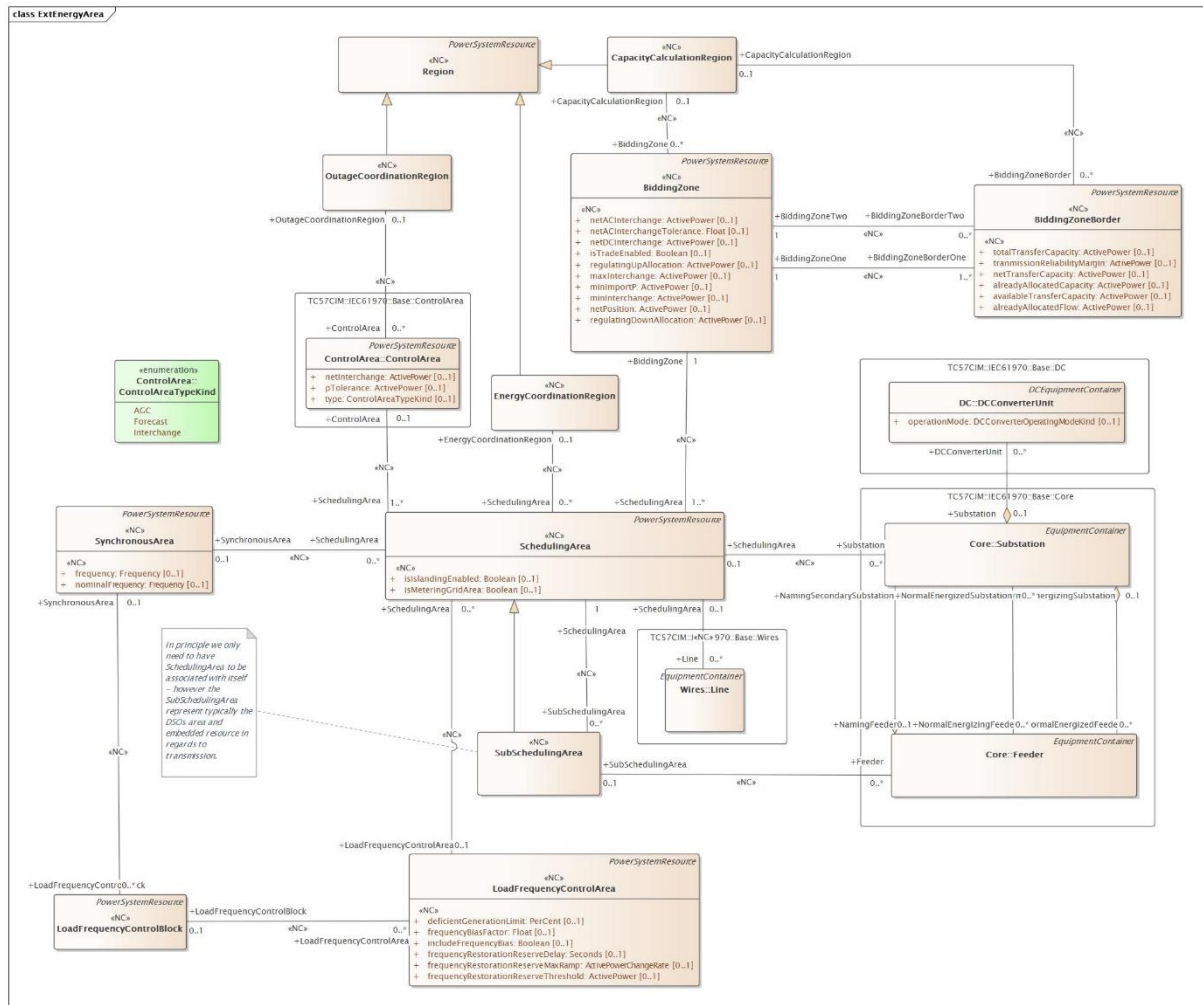


Figure 1 – Class diagram ExtArea::ExtEnergyArea

Figure 1: The diagram contains classes related to energy area.

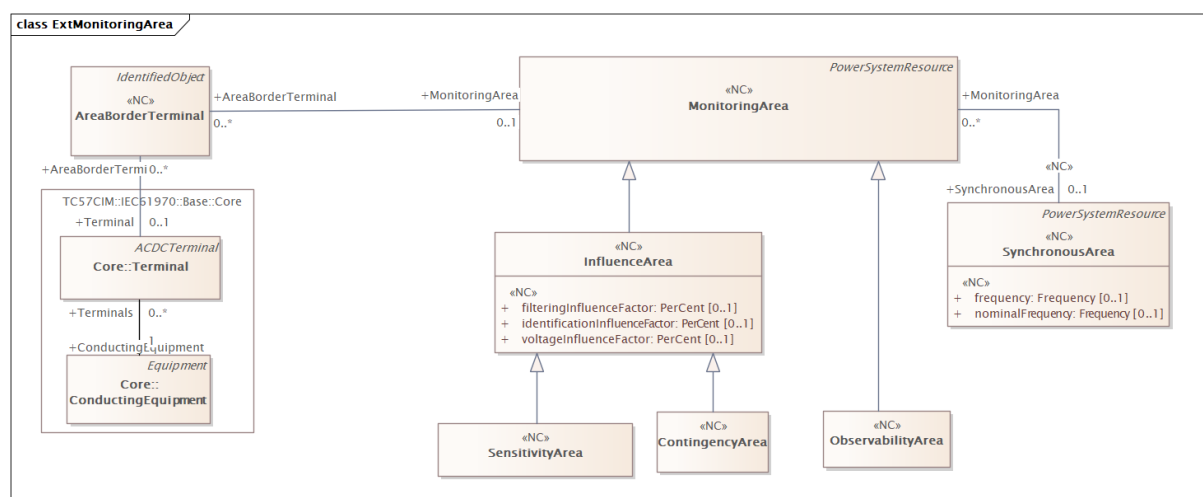
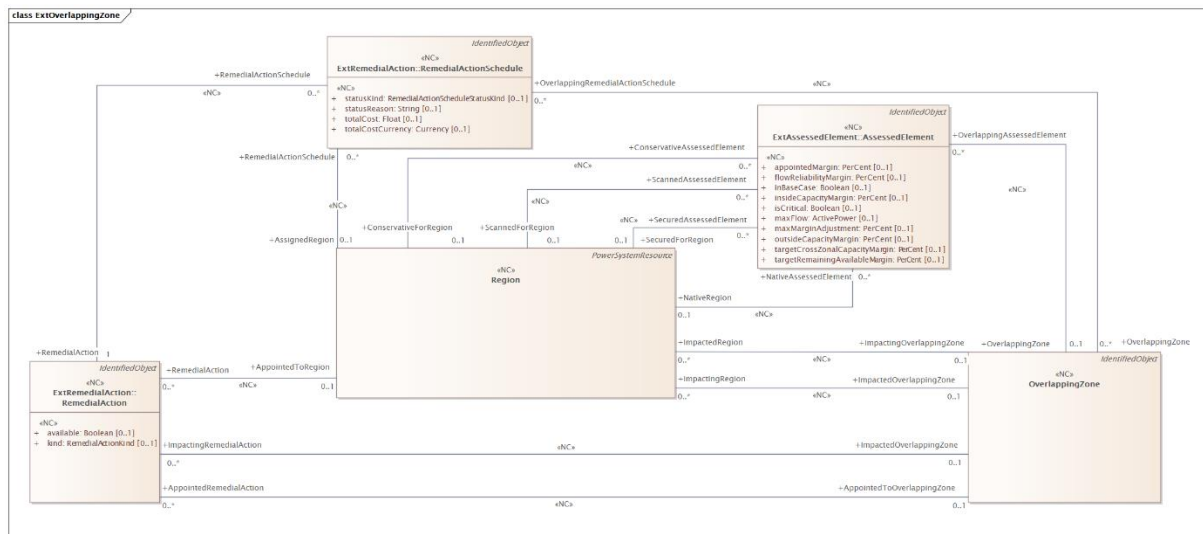


Figure 2 – Class diagram ExtArea::ExtMonitoringArea

Figure 2: This diagram shows control area specification and some related classes. The Terminal to AnalogValue linkages are shown for clarity in understanding the control area specification. The GeneratingUnit to Terminal linkages are also shown to illustrate how generation flows are specifically tied to the network.



**Figure 3 – Class diagram ExtArea::ExtOverlappingZone**

Figure 3: The diagram contains classes related to overlapping zone.

### 3.3.2 (NC) AreaBorderTerminal

Inheritance path = IdentifiedObject : ExtEulIdentifiedObject

The terminal defining the border of the area.

Table 2 shows all attributes of AreaBorderTerminal.

**Table 2 – Attributes of ExtArea::AreaBorderTerminal**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 3 shows all association ends of AreaBorderTerminal with other classes.

**Table 3 – Association ends of ExtArea::AreaBorderTerminal with other classes**

mult from	name	mult to	type	description
0..*	Terminal	0..1	Terminal	The Terminal that is part of an AreaBorderTerminal.
0..*	MonitoringArea	0..1	<a href="#">MonitoringArea</a>	The MonitoringArea defined by this AreaBorderTerminal.
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject

mult from	name	mult to	type	description
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

920

921 **3.3.3 (NC) BiddingZone**

922 Inheritance path = PowerSystemResource : IdentifiedObject : ExtEulIdentifiedObject

923 A bidding zone is a market-based method for handling power transmission congestion. It  
924 consists of scheduling areas that include the relevant production (supply) and consumption  
925 (demand) to form an electrical area with the same market price without capacity allocation.

926 Table 4 shows all attributes of BiddingZone.

927

**Table 4 – Attributes of ExtArea::BiddingZone**

name	mult	type	description
isTradeEnabled	0..1	Boolean	(NC) Identifies the mechanism for determining the energy price for a given bidding zone. If true, the bid and the offer is expected to be provided for the bidding zone to create the market price. If false, other mechanism determines the price of energy for a given bidding zone, e.g. virtual bidding zone.
netACInterchange	0..1	ActivePower	(NC) The netted aggregation of all AC external schedules of an area. Positive sign means flow into the area (Import).
netACInterchangeTolerance	0..1	Float	(NC) The area AC Net Position tolerance.
netDCInterchange	0..1	ActivePower	(NC) The netted aggregation of all DC external schedules of an area. Positive sign means flow into the area.
regulatingUpAllocation	0..1	ActivePower	(NC) The balancing capacity allocated for regulating up, by increasing the production, decrease the direct current export, increase direct current import or reducing the consumption of energy in the bidding zone. This must be a positive number.
maxInterchange	0..1	ActivePower	(NC) Maximum total active power (AC and DC) that the net position for the bidding zone can have to maintain operational security. Positive sign means flow into the bidding zone.
minImportP	0..1	ActivePower	(NC) Minimum active power.
regulatingDownAllocation	0..1	ActivePower	(NC) The balancing capacity allocated for regulating down, by decreasing the production, increase the direct current export, decrease direct current import or increasing the consumption of energy in the bidding zone. This must be a positive number.
minInterchange	0..1	ActivePower	(NC) Minimum total active power (AC and DC) that the net position for the bidding zone can have to maintain operational security. Negative sign means flow out of the bidding zone.
netPosition	0..1	ActivePower	(NC) Net position is the netted sum of electricity exports and imports for each market time unit for a bidding zone.
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject



name	mult	type	description
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 5 shows all association ends of BiddingZone with other classes.

**Table 5 – Association ends of ExtArea::BiddingZone with other classes**

mult from	name	mult to	type	description
1..1	SchedulingArea	1..*	<a href="#">SchedulingArea</a>	(NC) The scheduling area that has bidding zone.
0..*	CapacityCalculationRegion	0..1	<a href="#">CapacityCalculationRegion</a>	(NC) The capacity calculation region related to this bidding zone.
1..1	BiddingZoneBorderOne	1..*	<a href="#">BiddingZoneBorder</a>	(NC) The primary side of the border.
1..1	BiddingZoneBorderTwo	0..*	<a href="#">BiddingZoneBorder</a>	(NC) The secondary side of the border.
0..1	RedispatchRemedialAction	0..*	<a href="#">RedispatchRemedialAction</a>	(NC)
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.3.4 (NC) BiddingZoneBorder

Inheritance path = PowerSystemResource : IdentifiedObject : ExtEulIdentifiedObject

Defines the aggregated connection capacity between two Bidding Zones.

Table 6 shows all attributes of BiddingZoneBorder.

**Table 6 – Attributes of ExtArea::BiddingZoneBorder**

name	mult	type	description
transmissionReliabilityMargin	0..1	ActivePower	(NC) Transmission Reliability Margin (TRM) is the minimum reserve that system operators must have available at their connections so that they can help other countries to which their system is directly or indirectly connected, if necessary.
totalTransferCapacity	0..1	ActivePower	(NC) Total Transfer Capacity (TTC) is the maximum exchange program between two areas compatible with operational security standards applicable at each system if future network conditions, generation and load patterns were perfectly known in advance.
netTransferCapacity	0..1	ActivePower	(NC) Net Transfer Capacity (NTC) is defined as $NTC = TTC - TRM$ and corresponds to the maximum exchange between two areas



name	mult	type	description
			compatible with operational security limits applicable in both areas and taking into account the technical uncertainties on future network conditions.
alreadyAllocatedCapacity	0..1	ActivePower	(NC) Already Allocated Capacity (AAC) means the total amount of allocated transmission rights i.e. transmission capacity reserved by virtue of historical long-term contracts and the previously held transmission capacity reservation auctions.
availableTransferCapacity	0..1	ActivePower	(NC) Available Transfer Capacity (ATC) means the transmission capacity that remains available, after allocation procedure, to be used under the physical conditions of the transmission system. ATC value is defined as: $ATC = NTC - AAC$ .
alreadyAllocatedFlow	0..1	ActivePower	(NC) The maximum allowed flow on the collection of interconnection between two bidding zones.
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 7 shows all association ends of BiddingZoneBorder with other classes.

**Table 7 – Association ends of ExtArea::BiddingZoneBorder with other classes**

mult from	name	mult to	type	description
1..*	BiddingZoneOne	1..1	<a href="#">BiddingZone</a>	(NC) The bidding zone for the primary side.
0..*	BiddingZoneTwo	1..1	<a href="#">BiddingZone</a>	(NC) The bidding zone for the secondary side.
0..1	CountertradeRemedialAction	0..1	<a href="#">CountertradeRemedialAction</a>	(NC) The CountertradeRemedialAction applied to this BiddingZoneBorder.
0..*	CapacityCalculationRegion	0..1	<a href="#">CapacityCalculationRegion</a>	(NC) The capacity calculation region for which the capacity is derived from.
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

**3.3.5 (NC) CapacityCalculationRegion**

Inheritance path = [Region](#) : PowerSystemResource : IdentifiedObject : ExtEulIdentifiedObject  
 Capacity calculation region is a coherent part of the interconnected system that is used for calculating the transmission capacity for a bidding zone or between bidding zones.  
 Table 8 shows all attributes of CapacityCalculationRegion.

**Table 8 – Attributes of ExtArea::CapacityCalculationRegion**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 9 shows all association ends of CapacityCalculationRegion with other classes.

**Table 9 – Association ends of ExtArea::CapacityCalculationRegion with other classes**

mult from	name	mult to	type	description
0..1	BiddingZoneBorder	0..*	<a href="#">BiddingZoneBorder</a>	(NC) The bidding zone border on which the capacity is calculated.
0..1	BiddingZone	0..*	<a href="#">BiddingZone</a>	(NC) The bidding zone for this capacity calculation region.
0..*	SecurityCoordinator	0..1	<a href="#">SecurityCoordinator</a>	(NC) The security coordinator responsible for the capacity calculation region.
0..1	ConservativeAssessedElement	0..*	<a href="#">AssessedElement</a>	(NC) inherited from: <a href="#">Region</a>
0..1	RemedialAction	0..*	<a href="#">RemedialAction</a>	(NC) inherited from: <a href="#">Region</a>
0..1	SecuredAssessedElement	0..*	<a href="#">AssessedElement</a>	(NC) inherited from: <a href="#">Region</a>
0..1	RemedialActionSchedule	0..*	<a href="#">RemedialActionSchedule</a>	(NC) inherited from: <a href="#">Region</a>
0..1	LimitViolation	0..*	<a href="#">LimitViolation</a>	(NC) inherited from: <a href="#">Region</a>
0..*	ImpactingOverlappingZone	0..1	<a href="#">OverlappingZone</a>	(NC) inherited from: <a href="#">Region</a>
0..*	ImpactedOverlappingZone	0..1	<a href="#">OverlappingZone</a>	(NC) inherited from: <a href="#">Region</a>
0..1	ScannedAssessedElement	0..*	<a href="#">AssessedElement</a>	(NC) inherited from: <a href="#">Region</a>
0..1	NativeAssessedElement	0..*	<a href="#">AssessedElement</a>	(NC) inherited from: <a href="#">Region</a>
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject

mult from	name	mult to	type	description
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.3.6 (NC) ContingencyArea

Inheritance path = [InfluenceArea](#) : [MonitoringArea](#) : PowerSystemResource : IdentifiedObject : ExtEulIdentifiedObject

A monitoring area that defines the required contingency elements including elements that are outside its own control area. This includes elements that are part of the external contingency list.

Table 10 shows all attributes of ContingencyArea.

**Table 10 – Attributes of ExtArea::ContingencyArea**

name	mult	type	description
identificationInfluenceFactor	0..1	PerCent	(NC) inherited from: <a href="#">InfluenceArea</a>
filteringInfluenceFactor	0..1	PerCent	(NC) inherited from: <a href="#">InfluenceArea</a>
voltageInfluenceFactor	0..1	PerCent	(NC) inherited from: <a href="#">InfluenceArea</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 11 shows all association ends of ContingencyArea with other classes.

**Table 11 – Association ends of ExtArea::ContingencyArea with other classes**

mult from	name	mult to	type	description
0..*	SynchronousArea	0..1	<a href="#">SynchronousArea</a>	(NC) inherited from: <a href="#">MonitoringArea</a>
0..1	AreaBorderTerminal	0..*	<a href="#">AreaBorderTerminal</a>	inherited from: <a href="#">MonitoringArea</a>
0..*	SystemOperator	0..1	<a href="#">SystemOperator</a>	(NC) inherited from: <a href="#">MonitoringArea</a>
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

**3.3.7 (NC) EnergyCoordinationRegion**

Inheritance path = [Region](#) : PowerSystemResource : IdentifiedObject : ExtEulIdentifiedObject  
 A region that has a common organisation or a service that is responsible for alignment of  
 forecast and scheduling of energy.  
 Table 12 shows all attributes of EnergyCoordinationRegion.

**Table 12 – Attributes of ExtArea::EnergyCoordinationRegion**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 13 shows all association ends of EnergyCoordinationRegion with other classes.

**Table 13 – Association ends of ExtArea::EnergyCoordinationRegion with other classes**

mult from	name	mult to	type	description
0..1	SchedulingArea	0..*	<a href="#">SchedulingArea</a>	(NC) The scheduling area that is part of this energy coordination region.
0..*	EnergyAlignmentCoordinator	0..1	<a href="#">EnergyAlignmentCoordinator</a>	(NC) The energy alignment coordinator that operates this energy coordination region.
0..1	ConservativeAssessedElement	0..*	<a href="#">AssessedElement</a>	(NC) inherited from: <a href="#">Region</a>
0..1	RemedialAction	0..*	<a href="#">RemedialAction</a>	(NC) inherited from: <a href="#">Region</a>
0..1	SecuredAssessedElement	0..*	<a href="#">AssessedElement</a>	(NC) inherited from: <a href="#">Region</a>
0..1	RemedialActionSchedule	0..*	<a href="#">RemedialActionSchedule</a>	(NC) inherited from: <a href="#">Region</a>
0..1	LimitViolation	0..*	<a href="#">LimitViolation</a>	(NC) inherited from: <a href="#">Region</a>
0..*	ImpactingOverlappingZone	0..1	<a href="#">OverlappingZone</a>	(NC) inherited from: <a href="#">Region</a>
0..*	ImpactedOverlappingZone	0..1	<a href="#">OverlappingZone</a>	(NC) inherited from: <a href="#">Region</a>
0..1	ScannedAssessedElement	0..*	<a href="#">AssessedElement</a>	(NC) inherited from: <a href="#">Region</a>
0..1	NativeAssessedElement	0..*	<a href="#">AssessedElement</a>	(NC) inherited from: <a href="#">Region</a>
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject

mult from	name	mult to	type	description
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.3.8 (NC) InfluenceArea

Inheritance path = [MonitoringArea](#) : PowerSystemResource : IdentifiedObject : ExtEulIdentifiedObject

Influence area is a monitoring area that is defined by calculating the equipment that is affected by the influence factors.

Table 14 shows all attributes of InfluenceArea.

**Table 14 – Attributes of ExtArea::InfluenceArea**

name	mult	type	description
identificationInfluenceFactor	0..1	PerCent	(NC) Power flow identification influence factor of a network element that is normalised in order to take into account potential impacts induced by differences in Permanently Admissible Transmission Loading (PATL) values.
filteringInfluenceFactor	0..1	PerCent	(NC) Power flow filtering influence factor of a network element not normalised.
voltageInfluenceFactor	0..1	PerCent	(NC) Voltage influence factor of a network element.
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 15 shows all association ends of InfluenceArea with other classes.

**Table 15 – Association ends of ExtArea::InfluenceArea with other classes**

mult from	name	mult to	type	description
0..*	SynchronousArea	0..1	<a href="#">SynchronousArea</a>	(NC) inherited from: <a href="#">MonitoringArea</a>
0..1	AreaBorderTerminal	0..*	<a href="#">AreaBorderTerminal</a>	inherited from: <a href="#">MonitoringArea</a>
0..*	SystemOperator	0..1	<a href="#">SystemOperator</a>	(NC) inherited from: <a href="#">MonitoringArea</a>
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject

mult from	name	mult to	type	description
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.3.9 (NC) LoadFrequencyControlArea

Inheritance path = PowerSystemResource : IdentifiedObject : ExtEulIdentifiedObject

A part of a synchronous area or an entire synchronous area, physically demarcated by points of measurement at interconnectors to other load frequency control (LFC) areas, operated by one or more TSOs fulfilling the obligations of load-frequency control.

Table 16 shows all attributes of LoadFrequencyControlArea.

**Table 16 – Attributes of ExtArea::LoadFrequencyControlArea**

name	mult	type	description
deficientGenerationLimit	0..1	PerCent	(NC) Percentage of average dispatch target plus average regulation used to calculate Deficient Generation Limit. Analyst enterable online. Defaulted to 96 in the model if null, negative, or greater than 100.
frequencyBiasFactor	0..1	Float	(NC) Manually entered frequency bias in MW/Hz.
includeFrequencyBias	0..1	Boolean	(NC) True means the frequency bias that is taken into consideration in the frequency bias computation.
frequencyRestorationReserveDelay	0..1	Seconds	(NC) FRR delay expressed in seconds. Must be a positive multiple of AGC's cycle duration.
frequencyRestorationReserveMaxRamp	0..1	ActivePowerChangeRate	(NC) Maximum authorized ramp for both FRR dispatching and ramp to zero.
frequencyRestorationReserveThreshold	0..1	ActivePower	(NC) Authorized threshold for both FRR dispatching and ramp to zero.
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 17 shows all association ends of LoadFrequencyControlArea with other classes.

**Table 17 – Association ends of ExtArea::LoadFrequencyControlArea with other classes**

mult from	name	mult to	type	description
0..1	SchedulingArea	0..*	<a href="#">SchedulingArea</a>	(NC) The scheduling area that is part of this load frequency control area.
0..*	LoadFrequencyControlBlock	0..1	<a href="#">LoadFrequencyControlBlock</a>	(NC) The load frequency control block that has this load frequency control area.
0..*	FrequencyControlOperator	0..1	<a href="#">LoadFrequencyControlOperator</a>	(NC) The frequency control operator that operates this frequency control area.
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource

mult from	name	mult to	type	description
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

994

995 **3.3.10 (NC) LoadFrequencyControlBlock**

996 Inheritance path = PowerSystemResource : IdentifiedObject : ExtEulIdentifiedObject

997 A part of a synchronous area or an entire synchronous area, physically demarcated by points  
 998 of measurement at interconnectors to other load frequency control (LFC) blocks, consisting of  
 999 one or more LFC areas, operated by one or more TSOs fulfilling the obligations of load-  
 1000 frequency control.

1001 Table 18 shows all attributes of LoadFrequencyControlBlock.

1002

**Table 18 – Attributes of ExtArea::LoadFrequencyControlBlock**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

1003

1004 Table 19 shows all association ends of LoadFrequencyControlBlock with other classes.

1005 **Table 19 – Association ends of ExtArea::LoadFrequencyControlBlock with other**  
 1006 **classes**

mult from	name	mult to	type	description
0..*	SynchronousArea	0..1	<a href="#">SynchronousArea</a>	(NC) The synchronous area that has this load frequency control block.
0..1	LoadFrequencyControlArea	0..*	<a href="#">LoadFrequencyControlArea</a>	(NC) The load frequency control area that is part of this load frequency control block.
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

1007

1008 **3.3.11 (NC) MonitoringArea**

1009 Inheritance path = PowerSystemResource : IdentifiedObject : ExtEulIdentifiedObject

1010 A coherent part of the interconnected electrical power system, that includes the system  
1011 operators' responsibility area and the surrounding parts of other system operators' responsibility  
1012 area, that need to be monitored for security assessment.

1013 Table 20 shows all attributes of MonitoringArea.

1014

**Table 20 – Attributes of ExtArea::MonitoringArea**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

1015

1016 Table 21 shows all association ends of MonitoringArea with other classes.

1017

**Table 21 – Association ends of ExtArea::MonitoringArea with other classes**

mult from	name	mult to	type	description
0..*	SynchronousArea	0..1	<a href="#">SynchronousArea</a>	(NC) The synchronous area that has this monitoring area.
0..1	AreaBorderTerminal	0..*	<a href="#">AreaBorderTerminal</a>	The AreaBorderTerminal which defines the MonitoringArea.
0..*	SystemOperator	0..1	<a href="#">SystemOperator</a>	(NC) The system operator that operates this monitoring area.
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

1018

1019 **3.3.12 (NC) ObservabilityArea**1020 Inheritance path = [MonitoringArea](#) : PowerSystemResource : IdentifiedObject :  
1021 ExtEulIdentifiedObject

1022 A monitoring area that is given by a real time measurement.

1023 Table 22 shows all attributes of ObservabilityArea.



1024

**Table 22 – Attributes of ExtArea::ObservabilityArea**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

1025

1026

Table 23 shows all association ends of ObservabilityArea with other classes.

1027

**Table 23 – Association ends of ExtArea::ObservabilityArea with other classes**

mult from	name	mult to	type	description
0..*	SynchronousArea	0..1	<a href="#">SynchronousArea</a>	(NC) inherited from: <a href="#">MonitoringArea</a>
0..1	AreaBorderTerminal	0..*	<a href="#">AreaBorderTerminal</a>	inherited from: <a href="#">MonitoringArea</a>
0..*	SystemOperator	0..1	<a href="#">SystemOperator</a>	(NC) inherited from: <a href="#">MonitoringArea</a>
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

1028

1029

**3.3.13 (NC) OutageCoordinationRegion**

1030

Inheritance path = [Region](#) : PowerSystemResource : IdentifiedObject : ExtEulIdentifiedObject

1031

A region that has a common organisation or service responsible for outage planning and coordination and its impact on grid operation.

1032

1033

Table 24 shows all attributes of OutageCoordinationRegion.

1034

**Table 24 – Attributes of ExtArea::OutageCoordinationRegion**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

1035

1036

Table 25 shows all association ends of OutageCoordinationRegion with other classes.

1037 **Table 25 – Association ends of ExtArea::OutageCoordinationRegion with other classes**

mult from	name	mult to	type	description
0..1	ControlArea	0..*	ControlArea	(NC) The control area that is part of this outage coordination region.
0..*	SecurityCoordinator	0..1	<a href="#">SecurityCoordinator</a>	(NC) The security coordinator that is responsible for this outage coordination region.
0..*	OutageCoordinator	0..1	<a href="#">OutageCoordinator</a>	(NC) The outage coordinator responsible for this outage coordination region.
0..1	ConservativeAssessedElement	0..*	<a href="#">AssessedElement</a>	(NC) inherited from: <a href="#">Region</a>
0..1	RemedialAction	0..*	<a href="#">RemedialAction</a>	(NC) inherited from: <a href="#">Region</a>
0..1	SecuredAssessedElement	0..*	<a href="#">AssessedElement</a>	(NC) inherited from: <a href="#">Region</a>
0..1	RemedialActionSchedule	0..*	<a href="#">RemedialActionSchedule</a>	(NC) inherited from: <a href="#">Region</a>
0..1	LimitViolation	0..*	<a href="#">LimitViolation</a>	(NC) inherited from: <a href="#">Region</a>
0..*	ImpactingOverlappingZone	0..1	<a href="#">OverlappingZone</a>	(NC) inherited from: <a href="#">Region</a>
0..*	ImpactedOverlappingZone	0..1	<a href="#">OverlappingZone</a>	(NC) inherited from: <a href="#">Region</a>
0..1	ScannedAssessedElement	0..*	<a href="#">AssessedElement</a>	(NC) inherited from: <a href="#">Region</a>
0..1	NativeAssessedElement	0..*	<a href="#">AssessedElement</a>	(NC) inherited from: <a href="#">Region</a>
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

1038

1039 **3.3.14 (NC) OverlappingZone**

1040 Inheritance path = IdentifiedObject : ExtEuIdentifiedObject

1041 A collection of all the overlapping cross border assessed elements which have the same sets  
1042 of impacted and impacting regions.

1043 Table 26 shows all attributes of OverlappingZone.

1044 **Table 26 – Attributes of ExtArea::OverlappingZone**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject

name	mult	type	description
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 27 shows all association ends of OverlappingZone with other classes.

**Table 27 – Association ends of ExtArea::OverlappingZone with other classes**

mult from	name	mult to	type	description
0..1	ImpactingRemedialAction	0..*	<a href="#">RemedialAction</a>	(NC) The remedial action that is impacting an overlapping zone.
0..1	AppointedRemedialAction	0..*	<a href="#">RemedialAction</a>	(NC) The appointed remedial action that is appointed to an overlapping zone.
0..1	OverlappingAssessedElement	0..*	<a href="#">AssessedElement</a>	(NC) The overlapping assessed element on which the physical flows are significantly impacted by electricity exchanges in two or more regions or by remedial actions from two or more regions.
0..*	OverlappingRemedialActionSchedule	0..*	<a href="#">RemedialActionSchedule</a>	(NC) The remedial action schedule which is overlapping for this zone.
0..1	ImpactedRegion	0..*	<a href="#">Region</a>	(NC) The region that is impacted by this overlapping zone.
0..1	ImpactingRegion	0..*	<a href="#">Region</a>	(NC) The region that is impacting this overlapping zone.
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.3.15 (NC) Region

Inheritance path = PowerSystemResource : IdentifiedObject : ExtEulIdentifiedObject

A region where the system operator belongs to.

Table 28 shows all attributes of Region.

**Table 28 – Attributes of ExtArea::Region**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 29 shows all association ends of Region with other classes.

1056

**Table 29 – Association ends of ExtArea::Region with other classes**

mult from	name	mult to	type	description
0..1	ConservativeAssessedElement	0..*	<a href="#">AssessedElement</a>	(NC) The assessed element which is considered conservative for this region.
0..1	RemedialAction	0..*	<a href="#">RemedialAction</a>	(NC) The remedial action which is considered in the region.
0..1	SecuredAssessedElement	0..*	<a href="#">AssessedElement</a>	(NC) The assessed element secured for this region.
0..1	RemedialActionSchedule	0..*	<a href="#">RemedialActionSchedule</a>	(NC) The remedial action schedule relevant for this region.
0..1	LimitViolation	0..*	<a href="#">LimitViolation</a>	(NC) The limit violation reported by a region.
0..*	ImpactingOverlappingZone	0..1	<a href="#">OverlappingZone</a>	(NC) The overlapping zone which is impacting this impacted region.
0..*	ImpactedOverlappingZone	0..1	<a href="#">OverlappingZone</a>	(NC) The overlapping zone which is impacted by this impacting region.
0..1	ScannedAssessedElement	0..*	<a href="#">AssessedElement</a>	(NC) These are the scanned assessed elements for a region.
0..1	NativeAssessedElement	0..*	<a href="#">AssessedElement</a>	(NC) The native assessed element for a native region.
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

1057

**3.3.16 (NC) ScheduleResource**

1059 Inheritance path = PowerSystemResource : IdentifiedObject : ExtEulIdentifiedObject

1060 A schedule resource is a market-based method for handling participation of small units,  
 1061 particularly located on the lower voltage level that is controlled by a Distributed System  
 1062 Operator (DSO). It is a collection of units that can operate in the market by providing bids, offers  
 1063 and a resulting committed operational schedule for the collection.

1064 Table 30 shows all attributes of ScheduleResource.

1065

**Table 30 – Attributes of ExtArea::ScheduleResource**

name	mult	type	description
participationFactor	0..1	Float	Situation economic participation factor.
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject

name	mult	type	description
energyIdCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 31 shows all association ends of ScheduleResource with other classes.

**Table 31 – Association ends of ExtArea::ScheduleResource with other classes**

mult from	name	mult to	type	description
0..1	AreaDispatchableUnit	0..*	<a href="#">AreaDispatchableUnit</a>	(NC) The dispatchable unit for this scheduled resource.
0..1	PowerElectronicsUnit	0..*	PowerElectronicsUnit	(NC) The power electronics unit that relates to this schedule resource.
0..1	GeneratingUnit	0..*	GeneratingUnit	(NC) The generating unit that relates to this schedule resource.
0..1	HydroPump	0..*	HydroPump	(NC) The hydro pump that relates to this schedule resource.
0..*	SchedulingArea	0..1	<a href="#">SchedulingArea</a>	(NC) The scheduling area that has this schedule resource.
0..*	ResourceOf	0..1	<a href="#">ScheduleResource</a>	(NC) The schedule resource that has this subschedule resource.
0..1	GLSKSchedule	0..*	<a href="#">GLSKSchedule</a>	(NC) The GLSK schedule for a schedule resource.
0..1	RedispatchAction	0..*	<a href="#">RedispatchAction</a>	(NC) The redispatch action that relates to this schedule resource.
0..1	SubScheduleResource	0..*	<a href="#">ScheduleResource</a>	(NC) The subschedule resource that relates to the schedule resource.
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.3.17 (NC) SchedulingArea

Inheritance path = PowerSystemResource : IdentifiedObject : ExtEulIdentifiedObject

An area where production and/or consumption of energy can be forecasted, scheduled and measured. The area is operated by only one system operator, typically a Transmission System Operator (TSO). The area can consist of a sub area, which has the same definition as the main area, but it can be operated by another system operator (typically Distributed System Operator (DSO) or a Closed Distributed System Operator (CDSO)). This includes microgrid concept. A substation is the smallest grouping that can be included in the area. The area size should be considered in terms of the possibility of accumulated reading (settlement metering) and the capability of operating as an island.

Table 32 shows all attributes of SchedulingArea.

1081

**Table 32 – Attributes of ExtArea::SchedulingArea**

name	mult	type	description
isIslandingEnabled	0..1	Boolean	(NC) Identifies if the area can operate in island operation. If true, the area is enabled (capable) of operating as an electrical island. If false, the area does not have the capability or it is not enabled to operate as an electrical island.
isMeteringGridArea	0..1	Boolean	(NC) Identifies if the area is settlement metered for all import and export to the area. If true, the area is metered area. If false, it is not.
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

1082

1083

Table 33 shows all association ends of SchedulingArea with other classes.

1084

**Table 33 – Association ends of ExtArea::SchedulingArea with other classes**

mult from	name	mult to	type	description
0..1	DCPole	0..*	<a href="#">DCPole</a>	(NC) The DC pole that is part of this scheduling area.
1..*	ControlArea	0..1	ControlArea	(NC) The control area for this scheduling area.
0..1	Line	0..*	Line	(NC) The line that is part of this scheduling area.
0..1	Substation	0..*	Substation	(NC) The substation that is part of this scheduling area.
1..*	BiddingZone	1..1	<a href="#">BiddingZone</a>	(NC) The bidding zone related to this scheduling area.
0..*	EnergyCoordinationRegion	0..1	<a href="#">EnergyCoordinationRegion</a>	(NC) The energy coordination region that has this scheduling area.
0..*	LoadFrequencyControlArea	0..1	<a href="#">LoadFrequencyControlArea</a>	(NC) The load frequency control area which has this scheduling area.
0..1	ScheduleResource	0..*	<a href="#">ScheduleResource</a>	(NC) The schedule resource that belongs to this scheduled area.
1..1	AreaDispatchableUnit	0..*	<a href="#">AreaDispatchableUnit</a>	(NC) The area dispatchable unit related to a scheduling area.
0..1	EnergyGroup	0..*	<a href="#">EnergyGroup</a>	(NC) The energy group belonging to a given energy scheduling area.
1..1	SubSchedulingArea	0..*	<a href="#">SubSchedulingArea</a>	(NC) The subscheduling area that belongs to this scheduling area.
0..*	SynchronousArea	0..1	<a href="#">SynchronousArea</a>	(NC) The synchronous area that has this scheduling area.
0..*	SystemOperator	0..1	<a href="#">SystemOperator</a>	(NC) The system operator for this scheduling area.
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource

mult from	name	mult to	type	description
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.3.18 (NC) SensitivityArea

Inheritance path = [InfluenceArea](#) : [MonitoringArea](#) : PowerSystemResource : IdentifiedObject : ExtEulIdentifiedObject

A monitoring area that defines the required observability area given by the sensitivity factors. Table 34 shows all attributes of SensitivityArea.

**Table 34 – Attributes of ExtArea::SensitivityArea**

name	mult	type	description
identificationInfluenceFactor	0..1	PerCent	(NC) inherited from: <a href="#">InfluenceArea</a>
filteringInfluenceFactor	0..1	PerCent	(NC) inherited from: <a href="#">InfluenceArea</a>
voltageInfluenceFactor	0..1	PerCent	(NC) inherited from: <a href="#">InfluenceArea</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 35 shows all association ends of SensitivityArea with other classes.

**Table 35 – Association ends of ExtArea::SensitivityArea with other classes**

mult from	name	mult to	type	description
0..*	SynchronousArea	0..1	<a href="#">SynchronousArea</a>	(NC) inherited from: <a href="#">MonitoringArea</a>
0..1	AreaBorderTerminal	0..*	<a href="#">AreaBorderTerminal</a>	inherited from: <a href="#">MonitoringArea</a>
0..*	SystemOperator	0..1	<a href="#">SystemOperator</a>	(NC) inherited from: <a href="#">MonitoringArea</a>
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject



mult from	name	mult to	type	description
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.3.19 (NC) SubSchedulingArea

Inheritance path = [SchedulingArea](#) : PowerSystemResource : IdentifiedObject : ExtEulIdentifiedObject

An area that is a specialisation of scheduling area that is a part of another scheduling area. Typically part of a Transmission System Operator (TSO) scheduling area which is typically operated by a Distributed System Operator (DSO) or a Close Distributed System Operator (CDSO). This includes microgrid concept. A sub scheduling area can contain other sub areas. A sub scheduling area leaf will form the smallest entity of any given energy area. Table 36 shows all attributes of SubSchedulingArea.

**Table 36 – Attributes of ExtArea::SubSchedulingArea**

name	mult	type	description
isIslandingEnabled	0..1	Boolean	(NC) inherited from: <a href="#">SchedulingArea</a>
isMeteringGridArea	0..1	Boolean	(NC) inherited from: <a href="#">SchedulingArea</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 37 shows all association ends of SubSchedulingArea with other classes.

**Table 37 – Association ends of ExtArea::SubSchedulingArea with other classes**

mult from	name	mult to	type	description
0..*	SchedulingArea	1..1	<a href="#">SchedulingArea</a>	(NC) The scheduling area that has this subscheduling area.
0..1	Feeder	0..*	Feeder	(NC) The feeder that is part of this subscheduling area.
0..1	DCPole	0..*	<a href="#">DCPole</a>	(NC) inherited from: <a href="#">SchedulingArea</a>
1..*	ControlArea	0..1	ControlArea	(NC) inherited from: <a href="#">SchedulingArea</a>
0..1	Line	0..*	Line	(NC) inherited from: <a href="#">SchedulingArea</a>
0..1	Substation	0..*	Substation	(NC) inherited from: <a href="#">SchedulingArea</a>
1..*	BiddingZone	1..1	<a href="#">BiddingZone</a>	(NC) inherited from: <a href="#">SchedulingArea</a>
0..*	EnergyCoordinationRegion	0..1	<a href="#">EnergyCoordinationRegion</a>	(NC) inherited from: <a href="#">SchedulingArea</a>
0..*	LoadFrequencyControlArea	0..1	<a href="#">LoadFrequencyControlArea</a>	(NC) inherited from: <a href="#">SchedulingArea</a>
0..1	ScheduleResource	0..*	<a href="#">ScheduleResource</a>	(NC) inherited from: <a href="#">SchedulingArea</a>
1..1	AreaDispatchableUnit	0..*	<a href="#">AreaDispatchableUnit</a>	(NC) inherited from: <a href="#">SchedulingArea</a>
0..1	EnergyGroup	0..*	<a href="#">EnergyGroup</a>	(NC) inherited from: <a href="#">SchedulingArea</a>

mult from	name	mult to	type	description
1..1	SubSchedulingArea	0..*	<a href="#">SubSchedulingArea</a>	(NC) inherited from: <a href="#">SchedulingArea</a>
0..*	SynchronousArea	0..1	<a href="#">SynchronousArea</a>	(NC) inherited from: <a href="#">SchedulingArea</a>
0..*	SystemOperator	0..1	<a href="#">SystemOperator</a>	(NC) inherited from: <a href="#">SchedulingArea</a>
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

1109

1110 **3.3.20 (NC) SynchronousArea**

1111 Inheritance path = PowerSystemResource : IdentifiedObject : ExtEulIdentifiedObject

1112 A Synchronous Area is an electrical area covered by interconnect with a common System  
1113 Frequency in a steady-state.

1114 Table 38 shows all attributes of SynchronousArea.

1115 **Table 38 – Attributes of ExtArea::SynchronousArea**

name	mult	type	description
frequency	0..1	Frequency	(NC) The frequency of the electrical power system that can be measured in all network areas of the synchronous system under the assumption of a coherent value for the system in the time frame of seconds (with minor differences between different measurement locations only).
nominalFrequency	0..1	Frequency	(NC) The nominal frequency for the Synchronous Area, e.g. 50 Hz for Europe.
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

1116

1117 Table 39 shows all association ends of SynchronousArea with other classes.

1118 **Table 39 – Association ends of ExtArea::SynchronousArea with other classes**

mult from	name	mult to	type	description
0..1	SchedulingArea	0..*	<a href="#">SchedulingArea</a>	(NC) The scheduling area that is part of this synchronous area.

mult from	name	mult to	type	description
0..1	LoadFrequencyControlBlock	0..*	<a href="#">LoadFrequencyControlBlock</a>	(NC) The load frequency control block that is part of this synchronous area.
0..1	MonitoringArea	0..*	<a href="#">MonitoringArea</a>	(NC) The monitoring area that is part of this synchronous area.
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

1119

1120 **3.4 Assessed element extensions**1121 **3.4.1 General**

1122 This package contains the extensions related to the assessed element.

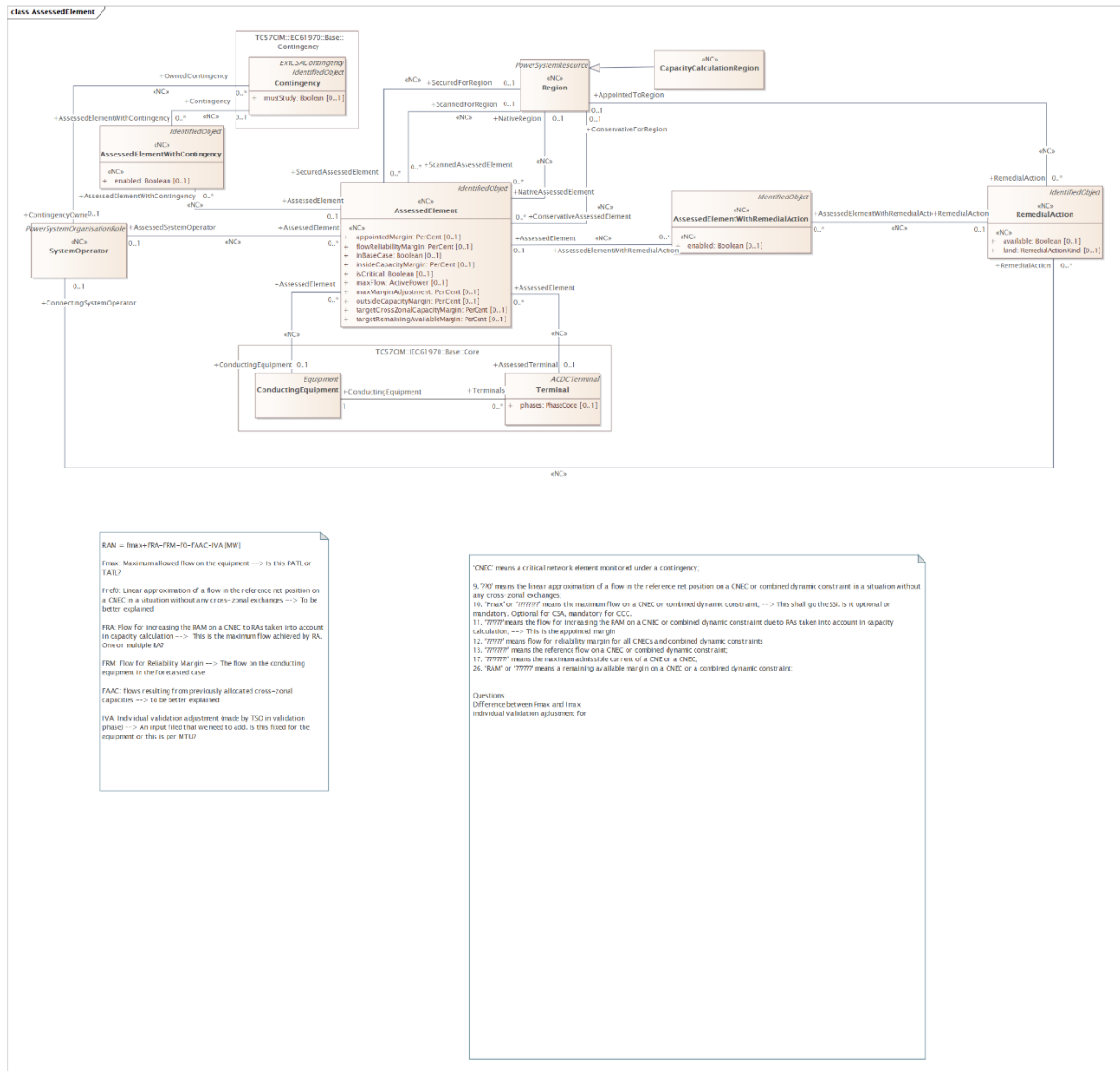


Figure 4 – Class diagram ExtAssessedElement::AssessedElement

Figure 4: The diagram contains classes related to assessed element.

### 3.4.2 (NC) AssessedElement

Inheritance path = IdentifiedObject : ExtEulIdentifiedObject

Assessed element is a network element for which the electrical state is evaluated in the regional or cross-regional process and which value is expected to fulfil regional rules function of the operational security limits.

The information of the validity period of the assessed element is derived from the conducting equipment.

The measurements and limits are as defined in the steady state hypothesis.

Table 40 shows all attributes of AssessedElement.

Table 40 – Attributes of ExtAssessedElement::AssessedElement

name	mult	type	description
appointedMargin	0..1	PerCent	(NC) The percentage (appointed to a region) of the remaining margin obtained in the grid model to reach its current limit. The maximum

name	mult	type	description
			percentage shall by default be 10% of the remaining margin. It is only used when an assessed element is considered conservative for a region.
inBaseCase	0..1	Boolean	(NC) Indicates if the assessed element is scanned in the base case. True means that the assessed element is scanned in the base case. False means it is not scanned in the base case. In case of false the association AssessedElement.Contingency is required.
maxFlow	0..1	ActivePower	(NC) Maximum flow on an a conducting equipment or a collection of conducting equipment forming a power transfer corridor. For assessed elements that is becomes critical due to contingency, this value represents the maximum flow with remedial action taken into consideration.
targetCrossZonalCapacityMargin	0..1	PerCent	(NC) Agreed target margin for the cross zonal capacity trading given by the percentage of a zero exchange situation flow (Net position equals zero) and maximum flow. In other words, when bidding zone exchange equals 0 MW commercially (in the market), the assessed element (ConductingEquipment or PowerTransferCorridor) should be loaded less than maximum loading (100%) minus the target. e.g. If the target is 70%, the loading must be less than 30%.
insideCapacityMargin	0..1	PerCent	(NC) Percentage of the maximum flow (margin) from coordinated capacity calculation, i.e. capacity available for cross-zonal trade within the considered coordination area.
outsideCapacityMargin	0..1	PerCent	(NC) Percentage of the maximum flow (margin) capacity calculation, i.e. the capacity available for cross-zonal trade outside the considered coordination area.
isCritical	0..1	Boolean	(NC) Indicates if the assessed element is critical. True, means that the assessed element is critical. False, means that the assessed element is not critical. Critical means that the assessed element for the conducting equipment or power transfer corridor are considered limiting for the power exchange.
maxMarginAdjustment	0..1	PerCent	(NC) Maximum adjustment, relative to maximum flow allowed for exceeding the maximum flow of this assessed element.
flowReliabilityMargin	0..1	PerCent	(NC) Percentage of the maximum flow (margin) reserved to anticipate forecasting errors.
targetRemainingAvailableMargin	0..1	PerCent	(NC) Target for the remaining available margin as a percentage of maximum flow.
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 41 shows all association ends of AssessedElement with other classes.

1138 **Table 41 – Association ends of ExtAssessedElement::AssessedElement with other**  
1139 **classes**

mult from	name	mult to	type	description
0..*	ScannedForRegion	0..1	<a href="#">Region</a>	(NC) This is the region in which this assessed element is scanned.
0..*	NativeRegion	0..1	<a href="#">Region</a>	(NC) The native region for an assessed element.
0..*	AssessedSystemOperator	0..1	<a href="#">SystemOperator</a>	(NC) A system operator that assesses the element.
0..1	AssessedElementWithContingency	0..*	<a href="#">AssessedElementWithContingency</a>	(NC) The contingency and assessed element combination to be simulated for this assessed element.
0..*	AssessedTerminal	0..1	Terminal	(NC) The terminal that is assessed.
0..*	AssessedPowerTransferCorridor	0..1	<a href="#">PowerTransferCorridor</a>	(NC) The power transfer corridor that is designated as an assessed element.
0..*	ConductingEquipment	0..1	ConductingEquipment	(NC) The conducting equipment that is designated as an assessed element, i.e. the equipment that is assessed.
0..*	OverlappingZone	0..1	<a href="#">OverlappingZone</a>	(NC) The overlapping zone grouping the overlapping assessed elements.
0..*	ConservativeForRegion	0..1	<a href="#">Region</a>	(NC) This is the region where the element is considered conservative.
0..*	SecuredForRegion	0..1	<a href="#">Region</a>	(NC) This is the region where the element is secured.
0..1	ObservableQuantity	0..*	<a href="#">ObservableQuantity</a>	(NC) The observable quantity for this assessed element with contingency.
0..1	AssessedElementWithRemedialAction	0..*	<a href="#">AssessedElementWithRemedialAction</a>	(NC) The assessed element and remedial action combination to be simulated for this assessed element.
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.4.3 (NC) AssessedElementWithContingency

Inheritance path = IdentifiedObject : ExtEulIdentifiedObject

The combination of an assessed element and a contingency.

Table 42 shows all attributes of AssessedElementWithContingency.

**Table 42 – Attributes of ExtAssessedElement::AssessedElementWithContingency**

name	mult	type	description
enabled	0..1	Boolean	(NC) It identifies if the assessed element with contingency shall be considered. True means considered, False means not considered.
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject

name	mult	type	description
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEuIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEuIdentifiedObject

Table 43 shows all association ends of AssessedElementWithContingency with other classes.

**Table 43 – Association ends of  
ExtAssessedElement::AssessedElementWithContingency with other classes**

mult from	name	mult to	type	description
0..*	Contingency	0..1	Contingency	(NC) The contingency defined for this contingency and assessed element combination.
0..*	AssessedElement	0..1	<a href="#">AssessedElement</a>	(NC) The assessed element defined for this contingency and assessed element combination.
0..1	ObservableQuantity	0..*	<a href="#">ObservableQuantity</a>	(NC) The observable quantity for this assessed element with contingency.
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.4.4 (NC) AssessedElementWithRemedialAction

Inheritance path = IdentifiedObject : ExtEuIdentifiedObject

The combination of an assessed element and a remedial action.

Table 44 shows all attributes of AssessedElementWithRemedialAction.

**Table 44 – Attributes of ExtAssessedElement::AssessedElementWithRemedialAction**

name	mult	type	description
enabled	0..1	Boolean	(NC) It identifies if the assessed element with remedial action shall be considered. True means considered, False means not considered.
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEuIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEuIdentifiedObject

Table 45 shows all association ends of AssessedElementWithRemedialAction with other classes.



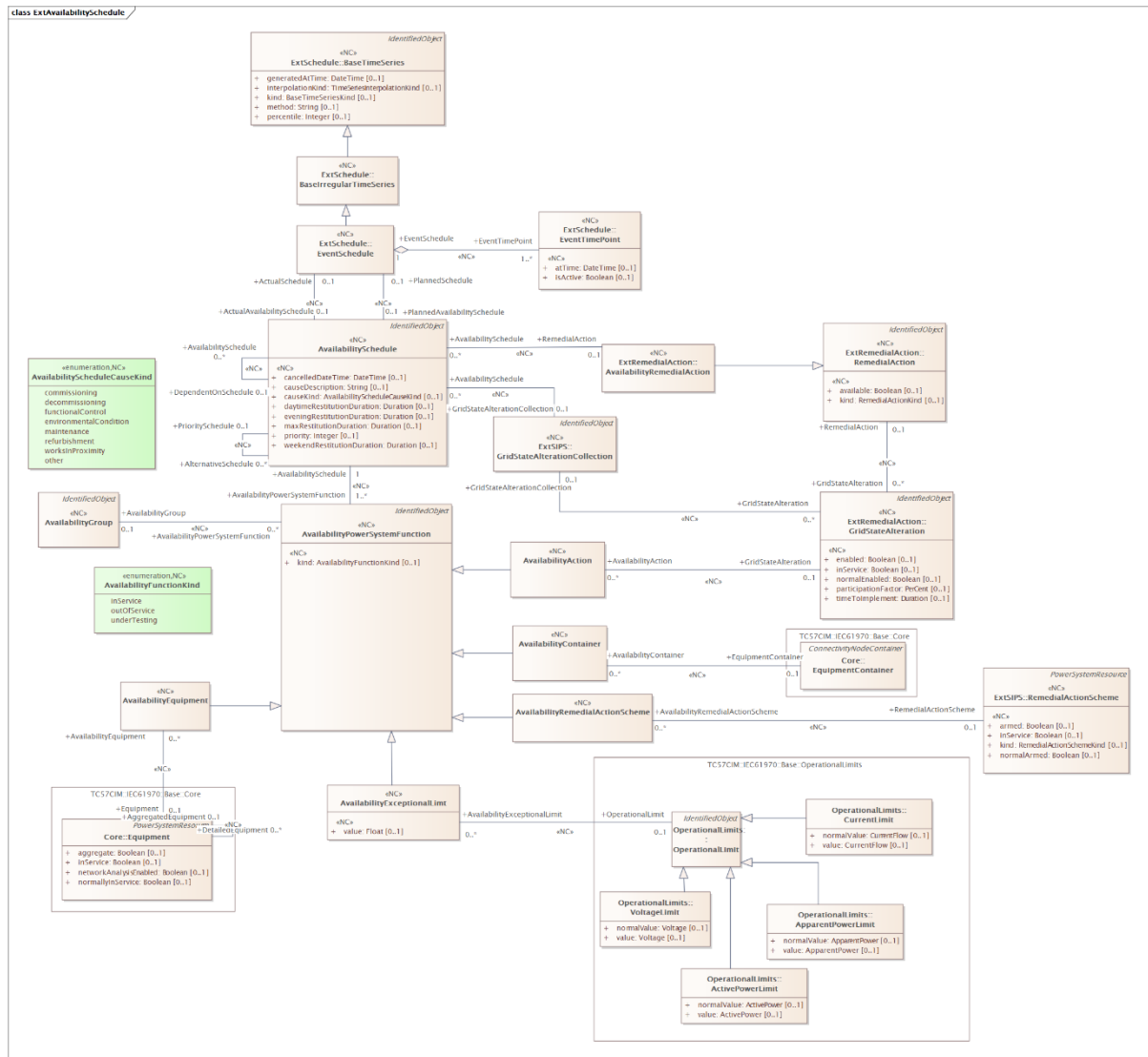
1159 **Table 45 – Association ends of**  
 1160 **ExtAssessedElement::AssessedElementWithRemedialAction with other classes**

mult from	name	mult to	type	description
0..*	AssessedElement	0..1	<a href="#">AssessedElement</a>	(NC) The assessed element defined for this assessed element and remedial action combination.
0..*	RemedialAction	0..1	<a href="#">RemedialAction</a>	(NC) The remedial action defined for this assessed element and remedial action combination.
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

1161  
 1162 **3.5 Package ExtAvailabilitySchedule**

1163 **3.5.1 General**

1164 This package contains the extensions related to the availability schedule.



**Figure 5 – Class diagram ExtAvailabilitySchedule::ExtAvailabilitySchedule**

Figure 5: The diagram contains classes related to availability schedule.

### 3.5.2 (NC) AvailabilityAction

Inheritance path = [AvailabilityPowerSystemFunction](#) : IdentifiedObject : ExtEulIdentifiedObject  
Availability action is availability power system function of type grid state alteration (e.g. tap position action).

Table 46 shows all attributes of AvailabilityAction.

**Table 46 – Attributes of ExtAvailabilitySchedule::AvailabilityAction**

name	mult	type	description
kind	0..1	<a href="#">AvailabilityFunctionKind</a>	(NC) inherited from: <a href="#">AvailabilityPowerSystemFunction</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject

name	mult	type	description
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 47 shows all association ends of AvailabilityAction with other classes.

**Table 47 – Association ends of ExtAvailabilitySchedule::AvailabilityAction with other classes**

mult from	name	mult to	type	description
0..*	GridStateAlteration	0..1	<a href="#">GridStateAlteration</a>	(NC) Grid state alteration that is affected by the availability given by this availability action.
0..*	AvailabilityGroup	0..1	<a href="#">AvailabilityGroup</a>	(NC) inherited from: <a href="#">AvailabilityPowerSystemFunction</a>
1..*	AvailabilitySchedule	1..1	<a href="#">AvailabilitySchedule</a>	(NC) inherited from: <a href="#">AvailabilityPowerSystemFunction</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.5.3 (NC) AvailabilityEquipment

Inheritance path = [AvailabilityPowerSystemFunction](#) : IdentifiedObject : ExtEulIdentifiedObject  
Availability equipment is availability power system function of type equipment (e.g. ACLLineSegment).

Table 48 shows all attributes of AvailabilityEquipment.

**Table 48 – Attributes of ExtAvailabilitySchedule::AvailabilityEquipment**

name	mult	type	description
kind	0..1	<a href="#">AvailabilityFunctionKind</a>	(NC) inherited from: <a href="#">AvailabilityPowerSystemFunction</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 49 shows all association ends of AvailabilityEquipment with other classes.

**Table 49 – Association ends of ExtAvailabilitySchedule::AvailabilityEquipment with other classes**

mult from	name	mult to	type	description
0..*	Equipment	0..1	Equipment	(NC) Equipment that is affected by the availability given by this availability equipment.

mult from	name	mult to	type	description
0..*	AvailabilityGroup	0..1	<a href="#">AvailabilityGroup</a>	(NC) inherited from: <a href="#">AvailabilityPowerSystemFunction</a>
1..*	AvailabilitySchedule	1..1	<a href="#">AvailabilitySchedule</a>	(NC) inherited from: <a href="#">AvailabilityPowerSystemFunction</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

1189

1190 **3.5.4 (NC) AvailabilityExceptionallLimit**1191 Inheritance path = [AvailabilityPowerSystemFunction](#) : IdentifiedObject : ExtEulIdentifiedObject

1192 Availability exceptional limit is availability power system function of type operational limit

1193 restriction (e.g. current limit on ACLineSegment terminal). This is limits that occur due to special

1194 operational condition that is outside the normal dynamic rating. The exceptional limit could also

1195 be the cause of asset related issues, e.g. de-rating due to fault.

1196 Table 50 shows all attributes of AvailabilityExceptionallLimit.

1197 **Table 50 – Attributes of ExtAvailabilitySchedule::AvailabilityExceptionallLimit**

name	mult	type	description
value	0..1	Float	(NC) Value for the referred operational limit.
kind	0..1	<a href="#">AvailabilityFunctionKind</a>	(NC) inherited from: <a href="#">AvailabilityPowerSystemFunction</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

1198

1199 Table 51 shows all association ends of AvailabilityExceptionallLimit with other classes.

1200 **Table 51 – Association ends of ExtAvailabilitySchedule::AvailabilityExceptionallLimit**  
1201 **with other classes**

mult from	name	mult to	type	description
0..*	OperationalLimit	0..1	OperationalLimit	(NC) Operational limit that is constrained by this availability exceptional limit.
0..*	AvailabilityGroup	0..1	<a href="#">AvailabilityGroup</a>	(NC) inherited from: <a href="#">AvailabilityPowerSystemFunction</a>
1..*	AvailabilitySchedule	1..1	<a href="#">AvailabilitySchedule</a>	(NC) inherited from: <a href="#">AvailabilityPowerSystemFunction</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject

mult from	name	mult to	type	description
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.5.5 (NC) AvailabilityGroup

Inheritance path = IdentifiedObject : ExtEulIdentifiedObject

Container to link relevant equipment that is affected by (un)availability schedule across availability coordinator (e.g. TSO-TSO, TSO-DSO or DSO-DSO).

Table 52 shows all attributes of AvailabilityGroup.

**Table 52 – Attributes of ExtAvailabilitySchedule::AvailabilityGroup**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 53 shows all association ends of AvailabilityGroup with other classes.

**Table 53 – Association ends of ExtAvailabilitySchedule::AvailabilityGroup with other classes**

mult from	name	mult to	type	description
0..1	AvailabilityPowerSystem Function	0..*	<a href="#">AvailabilityPowerSystem Function</a>	(NC) Availability power system function that is depending on power system function controlled by other system operator.
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.5.6 (NC) AvailabilityPowerSystemFunction

Inheritance path = IdentifiedObject : ExtEulIdentifiedObject

Availability power system function describes the power system function that has a non-normal availability in the associated availability schedule. The availability of the function is needed as part of a power flow solution. This function is the cause and not the effect of the availability, if the effect can be calculated through power flow. For instance if only the step-up transformer for a generator is not available, the power flow will calculate that the generator is de-energized (outage). If both are tagged as not available it will not be possible to investigate remedial action for connecting the generator. In some cases there could be need to calculate compensations. It is expected that the power flow function would need to support simple topology changes (e.g. open switch on each end of a line that is not available). More complicated grid state alteration would need to accommodate the available schedule.

Table 54 shows all attributes of AvailabilityPowerSystemFunction.

1227 **Table 54 – Attributes of ExtAvailabilitySchedule::AvailabilityPowerSystemFunction**

name	mult	type	description
kind	0..1	<a href="#">AvailabilityFunctionKind</a>	(NC) Kind of availability that affect the power system function.
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

1228  
1229 Table 55 shows all association ends of AvailabilityPowerSystemFunction with other classes.

1230 **Table 55 – Association ends of**  
1231 **ExtAvailabilitySchedule::AvailabilityPowerSystemFunction with other classes**

mult from	name	mult to	type	description
0..*	AvailabilityGroup	0..1	<a href="#">AvailabilityGroup</a>	(NC) Availability group that link all related power system function controlled by all relevant system operators.
1..*	AvailabilitySchedule	1..1	<a href="#">AvailabilitySchedule</a>	(NC) Availability schedule for this availability power system function.
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 1232 1233 3.5.7 (NC) AvailabilityRemedialActionScheme

1234 Inheritance path = [AvailabilityPowerSystemFunction](#) : IdentifiedObject : ExtEulIdentifiedObject  
1235 Availability remedial action scheme is availability power system function of type remedial action  
1236 scheme (e.g. System Integrity Protection Scheme (SIPS)) For instance SIPS that is taken out-  
1237 of-service due to communication issues.

1238 Table 56 shows all attributes of AvailabilityRemedialActionScheme.

1239 **Table 56 – Attributes of ExtAvailabilitySchedule::AvailabilityRemedialActionScheme**

name	mult	type	description
kind	0..1	<a href="#">AvailabilityFunctionKind</a>	(NC) inherited from: <a href="#">AvailabilityPowerSystemFunction</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

1240  
1241 Table 57 shows all association ends of AvailabilityRemedialActionScheme with other classes.

**Table 57 – Association ends of ExtAvailabilitySchedule::AvailabilityRemedialActionScheme with other classes**

mult from	name	mult to	type	description
0..*	RemedialActionScheme	0..1	<a href="#">RemedialActionScheme</a>	(NC) Remedial action scheme that is affected by the availability given by this availability remedial action scheme.
0..*	AvailabilityGroup	0..1	<a href="#">AvailabilityGroup</a>	(NC) inherited from: <a href="#">AvailabilityPowerSystemFunction</a>
1..*	AvailabilitySchedule	1..1	<a href="#">AvailabilitySchedule</a>	(NC) inherited from: <a href="#">AvailabilityPowerSystemFunction</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.5.8 (NC) AvailabilitySchedule

Inheritance path = IdentifiedObject : ExtEulIdentifiedObject

A given (un)availability schedule with a given status and cause that include multiple equipment that need to follow the same scheduling periods.

Table 58 shows all attributes of AvailabilitySchedule.

**Table 58 – Attributes of ExtAvailabilitySchedule::AvailabilitySchedule**

name	mult	type	description
cancelledDateTime	0..1	DateTime	(NC) The date and time the (un)availability schedule were cancelled .
causeDescription	0..1	String	(NC) A cause description for a cause kind. In case of CauseKind equals other, description or a reference of the cause of the (un)availability schedule.
causeKind	0..1	<a href="#">AvailabilityScheduleCauseKind</a>	(NC) Kind of cause for the availability schedule.
daytimeRestitutionDuration	0..1	Duration	(NC) The time required to take the out-of-service equipment back into service during daytime. This includes the start-up time for generating units.
eveningRestitutionDuration	0..1	Duration	(NC) The time required to take the out-of-service equipment back into service after office hours. This includes the start-up time for generating units.
maxRestitutionDuration	0..1	Duration	(NC) The maximum time required to take the out-of-service equipment back into service. This includes the start-up time for generating units.
priority	0..1	Integer	(NC) Value 0 means ignore priority. 1 means the highest priority, 2 is the second highest priority.
weekendRestitutionDuration	0..1	Duration	(NC) The time required to take the out-of-service equipment back into service in the weekend or during bank holidays. This includes the start-up time for generating units.
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject



name	mult	type	description
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 59 shows all association ends of AvailabilitySchedule with other classes.

**Table 59 – Association ends of ExtAvailabilitySchedule::AvailabilitySchedule with other classes**

mult from	name	mult to	type	description
1..1	AvailabilityPowerSystem Function	1..*	<a href="#">AvailabilityPowerSystem Function</a>	(NC) Availability power system function that describes the functionality that belongs to a given availability schedule to define the period the properties valid for.
0..*	RemedialAction	0..1	<a href="#">AvailabilityRemedialAction</a>	(NC) Remedial action that is cancelling this availability schedule.
0..1	ActualSchedule	0..1	<a href="#">EventSchedule</a>	(NC) Actual schedule that relates to this availability schedule.
0..1	PlannedSchedule	0..1	<a href="#">EventSchedule</a>	(NC) Planned schedule that relates to this planned availability schedule.
0..*	DependentOnSchedule	0..1	<a href="#">AvailabilitySchedule</a>	(NC) (un)availability schedule requested by one operator may require another operator to request there (un)availability schedule. This association is linking the schedules so that the dependency is clear.
0..1	AlternativeSchedule	0..*	<a href="#">AvailabilitySchedule</a>	(NC) Alternative schedule. The priority in regards to multiple alternatives is given by the priority attribute. This schedule is only relevant if all the alternatives with higher priority are cancelled.
0..*	GridStateAlterationCollection	0..1	<a href="#">GridStateAlterationCollection</a>	(NC) The grid state alteration collection that has this availability schedule.
0..1	PowerSystemProject	0..1	PowerSystemProject	(NC) The power system project that has this availability schedule.
0..1	AvailabilitySchedule	0..*	<a href="#">AvailabilitySchedule</a>	(NC) Availability schedule that has a dependent availability schedule.
0..*	PrioritySchedule	0..1	<a href="#">AvailabilitySchedule</a>	(NC) Priority schedule. This is the schedule that has the highest priority and the only valid if not cancelled.
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.5.9 (NC) AvailabilityContainer

Inheritance path = [AvailabilityPowerSystemFunction](#) : IdentifiedObject : ExtEulIdentifiedObject  
Availability container is availability power system function of type equipment container (e.g. Line, Bay etc). This is used when multiple equipment in the relevant container are having the same availability.

1261 Table 60 shows all attributes of AvailabilityContainer.

1262 **Table 60 – Attributes of ExtAvailabilitySchedule::AvailabilityContainer**

name	mult	type	description
kind	0..1	<a href="#">AvailabilityFunctionKind</a>	(NC) inherited from: <a href="#">AvailabilityPowerSystemFunction</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

1263  
1264 Table 61 shows all association ends of AvailabilityContainer with other classes.

1265 **Table 61 – Association ends of ExtAvailabilitySchedule::AvailabilityContainer with**  
1266 **other classes**

mult from	name	mult to	type	description
0..*	EquipmentContainer	0..1	EquipmentContainer	(NC) Equipment container that is affected by the availability given by this availability container.
0..*	AvailabilityGroup	0..1	<a href="#">AvailabilityGroup</a>	(NC) inherited from: <a href="#">AvailabilityPowerSystemFunction</a>
1..*	AvailabilitySchedule	1..1	<a href="#">AvailabilitySchedule</a>	(NC) inherited from: <a href="#">AvailabilityPowerSystemFunction</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

1267  
1268 **3.5.10 (NC) AvailabilityFunctionKind enumeration**

1269 Kind of availability that is affecting the function.

1270 Table 62 shows all literals of AvailabilityFunctionKind.

1271 **Table 62 – Literals of ExtAvailabilitySchedule::AvailabilityFunctionKind**

literal	value	description
inService		Function is in service.
outOfService		Function is out-of-service.
underTesting		Function is under testing and need to expect unscheduled availability.

1272  
1273 **3.5.11 (NC) AvailabilityScheduleCauseKind enumeration**

1274 The kinds of cause of the (un)availability schedule.

1275 Table 63 shows all literals of AvailabilityScheduleCauseKind.

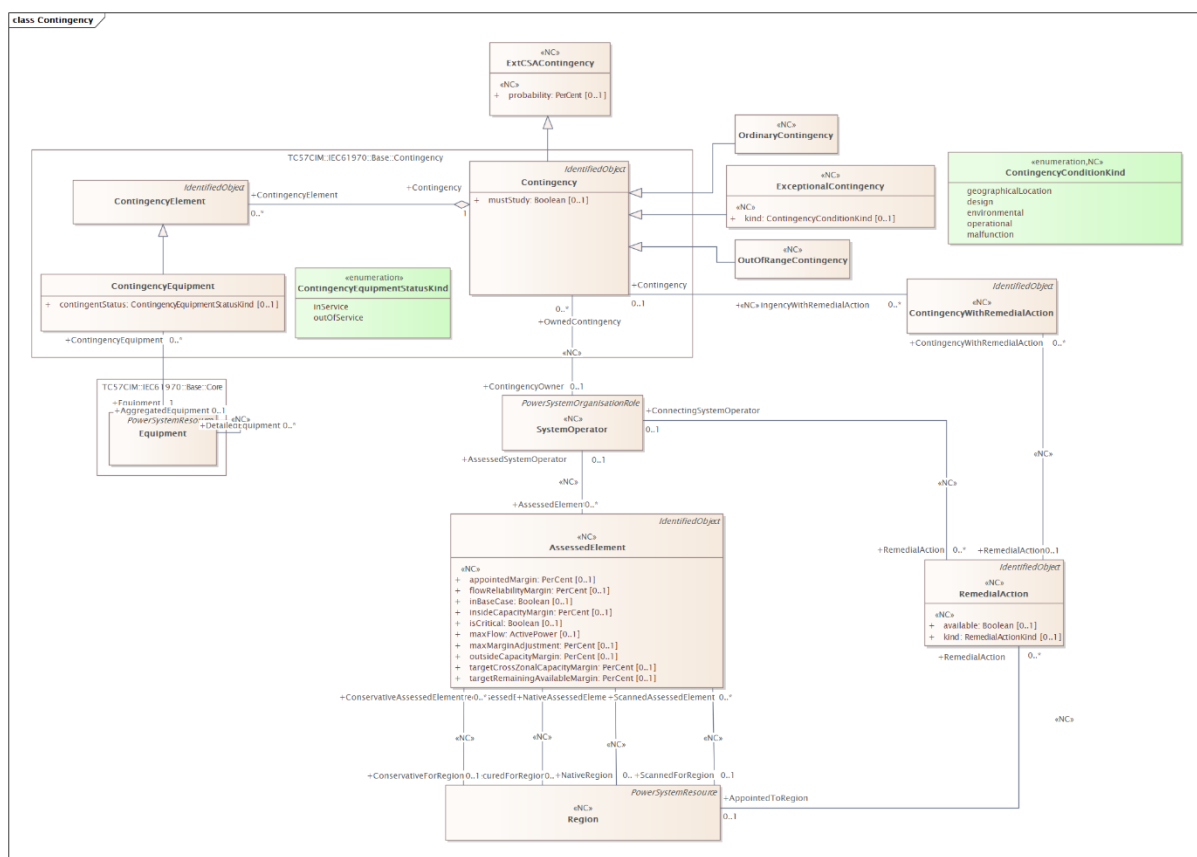
### Table 63 – Literals of ExtAvailabilitySchedule::AvailabilityScheduleCauseKind

literal	value	description
commissioning		The cause is due to a commissioning.
decommissioning		The cause is due to a decommissioning.
functionalControl		The cause is due to a functional control (in & out).
environmentalCondition		The cause is due to an environmental condition. This can lead to exceptional margin and limits.
maintenance		The cause is due to a maintenance.
refurbishment		The cause is due to a refurbishment, either upgrade or downgrade.
worksInProximity		The cause is due to a works in proximity.
other		The cause is of other kind.

### 3.6 Contingency extensions

### 3.6.1 General

This package contains the extensions related to the contingency.



**Figure 6 – Class diagram ExtContingency::Contingency**

Figure 6: The diagram contains classes related to the contingency.

### 3.6.2 (NC) ContingencyWithRemedialAction

Inheritance path = IdentifiedObject : ExtEuIdentifiedObject

1286 The combination of a contingency and a remedial action.  
1287 Table 64 shows all attributes of ContingencyWithRemedialAction.

1288 **Table 64 – Attributes of ExtContingency::ContingencyWithRemedialAction**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEuIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEuIdentifiedObject

1289  
1290 Table 65 shows all association ends of ContingencyWithRemedialAction with other classes.

1291 **Table 65 – Association ends of ExtContingency::ContingencyWithRemedialAction with**  
1292 **other classes**

mult from	name	mult to	type	description
0..*	Contingency	0..1	Contingency	(NC) The contingency that is associated with a remedial action, i.e. the contingency that is the cause for the creation of a remedial action and justifies it or would usually be resolved with a remedial action.
0..*	RemedialAction	0..1	<a href="#">RemedialAction</a>	(NC) The remedial action defined for this contingency and remedial action combination.
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 1293 1294 3.6.3 (NC) ExceptionalContingency

1295 Inheritance path = Contingency : IdentifiedObject : ExtEuIdentifiedObject : [ExtCSAContingency](#)  
1296 Exceptional contingency means the simultaneous occurrence of multiple contingencies with a  
1297 common cause.

1298 Table 66 shows all attributes of ExceptionalContingency.

1299 **Table 66 – Attributes of ExtContingency::ExceptionalContingency**

name	mult	type	description
kind	0..1	<a href="#">ContingencyConditionKind</a>	(NC) Defines the kind of relevance and criteria of application of the exceptional contingency.
mustStudy	0..1	Boolean	inherited from: Contingency
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEuIdentifiedObject

name	mult	type	description
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject
probability	0..1	PerCent	(NC) inherited from: <a href="#">ExtCSAContingency</a>

Table 67 shows all association ends of ExceptionalContingency with other classes.

**Table 67 – Association ends of ExtContingency::ExceptionalContingency with other classes**

mult from	name	mult to	type	description
1..1	ContingencyElement	0..*	ContingencyElement	inherited from: Contingency
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.6.4 (NC) ExtCSAContingency root class

Contains attributes that extend the Contingency class by assigning an owner and probability of occurrence.

Table 68 shows all attributes of ExtCSAContingency.

**Table 68 – Attributes of ExtContingency::ExtCSAContingency**

name	mult	type	description
probability	0..1	PerCent	(NC) Probability of occurrence.

### 3.6.5 (NC) OrdinaryContingency

Inheritance path = Contingency : IdentifiedObject : ExtEulIdentifiedObject : [ExtCSAContingency](#)

Ordinary contingency means the occurrence of a contingency of a single branch or injection.

Table 69 shows all attributes of OrdinaryContingency.

**Table 69 – Attributes of ExtContingency::OrdinaryContingency**

name	mult	type	description
mustStudy	0..1	Boolean	inherited from: Contingency
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject
probability	0..1	PerCent	(NC) inherited from: <a href="#">ExtCSAContingency</a>

Table 70 shows all association ends of OrdinaryContingency with other classes.

**Table 70 – Association ends of ExtContingency::OrdinaryContingency with other classes**

mult from	name	mult to	type	description
1..1	ContingencyElement	0..*	ContingencyElement	inherited from: Contingency
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

**3.6.6 (NC) OutOfRangeContingency**

Inheritance path = Contingency : IdentifiedObject : ExtEulIdentifiedObject : [ExtCSAContingency](#)

Out of range means the simultaneous occurrence of multiple contingencies without a common cause, or a loss of power generating modules with a total loss of generation capacity exceeding the reference incident.

Table 71 shows all attributes of OutOfRangeContingency.

**Table 71 – Attributes of ExtContingency::OutOfRangeContingency**

name	mult	type	description
mustStudy	0..1	Boolean	inherited from: Contingency
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject
probability	0..1	PerCent	(NC) inherited from: <a href="#">ExtCSAContingency</a>

Table 72 shows all association ends of OutOfRangeContingency with other classes.

**Table 72 – Association ends of ExtContingency::OutOfRangeContingency with other classes**

mult from	name	mult to	type	description
1..1	ContingencyElement	0..*	ContingencyElement	inherited from: Contingency
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

**3.6.7 (NC) ContingencyConditionKind enumeration**

Kinds of occurrence criteria of application.

Table 73 shows all literals of ContingencyConditionKind.

1336

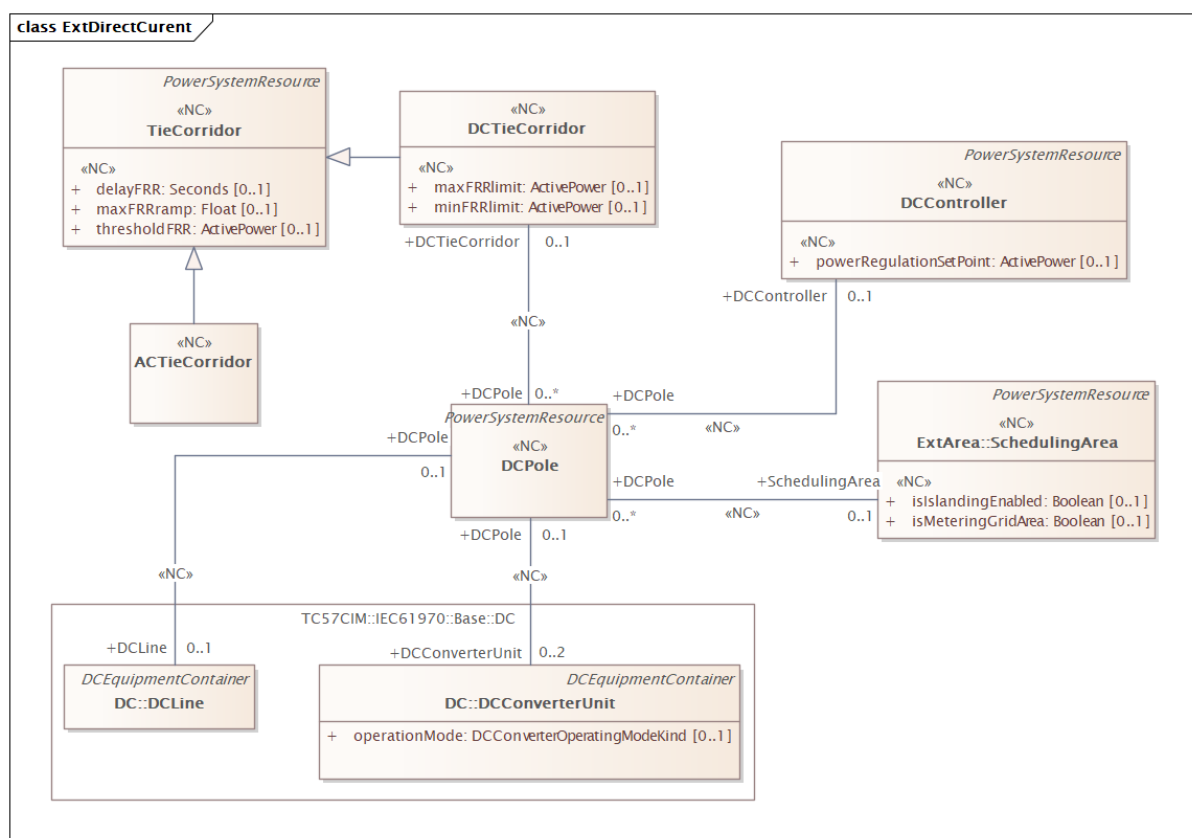
**Table 73 – Literals of ExtContingency::ContingencyConditionKind**

literal	value	description
geographicalLocation		Permanent occurrence factor which is specific geographical location.
design		Permanent occurrence factor which is design condition.
environmental		Temporary occurrence factor which is weather or environmental condition (e.g. storm).
operational		Temporary occurrence factor which is operational condition.
malfunction		Temporary occurrence factor which is life time or generic malfunction affecting the risk of failure condition.

1337

**3.7 Package ExtDirectCurent****3.7.1 General**

This package contains the extensions related to the direct current (DC).



1341

**Figure 7 – Class diagram ExtDirectCurent::ExtDirectCurent**

Figure 7: The diagram contains classes related to direct current.

**3.7.2 (NC) ACTieCorridor**

Inheritance path = [TieCorridor](#) : PowerSystemResource : IdentifiedObject : ExtEulidentifiedObject

A collection of one or more AC tie lines that connect to different control areas together.



1348 Table 74 shows all attributes of ACTieCorridor.

1349 **Table 74 – Attributes of ExtDirectCurent::ACTieCorridor**

name	mult	type	description
delayFRR	0..1	Seconds	(NC) inherited from: <a href="#">TieCorridor</a>
maxFRRramp	0..1	Float	(NC) inherited from: <a href="#">TieCorridor</a>
thresholdFRR	0..1	ActivePower	(NC) inherited from: <a href="#">TieCorridor</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

1350

1351 Table 75 shows all association ends of ACTieCorridor with other classes.

1352 **Table 75 – Association ends of ExtDirectCurent::ACTieCorridor with other classes**

mult from	name	mult to	type	description
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

1353

### 1354 3.7.3 (NC) DCController

1355 Inheritance path = PowerSystemResource : IdentifiedObject : ExtEulIdentifiedObject

1356 The direct current controller providing the power regulation setpoint for one or more direct  
1357 current poles.

1358 Table 76 shows all attributes of DCController.

1359 **Table 76 – Attributes of ExtDirectCurent::DCController**

name	mult	type	description
powerRegulationSetPoint	0..1	ActivePower	(NC) Power regulation setpoint giving the instruction for the controller.
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject

name	mult	type	description
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 77 shows all association ends of DCController with other classes.

**Table 77 – Association ends of ExtDirectCurent::DCController with other classes**

mult from	name	mult to	type	description
1..1	DCControllerAction	0..*	<a href="#">DCControllerAction</a>	(NC) The DCControllerAction for this DCController.
0..1	DCPole	0..*	<a href="#">DCPole</a>	(NC) This is the DCPole which is controlled by the controller.
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.7.4 (NC) DCPole

Inheritance path = PowerSystemResource : IdentifiedObject : ExtEulIdentifiedObject

The direct current (DC) pole is the circuit which includes converter units from both sides and the relevant direct current line. This forms the smallest unit of transmission control.

Table 78 shows all attributes of DCPole.

**Table 78 – Attributes of ExtDirectCurent::DCPole**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 79 shows all association ends of DCPole with other classes.

**Table 79 – Association ends of ExtDirectCurent::DCPole with other classes**

mult from	name	mult to	type	description
0..1	DCLine	0..1	DCLine	(NC) The DC line that is related to this DC pole.
0..1	DCConverterUnit	0..2	DCConverterUnit	(NC) The DC converter unit that relates to this DC pole.

mult from	name	mult to	type	description
0..*	DCTieCorridor	0..1	<a href="#">DCTieCorridor</a>	(NC) The DCTieCorridor that has this DC pole.
0..*	SchedulingArea	0..1	<a href="#">SchedulingArea</a>	(NC) The scheduling area that has this DC pole.
0..*	DCController	0..1	<a href="#">DCController</a>	(NC) This is the DCController for this Pole.
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

1373

1374 **3.7.5 (NC) DCTieCorridor**

1375 Inheritance path = [TieCorridor](#) : PowerSystemResource : IdentifiedObject :  
 1376 ExtEulIdentifiedObject

1377 A collection of one or more direct current poles that connect to different control areas together.

1378 Table 80 shows all attributes of DCTieCorridor.

1379

**Table 80 – Attributes of ExtDirectCurent::DCTieCorridor**

name	mult	type	description
maxFRRlimit	0..1	ActivePower	(NC) Maximum allocated limit for Frequency Restoration Reserve (FRR).
minFRRlimit	0..1	ActivePower	(NC) Minimum allocated limit for Frequency Restoration Reserve (FRR).
delayFRR	0..1	Seconds	(NC) inherited from: <a href="#">TieCorridor</a>
maxFRRramp	0..1	Float	(NC) inherited from: <a href="#">TieCorridor</a>
thresholdFRR	0..1	ActivePower	(NC) inherited from: <a href="#">TieCorridor</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

1380

1381 Table 81 shows all association ends of DCTieCorridor with other classes.

1382 **Table 81 – Association ends of ExtDirectCurrent::DCTieCorridor with other classes**

mult from	name	mult to	type	description
0..*	AreaDispatchableUnit	0..1	<a href="#">AreaDispatchableUnit</a>	(NC) The AreaDispatchableUnit for the DCTieCorridor.
0..1	DCPole	0..*	<a href="#">DCPole</a>	(NC) The DCPole which is part of the DC link/corridor.
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

1383

1384 **3.7.6 (NC) TieCorridor**

1385 Inheritance path = PowerSystemResource : IdentifiedObject : ExtEulIdentifiedObject

1386 A collection of one or more tie-lines or direct current poles that connect two different control  
1387 areas together.

1388 Table 82 shows all attributes of TieCorridor.

1389 **Table 82 – Attributes of ExtDirectCurrent::TieCorridor**

name	mult	type	description
delayFRR	0..1	Seconds	(NC) A positive number that is a multiple of Automatic Generation Control (AGC) run cycles that describes the delay in adapting imbalance of the tie corridor.
maxFRRramp	0..1	Float	(NC) Maximum authorized ramp for both Frequency Reserve Restoration (FRR) dispatching and ramp to zero.
thresholdFRR	0..1	ActivePower	(NC) Frequency Reserve Restoration (FRR) coherency check threshold.
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

1390

1391 Table 83 shows all association ends of TieCorridor with other classes.

1392 **Table 83 – Association ends of ExtDirectCurrent::TieCorridor with other classes**

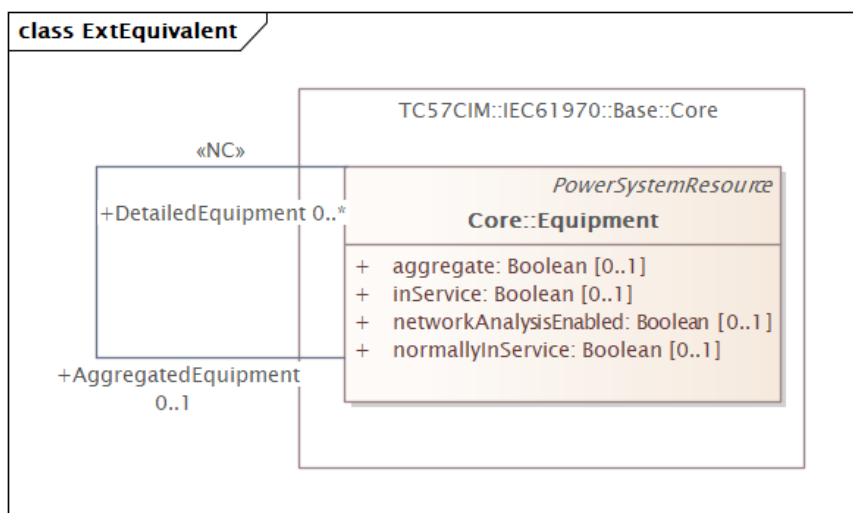
mult from	name	mult to	type	description
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource

mult from	name	mult to	type	description
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

1393

1394 **3.8 Package ExtEquivalent**

1395 This package contains the extensions related to the equivalents.



1396

1397 **Figure 8 – Class diagram ExtEquivalent::ExtEquivalent**

1398 Figure 8: The diagram contains association related to equipment.

1399 **3.9 Package ExtFACTS**1400 **3.9.1 General**

1401 This package contains the extensions related to the FACTS.

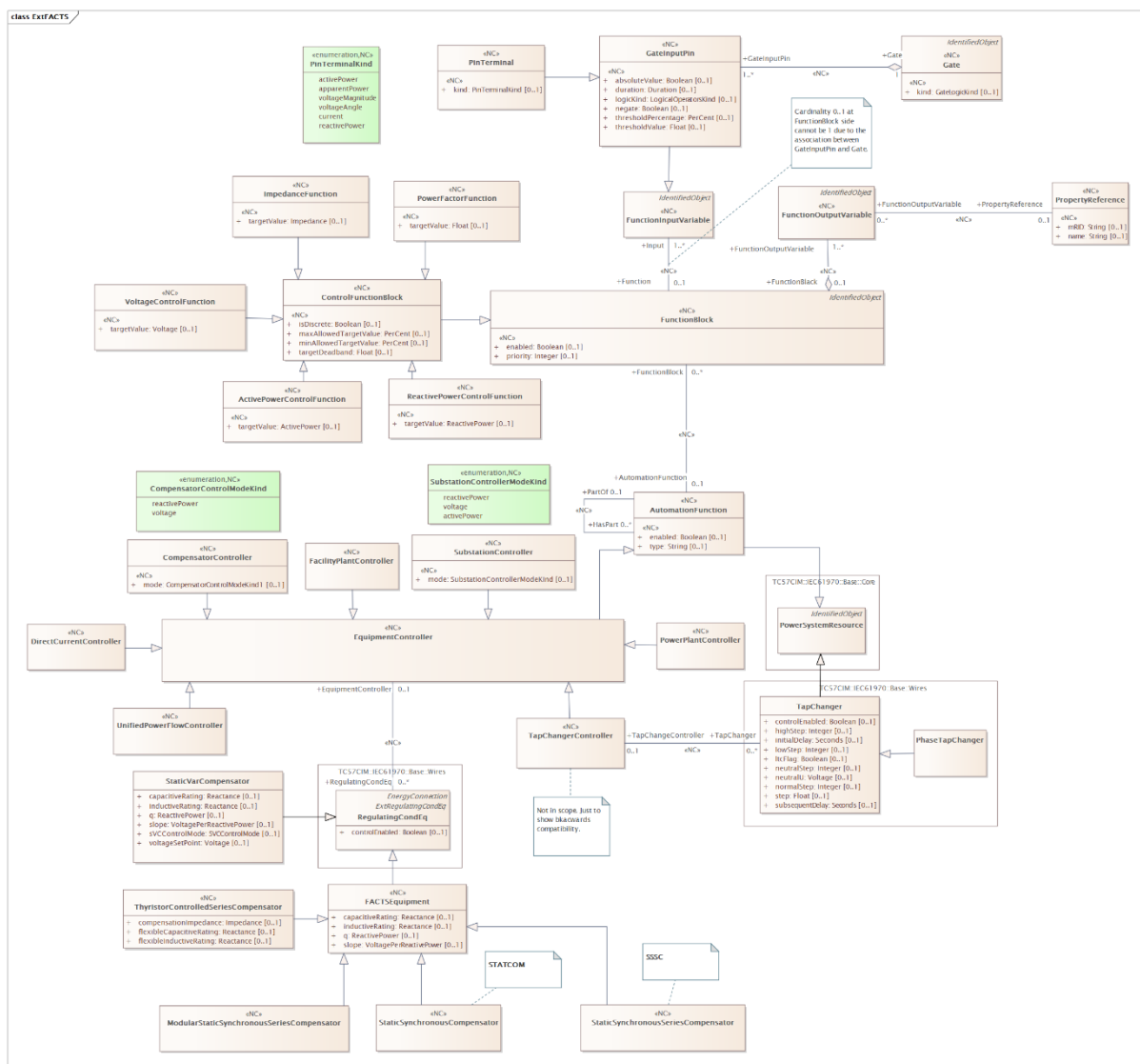


Figure 9 – Class diagram ExtFACTS::ExtFACTS

Figure 9: The diagram contains association related to FACTS.

### 3.9.2 (NC) ActivePowerControlFunction

Inheritance path = [ControlFunctionBlock](#) : [FunctionBlock](#) : IdentifiedObject : ExtEulIdentifiedObject

Active power control function is a function block that calculate the controlled equipment operation point to archive the target active power.

Table 84 shows all attributes of ActivePowerControlFunction.

Table 84 – Attributes of ExtFACTS::ActivePowerControlFunction

name	mult	type	description
targetValue	0..1	ActivePower	(NC) Target value for the active power that the control function is calculating to archive by adjusting the operational setting to the controlled equipment.
isDiscrete	0..1	Boolean	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
targetDeadband	0..1	Float	(NC) inherited from: <a href="#">ControlFunctionBlock</a>

name	mult	type	description
maxAllowedTargetValue	0..1	PerCent	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
minAllowedTargetValue	0..1	PerCent	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
enabled	0..1	Boolean	(NC) inherited from: <a href="#">FunctionBlock</a>
priority	0..1	Integer	(NC) inherited from: <a href="#">FunctionBlock</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 85 shows all association ends of ActivePowerControlFunction with other classes.

**Table 85 – Association ends of ExtFACTS::ActivePowerControlFunction with other classes**

mult from	name	mult to	type	description
0..*	AutomationFunction	0..1	<a href="#">AutomationFunction</a>	(NC) inherited from: <a href="#">FunctionBlock</a>
0..1	Input	1..*	<a href="#">FunctionInputVariable</a>	(NC) inherited from: <a href="#">FunctionBlock</a>
0..1	FunctionOutputVariable	1..*	<a href="#">FunctionOutputVariable</a>	(NC) inherited from: <a href="#">FunctionBlock</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.9.3 (NC) AutomationFunction

Inheritance path = PowerSystemResource : IdentifiedObject : ExtEulIdentifiedObject

Automation function is a collection of functional block or other automation function that can be executed as a work cycle program as part of an automated system.

Table 86 shows all attributes of AutomationFunction.

**Table 86 – Attributes of ExtFACTS::AutomationFunction**

name	mult	type	description
enabled	0..1	Boolean	(NC) True, if the automation function is enabled (active). Otherwise false.
type	0..1	String	(NC) Type of automation function.
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 87 shows all association ends of AutomationFunction with other classes.



1425 **Table 87 – Association ends of ExtFACTS::AutomationFunction with other classes**

mult from	name	mult to	type	description
0..1	HasPart	0..*	<a href="#">AutomationFunction</a>	(NC) Automation function has this automation function as a part.
0..1	FunctionBlock	0..*	<a href="#">FunctionBlock</a>	(NC) Function block is part of this automation function.
0..*	PartOf	0..1	<a href="#">AutomationFunction</a>	(NC) Automation function is part of this automation function.
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

1426

1427 **3.9.4 (NC) CompensatorController**

1428 Inheritance path = [EquipmentController](#) : [AutomationFunction](#) : PowerSystemResource :  
 1429 IdentifiedObject : ExtEulIdentifiedObject

1430 Compensator controller is controlling the equipment to optimize the use of the compensators.

1431 Table 88 shows all attributes of CompensatorController.

1432 **Table 88 – Attributes of ExtFACTS::CompensatorController**

name	mult	type	description
enabled	0..1	Boolean	(NC) inherited from: <a href="#">AutomationFunction</a>
type	0..1	String	(NC) inherited from: <a href="#">AutomationFunction</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

1433

1434 Table 89 shows all association ends of CompensatorController with other classes.

1435 **Table 89 – Association ends of ExtFACTS::CompensatorController with other classes**

mult from	name	mult to	type	description
0..1	RegulatingCondEq	0..*	RegulatingCondEq	(NC) inherited from: <a href="#">EquipmentController</a>
0..1	HasPart	0..*	<a href="#">AutomationFunction</a>	(NC) inherited from: <a href="#">AutomationFunction</a>
0..1	FunctionBlock	0..*	<a href="#">FunctionBlock</a>	(NC) inherited from: <a href="#">AutomationFunction</a>
0..*	PartOf	0..1	<a href="#">AutomationFunction</a>	(NC) inherited from: <a href="#">AutomationFunction</a>

mult from	name	mult to	type	description
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.9.5 (NC) ControlFunctionBlock

Inheritance path = [FunctionBlock](#) : IdentifiedObject : ExtEulIdentifiedObject

Control function block is a function block that contain algorithm for controlling equipment.

Table 90 shows all attributes of ControlFunctionBlock.

**Table 90 – Attributes of ExtFACTS::ControlFunctionBlock**

name	mult	type	description
isDiscrete	0..1	Boolean	(NC) True, if the control function is discrete. This applies to equipment with discrete controls, e.g. tap changers and shunt compensators.
targetDeadband	0..1	Float	(NC) Target deadband is used with discrete control to avoid excessive update of controls like tap changers and shunt compensator banks while regulating. The attribute shall be a positive value or zero. If isDiscrete is set to "false", the targetDeadband is to be ignored. Note that for instance, if the targetValue is 100 kV and the targetDeadband is 2 kV the range is from 99 to 101 kV.
maxAllowedTargetValue	0..1	PerCent	(NC) Maximum allowed target value given by the percent of target value.
minAllowedTargetValue	0..1	PerCent	(NC) Minimum allowed target value given by the percent of target value.
enabled	0..1	Boolean	(NC) inherited from: <a href="#">FunctionBlock</a>
priority	0..1	Integer	(NC) inherited from: <a href="#">FunctionBlock</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 91 shows all association ends of ControlFunctionBlock with other classes.

1444 **Table 91 – Association ends of ExtFACTS::ControlFunctionBlock with other classes**

mult from	name	mult to	type	description
0..*	AutomationFunction	0..1	<a href="#">AutomationFunction</a>	(NC) inherited from: <a href="#">FunctionBlock</a>
0..1	Input	1..*	<a href="#">FunctionInputVariable</a>	(NC) inherited from: <a href="#">FunctionBlock</a>
0..1	FunctionOutputVariable	1..*	<a href="#">FunctionOutputVariable</a>	(NC) inherited from: <a href="#">FunctionBlock</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

1445

1446 **3.9.6 (NC) DirectCurrentController**

1447 Inheritance path = [EquipmentController](#) : [AutomationFunction](#) : PowerSystemResource :  
 1448 IdentifiedObject : ExtEulIdentifiedObject

1449 Power flow controller for direct current that can be used in high-voltage direct current grids and  
 1450 for low-voltage direct current microgrids. It uses a high-frequency isolated dc-dc converter  
 1451 cascaded with a controllable full-bridge inverter that creates a small bipolar voltage in series  
 1452 with the line. The controller can control the power and compensate for accumulated voltage  
 1453 drop in a distribution line.

1454 Table 92 shows all attributes of DirectCurrentController.

1455 **Table 92 – Attributes of ExtFACTS::DirectCurrentController**

name	mult	type	description
enabled	0..1	Boolean	(NC) inherited from: <a href="#">AutomationFunction</a>
type	0..1	String	(NC) inherited from: <a href="#">AutomationFunction</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

1456

1457 Table 93 shows all association ends of DirectCurrentController with other classes.

1458 **Table 93 – Association ends of ExtFACTS::DirectCurrentController with other classes**

mult from	name	mult to	type	description
0..1	RegulatingCondEq	0..*	RegulatingCondEq	(NC) inherited from: <a href="#">EquipmentController</a>
0..1	HasPart	0..*	<a href="#">AutomationFunction</a>	(NC) inherited from: <a href="#">AutomationFunction</a>
0..1	FunctionBlock	0..*	<a href="#">FunctionBlock</a>	(NC) inherited from: <a href="#">AutomationFunction</a>
0..*	PartOf	0..1	<a href="#">AutomationFunction</a>	(NC) inherited from: <a href="#">AutomationFunction</a>
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource

mult from	name	mult to	type	description
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

1459

1460 **3.9.7 (NC) EquipmentController**

1461 Inheritance path = [AutomationFunction](#) : PowerSystemResource : IdentifiedObject :  
 1462 ExtEulIdentifiedObject

1463 Equipment controller is an automation function that can control one or multiple equipment  
 1464 function to archive all the targets inside the given tolerance.

1465 Table 94 shows all attributes of EquipmentController.

1466

**Table 94 – Attributes of ExtFACTS::EquipmentController**

name	mult	type	description
enabled	0..1	Boolean	(NC) inherited from: <a href="#">AutomationFunction</a>
type	0..1	String	(NC) inherited from: <a href="#">AutomationFunction</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

1467

1468 Table 95 shows all association ends of EquipmentController with other classes.

1469 **Table 95 – Association ends of ExtFACTS::EquipmentController with other classes**

mult from	name	mult to	type	description
0..1	RegulatingCondEq	0..*	RegulatingCondEq	(NC)
0..1	HasPart	0..*	<a href="#">AutomationFunction</a>	(NC) inherited from: <a href="#">AutomationFunction</a>
0..1	FunctionBlock	0..*	<a href="#">FunctionBlock</a>	(NC) inherited from: <a href="#">AutomationFunction</a>
0..*	PartOf	0..1	<a href="#">AutomationFunction</a>	(NC) inherited from: <a href="#">AutomationFunction</a>
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject

mult from	name	mult to	type	description
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

1470

1471 **3.9.8 (NC) FacilityPlantController**

1472 Inheritance path = [EquipmentController](#) : [AutomationFunction](#) : PowerSystemResource :  
 1473 IdentifiedObject : ExtEulIdentifiedObject

1474 Facility plant controller is controlling the equipment to optimize the facility plant.

1475 Table 96 shows all attributes of FacilityPlantController.

1476

**Table 96 – Attributes of ExtFACTS::FacilityPlantController**

name	mult	type	description
enabled	0..1	Boolean	(NC) inherited from: <a href="#">AutomationFunction</a>
type	0..1	String	(NC) inherited from: <a href="#">AutomationFunction</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

1477

1478 Table 97 shows all association ends of FacilityPlantController with other classes.

1479 **Table 97 – Association ends of ExtFACTS::FacilityPlantController with other classes**

mult from	name	mult to	type	description
0..1	RegulatingCondEq	0..*	RegulatingCondEq	(NC) inherited from: <a href="#">EquipmentController</a>
0..1	HasPart	0..*	<a href="#">AutomationFunction</a>	(NC) inherited from: <a href="#">AutomationFunction</a>
0..1	FunctionBlock	0..*	<a href="#">FunctionBlock</a>	(NC) inherited from: <a href="#">AutomationFunction</a>
0..*	PartOf	0..1	<a href="#">AutomationFunction</a>	(NC) inherited from: <a href="#">AutomationFunction</a>
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

1480

1481 **3.9.9 (NC) FACTSEquipment**

1482 Inheritance path = [RegulatingCondEq](#) : [EnergyConnection](#) : [ConductingEquipment](#) :  
 1483 [Equipment](#) : [PowerSystemResource](#) : [IdentifiedObject](#) : [ExtEulIdentifiedObject](#)

1484 Flexible Alternating Current Transmission System regulating equipment.

1485 Table 98 shows all attributes of FACTSEquipment.

1486 **Table 98 – Attributes of ExtFACTS::FACTSEquipment**

name	mult	type	description
capacitiveRating	0..1	Reactance	Capacitive reactance at maximum capacitive reactive power. Shall always be positive.
inductiveRating	0..1	Reactance	Inductive reactance at maximum inductive reactive power. Shall always be negative.
slope	0..1	VoltagePerReactivePower	The characteristics slope of an SVC defines how the reactive power output changes in proportion to the difference between the regulated bus voltage and the voltage setpoint. The attribute shall be a positive value or zero.
q	0..1	ReactivePower	Reactive power injection. Load sign convention is used, i.e. positive sign means flow out from a node. Starting value for a steady state solution.
controlEnabled	0..1	Boolean	inherited from: RegulatingCondEq
aggregate	0..1	Boolean	inherited from: Equipment
inService	0..1	Boolean	inherited from: Equipment
networkAnalysisEnabled	0..1	Boolean	inherited from: Equipment
normallyInService	0..1	Boolean	inherited from: Equipment
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

1487

1488 Table 99 shows all association ends of FACTSEquipment with other classes.

1489 **Table 99 – Association ends of ExtFACTS::FACTSEquipment with other classes**

mult from	name	mult to	type	description
1..1	FACTSAction	0..*	<a href="#">FACTSAction</a>	(NC) Action which is applied to a FACTS equipment.
0..*	RegulatingControl	0..1	RegulatingControl	inherited from: RegulatingCondEq
0..*	BaseVoltage	0..1	BaseVoltage	inherited from: ConductingEquipment
1..1	SvStatus	0..*	SvStatus	inherited from: ConductingEquipment
0..*	ProtectionEquipments	0..*	ProtectionEquipment	inherited from: ConductingEquipment
1..1	Terminals	0..*	Terminal	inherited from: ConductingEquipment
0..1	RelayDynamics	0..*	RelayDynamics	inherited from: ConductingEquipment
0..*	AggregatedEquipment	0..1	Equipment	(NC) inherited from: Equipment
0..1	Faults	0..*	Fault	inherited from: Equipment
0..1	OperationalLimitSet	0..*	OperationalLimitSet	inherited from: Equipment
1..1	ContingencyEquipment	0..*	ContingencyEquipment	inherited from: Equipment
0..*	EquipmentContainer	0..1	EquipmentContainer	inherited from: Equipment

mult from	name	mult to	type	description
0..*	AdditionalEquipmentContainer	0..*	EquipmentContainer	inherited from: Equipment
0..1	DetailedModelDynamics	0..*	DetailedModelDynamics	inherited from: Equipment
0..1	DetailedEquipment	0..*	Equipment	(NC) inherited from: Equipment
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

1490

1491 **3.9.10 (NC) FunctionBlock**

1492 Inheritance path = IdentifiedObject : ExtEulIdentifiedObject

1493 Function block is a function described as a set of elementary blocks. The blocks describe the  
1494 function between input variables and output variables.

1495 Table 100 shows all attributes of FunctionBlock.

1496

**Table 100 – Attributes of ExtFACTS::FunctionBlock**

name	mult	type	description
enabled	0..1	Boolean	(NC) True, if the function block is enabled (active). Otherwise false.
priority	0..1	Integer	(NC) Value 0 means ignore priority. 1 means the highest priority, 2 is the second highest priority.
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

1497

1498 Table 101 shows all association ends of FunctionBlock with other classes.

1499

**Table 101 – Association ends of ExtFACTS::FunctionBlock with other classes**

mult from	name	mult to	type	description
0..*	AutomationFunction	0..1	<a href="#">AutomationFunction</a>	(NC) Automation function describe automation that this function block is part of.
0..1	Input	1..*	<a href="#">FunctionInputVariable</a>	(NC) Function input variable describe the input or domain to the function block.



mult from	name	mult to	type	description
0..1	FunctionOutputVariable	1..*	<a href="#">FunctionOutputVariable</a>	(NC) Function output variable describe the output or codomain to the function block.
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

1500

1501 **3.9.11 (NC) FunctionInputVariable**

1502 Inheritance path = IdentifiedObject : ExtEulIdentifiedObject

1503 Functional input variable defines the domain of the function.

1504 Table 102 shows all attributes of FunctionInputVariable.

1505 **Table 102 – Attributes of ExtFACTS::FunctionInputVariable**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

1506

1507 Table 103 shows all association ends of FunctionInputVariable with other classes.

1508 **Table 103 – Association ends of ExtFACTS::FunctionInputVariable with other classes**

mult from	name	mult to	type	description
1..*	Function	0..1	<a href="#">FunctionBlock</a>	(NC) Function block describe the function that function input variable provides the domain for.
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

1509

1510 **3.9.12 (NC) FunctionOutputVariable**

1511 Inheritance path = IdentifiedObject : ExtEulIdentifiedObject

1512 Functional output variable defines the codomain of the function.

1513 Table 104 shows all attributes of FunctionOutputVariable.

1514 **Table 104 – Attributes of ExtFACTS::FunctionOutputVariable**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject

name	mult	type	description
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 105 shows all association ends of FunctionOutputVariable with other classes.

**Table 105 – Association ends of ExtFACTS::FunctionOutputVariable with other classes**

mult from	name	mult to	type	description
1..*	FunctionBlock	0..1	<a href="#">FunctionBlock</a>	(NC) Function block describe the function that function output variable provides the codomain for.
0..*	PropertyReference	0..1	<a href="#">PropertyReference</a>	(NC) Property reference refers to a given class and property that is populated by the function output variable.
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.9.13 (NC) ImpedanceFunction

Inheritance path = [ControlFunctionBlock](#) : [FunctionBlock](#) : IdentifiedObject : ExtEulIdentifiedObject

Impedance function is a function block that calculates the controlled equipment operation point to archive the target impedance.

Table 106 shows all attributes of ImpedanceFunction.

**Table 106 – Attributes of ExtFACTS::ImpedanceFunction**

name	mult	type	description
targetValue	0..1	Impedance	(NC) Target value for the impedance that the control function is calculating to archive by adjusting the operational setting to the controlled equipment.
isDiscrete	0..1	Boolean	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
targetDeadband	0..1	Float	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
maxAllowedTargetValue	0..1	PerCent	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
minAllowedTargetValue	0..1	PerCent	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
enabled	0..1	Boolean	(NC) inherited from: <a href="#">FunctionBlock</a>
priority	0..1	Integer	(NC) inherited from: <a href="#">FunctionBlock</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject

name	mult	type	description
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 107 shows all association ends of ImpedanceFunction with other classes.

**Table 107 – Association ends of ExtFACTS::ImpedanceFunction with other classes**

mult from	name	mult to	type	description
0..*	AutomationFunction	0..1	<a href="#">AutomationFunction</a>	(NC) inherited from: <a href="#">FunctionBlock</a>
0..1	Input	1..*	<a href="#">FunctionInputVariable</a>	(NC) inherited from: <a href="#">FunctionBlock</a>
0..1	FunctionOutputVariable	1..*	<a href="#">FunctionOutputVariable</a>	(NC) inherited from: <a href="#">FunctionBlock</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.9.14 (NC) ModularStaticSynchronousSeriesCompensator

Inheritance path = [FACTSEquipment](#) : RegulatingCondEq : EnergyConnection : ConductingEquipment : Equipment : PowerSystemResource : IdentifiedObject : ExtEulIdentifiedObject

Modular static synchronous series compensator (MSSSC) is a type of flexible AC transmission system regulating equipment which consists of solid-state voltage source inverter connected in series with a transmission line. This is similar to static synchronous series compensator (SSSC), but without injection transformer. This enables the MSSSC to be truly modular with the ability to simply install a number of equipment in series to provide a desired maximum level of impedance. MSSSC can be dispersed into multiple location in a circuit working collectively under the same controller scheme.

Table 108 shows all attributes of ModularStaticSynchronousSeriesCompensator.

**Table 108 – Attributes of ExtFACTS::ModularStaticSynchronousSeriesCompensator**

name	mult	type	description
capacitiveRating	0..1	Reactance	inherited from: <a href="#">FACTSEquipment</a>
inductiveRating	0..1	Reactance	inherited from: <a href="#">FACTSEquipment</a>
slope	0..1	VoltagePerReactivePower	inherited from: <a href="#">FACTSEquipment</a>
q	0..1	ReactivePower	inherited from: <a href="#">FACTSEquipment</a>
controlEnabled	0..1	Boolean	inherited from: RegulatingCondEq
aggregate	0..1	Boolean	inherited from: Equipment
inService	0..1	Boolean	inherited from: Equipment
networkAnalysisEnabled	0..1	Boolean	inherited from: Equipment
normallyInService	0..1	Boolean	inherited from: Equipment
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject

name	mult	type	description
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 109 shows all association ends of ModularStaticSynchronousSeriesCompensator with other classes.

**Table 109 – Association ends of  
ExtFACTS::ModularStaticSynchronousSeriesCompensator with other classes**

mult from	name	mult to	type	description
1..1	FACTSAction	0..*	<a href="#">FACTSAction</a>	(NC) inherited from: <a href="#">FACTSEquipment</a>
0..*	RegulatingControl	0..1	RegulatingControl	inherited from: RegulatingCondEq
0..*	BaseVoltage	0..1	BaseVoltage	inherited from: ConductingEquipment
1..1	SvStatus	0..*	SvStatus	inherited from: ConductingEquipment
0..*	ProtectionEquipments	0..*	ProtectionEquipment	inherited from: ConductingEquipment
1..1	Terminals	0..*	Terminal	inherited from: ConductingEquipment
0..1	RelayDynamics	0..*	RelayDynamics	inherited from: ConductingEquipment
0..*	AggregatedEquipment	0..1	Equipment	(NC) inherited from: Equipment
0..1	Faults	0..*	Fault	inherited from: Equipment
0..1	OperationalLimitSet	0..*	OperationalLimitSet	inherited from: Equipment
1..1	ContingencyEquipment	0..*	ContingencyEquipment	inherited from: Equipment
0..*	EquipmentContainer	0..1	EquipmentContainer	inherited from: Equipment
0..*	AdditionalEquipmentContainer	0..*	EquipmentContainer	inherited from: Equipment
0..1	DetailedModelDynamics	0..*	DetailedModelDynamics	inherited from: Equipment
0..1	DetailedEquipment	0..*	Equipment	(NC) inherited from: Equipment
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.9.15 (NC) PowerFactorFunction

Inheritance path = [ControlFunctionBlock](#) : [FunctionBlock](#) : IdentifiedObject : ExtEulIdentifiedObject

Power factor function is a function block that calculates the controlled equipment operation point to archive the target power factor.

Table 110 shows all attributes of PowerFactorFunction.

1555

**Table 110 – Attributes of ExtFACTS::PowerFactorFunction**

name	mult	type	description
targetValue	0..1	Float	(NC) Target value for the power factor that the control function is calculating to archive by adjusting the operational setting to the controlled equipment.
isDiscrete	0..1	Boolean	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
targetDeadband	0..1	Float	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
maxAllowedTargetValue	0..1	PerCent	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
minAllowedTargetValue	0..1	PerCent	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
enabled	0..1	Boolean	(NC) inherited from: <a href="#">FunctionBlock</a>
priority	0..1	Integer	(NC) inherited from: <a href="#">FunctionBlock</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

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1557

Table 111 shows all association ends of PowerFactorFunction with other classes.

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**Table 111 – Association ends of ExtFACTS::PowerFactorFunction with other classes**

mult from	name	mult to	type	description
0..*	AutomationFunction	0..1	<a href="#">AutomationFunction</a>	(NC) inherited from: <a href="#">FunctionBlock</a>
0..1	Input	1..*	<a href="#">FunctionInputVariable</a>	(NC) inherited from: <a href="#">FunctionBlock</a>
0..1	FunctionOutputVariable	1..*	<a href="#">FunctionOutputVariable</a>	(NC) inherited from: <a href="#">FunctionBlock</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

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**3.9.16 (NC) PowerPlantController**

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Inheritance path = [EquipmentController](#) : [AutomationFunction](#) : PowerSystemResource : IdentifiedObject : ExtEulIdentifiedObject

1562

Power plant controller is controlling the equipment to optimize the performance of the power plant.

1563

Table 112 shows all attributes of PowerPlantController.

1564

**Table 112 – Attributes of ExtFACTS::PowerPlantController**

name	mult	type	description
enabled	0..1	Boolean	(NC) inherited from: <a href="#">AutomationFunction</a>
type	0..1	String	(NC) inherited from: <a href="#">AutomationFunction</a>
aliasName	0..1	String	inherited from: IdentifiedObject

name	mult	type	description
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 113 shows all association ends of PowerPlantController with other classes.

**Table 113 – Association ends of ExtFACTS::PowerPlantController with other classes**

mult from	name	mult to	type	description
0..1	RegulatingCondEq	0..*	RegulatingCondEq	(NC) inherited from: <a href="#">EquipmentController</a>
0..1	HasPart	0..*	<a href="#">AutomationFunction</a>	(NC) inherited from: <a href="#">AutomationFunction</a>
0..1	FunctionBlock	0..*	<a href="#">FunctionBlock</a>	(NC) inherited from: <a href="#">AutomationFunction</a>
0..*	PartOf	0..1	<a href="#">AutomationFunction</a>	(NC) inherited from: <a href="#">AutomationFunction</a>
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.9.17 (NC) ReactivePowerControlFunction

Inheritance path = [ControlFunctionBlock](#) : [FunctionBlock](#) : IdentifiedObject : ExtEulIdentifiedObject

Reactive power control function is a function block that calculate the controlled equipment operation point to archive the target reactive power.

Table 114 shows all attributes of ReactivePowerControlFunction.

**Table 114 – Attributes of ExtFACTS::ReactivePowerControlFunction**

name	mult	type	description
targetValue	0..1	ReactivePower	(NC) Target value for the reactive power that the control function is calculating to archive by adjusting the operational setting to the controlled equipment.
isDiscrete	0..1	Boolean	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
targetDeadband	0..1	Float	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
maxAllowedTargetValue	0..1	PerCent	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
minAllowedTargetValue	0..1	PerCent	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
enabled	0..1	Boolean	(NC) inherited from: <a href="#">FunctionBlock</a>
priority	0..1	Integer	(NC) inherited from: <a href="#">FunctionBlock</a>

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 115 shows all association ends of ReactivePowerControlFunction with other classes.

**Table 115 – Association ends of ExtFACTS::ReactivePowerControlFunction with other classes**

mult from	name	mult to	type	description
0..*	AutomationFunction	0..1	<a href="#">AutomationFunction</a>	(NC) inherited from: <a href="#">FunctionBlock</a>
0..1	Input	1..*	<a href="#">FunctionInputVariable</a>	(NC) inherited from: <a href="#">FunctionBlock</a>
0..1	FunctionOutputVariable	1..*	<a href="#">FunctionOutputVariable</a>	(NC) inherited from: <a href="#">FunctionBlock</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.9.18 (NC) StaticSynchronousCompensator

Inheritance path = [FACTSEquipment](#) : RegulatingCondEq : EnergyConnection : ConductingEquipment : Equipment : PowerSystemResource : IdentifiedObject : ExtEulIdentifiedObject

Static synchronous compensator (STATCOM), also known as a static synchronous condenser (STATCON), is a type of flexible AC transmission system regulating equipment used on alternating current electricity transmission networks. It is based on a power electronics voltage-source converter and can act as either a source or sink of reactive AC power to an electricity network. If connected to a source of power it can also provide active AC power.

Table 116 shows all attributes of StaticSynchronousCompensator.

**Table 116 – Attributes of ExtFACTS::StaticSynchronousCompensator**

name	mult	type	description
capacitiveRating	0..1	Reactance	inherited from: <a href="#">FACTSEquipment</a>
inductiveRating	0..1	Reactance	inherited from: <a href="#">FACTSEquipment</a>
slope	0..1	VoltagePerReactivePower	inherited from: <a href="#">FACTSEquipment</a>
q	0..1	ReactivePower	inherited from: <a href="#">FACTSEquipment</a>
controlEnabled	0..1	Boolean	inherited from: RegulatingCondEq
aggregate	0..1	Boolean	inherited from: Equipment
inService	0..1	Boolean	inherited from: Equipment
networkAnalysisEnabled	0..1	Boolean	inherited from: Equipment
normallyInService	0..1	Boolean	inherited from: Equipment



name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 117 shows all association ends of StaticSynchronousCompensator with other classes.

**Table 117 – Association ends of ExtFACTS::StaticSynchronousCompensator with other classes**

mult from	name	mult to	type	description
1..1	FACTSAction	0..*	<a href="#">FACTSAction</a>	(NC) inherited from: <a href="#">FACTSEquipment</a>
0..*	RegulatingControl	0..1	RegulatingControl	inherited from: RegulatingCondEq
0..*	BaseVoltage	0..1	BaseVoltage	inherited from: ConductingEquipment
1..1	SvStatus	0..*	SvStatus	inherited from: ConductingEquipment
0..*	ProtectionEquipments	0..*	ProtectionEquipment	inherited from: ConductingEquipment
1..1	Terminals	0..*	Terminal	inherited from: ConductingEquipment
0..1	RelayDynamics	0..*	RelayDynamics	inherited from: ConductingEquipment
0..*	AggregatedEquipment	0..1	Equipment	(NC) inherited from: Equipment
0..1	Faults	0..*	Fault	inherited from: Equipment
0..1	OperationalLimitSet	0..*	OperationalLimitSet	inherited from: Equipment
1..1	ContingencyEquipment	0..*	ContingencyEquipment	inherited from: Equipment
0..*	EquipmentContainer	0..1	EquipmentContainer	inherited from: Equipment
0..*	AdditionalEquipmentContainer	0..*	EquipmentContainer	inherited from: Equipment
0..1	DetailedModelDynamics	0..*	DetailedModelDynamics	inherited from: Equipment
0..1	DetailedEquipment	0..*	Equipment	(NC) inherited from: Equipment
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

**3.9.19 (NC) StaticSynchronousSeriesCompensator**

Inheritance path = [FACTSEquipment](#) : RegulatingCondEq : EnergyConnection :  
 ConductingEquipment : Equipment : PowerSystemResource : IdentifiedObject :  
 ExtEulIdentifiedObject

Static synchronous series compensator (SSSC) is a type of flexible AC transmission system which consists of a solid-state voltage source inverter coupled with a transformer that is connected in series with a transmission line. This device can inject an almost sinusoidal voltage in series with the line. This injected voltage could be considered as an inductive or capacitive reactance, which is connected in series with the transmission line. This feature can provide controllable voltage compensation. In addition, SSSC is able to reverse the power flow by injecting a sufficiently large series reactive compensating voltage.

Table 118 shows all attributes of StaticSynchronousSeriesCompensator.

**Table 118 – Attributes of ExtFACTS::StaticSynchronousSeriesCompensator**

name	mult	type	description
capacitiveRating	0..1	Reactance	inherited from: <a href="#">FACTSEquipment</a>
inductiveRating	0..1	Reactance	inherited from: <a href="#">FACTSEquipment</a>
slope	0..1	VoltagePerReactivePower	inherited from: <a href="#">FACTSEquipment</a>
q	0..1	ReactivePower	inherited from: <a href="#">FACTSEquipment</a>
controlEnabled	0..1	Boolean	inherited from: RegulatingCondEq
aggregate	0..1	Boolean	inherited from: Equipment
inService	0..1	Boolean	inherited from: Equipment
networkAnalysisEnabled	0..1	Boolean	inherited from: Equipment
normallyInService	0..1	Boolean	inherited from: Equipment
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 119 shows all association ends of StaticSynchronousSeriesCompensator with other classes.

**Table 119 – Association ends of ExtFACTS::StaticSynchronousSeriesCompensator with other classes**

mult from	name	mult to	type	description
1..1	FACTSAction	0..*	<a href="#">FACTSAction</a>	(NC) inherited from: <a href="#">FACTSEquipment</a>
0..*	RegulatingControl	0..1	RegulatingControl	inherited from: RegulatingCondEq
0..*	BaseVoltage	0..1	BaseVoltage	inherited from: ConductingEquipment
1..1	SvStatus	0..*	SvStatus	inherited from: ConductingEquipment
0..*	ProtectionEquipments	0..*	ProtectionEquipment	inherited from: ConductingEquipment
1..1	Terminals	0..*	Terminal	inherited from: ConductingEquipment
0..1	RelayDynamics	0..*	RelayDynamics	inherited from: ConductingEquipment
0..*	AggregatedEquipment	0..1	Equipment	(NC) inherited from: Equipment

mult from	name	mult to	type	description
0..1	Faults	0..*	Fault	inherited from: Equipment
0..1	OperationalLimitSet	0..*	OperationalLimitSet	inherited from: Equipment
1..1	ContingencyEquipment	0..*	ContingencyEquipment	inherited from: Equipment
0..*	EquipmentContainer	0..1	EquipmentContainer	inherited from: Equipment
0..*	AdditionalEquipmentContainer	0..*	EquipmentContainer	inherited from: Equipment
0..1	DetailedModelDynamics	0..*	DetailedModelDynamics	inherited from: Equipment
0..1	DetailedEquipment	0..*	Equipment	(NC) inherited from: Equipment
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

1617

1618 **3.9.20 (NC) SubstationController**

1619 Inheritance path = [EquipmentController](#) : [AutomationFunction](#) : PowerSystemResource :  
 1620 IdentifiedObject : ExtEulIdentifiedObject

1621 Substation controller is controlling the equipment to optimize the use of the controlling  
 1622 equipment within a substation.

1623 Table 120 shows all attributes of SubstationController.

1624

**Table 120 – Attributes of ExtFACTS::SubstationController**

name	mult	type	description
mode	0..1	<a href="#">SubstationControllerModeKind</a>	(NC) Mode of the substation controller.
enabled	0..1	Boolean	(NC) inherited from: <a href="#">AutomationFunction</a>
type	0..1	String	(NC) inherited from: <a href="#">AutomationFunction</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

1625

1626 Table 121 shows all association ends of SubstationController with other classes.

1627 **Table 121 – Association ends of ExtFACTS::SubstationController with other classes**

mult from	name	mult to	type	description
0..1	RegulatingCondEq	0..*	RegulatingCondEq	(NC) inherited from: <a href="#">EquipmentController</a>
0..1	HasPart	0..*	<a href="#">AutomationFunction</a>	(NC) inherited from: <a href="#">AutomationFunction</a>
0..1	FunctionBlock	0..*	<a href="#">FunctionBlock</a>	(NC) inherited from: <a href="#">AutomationFunction</a>
0..*	PartOf	0..1	<a href="#">AutomationFunction</a>	(NC) inherited from: <a href="#">AutomationFunction</a>
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

1628

1629 **3.9.21 (NC) TapChangerController**

1630 Inheritance path = [EquipmentController](#) : [AutomationFunction](#) : PowerSystemResource :  
 1631 IdentifiedObject : ExtEulIdentifiedObject

1632 Tap changer controller is a equipment controller that control a tap changer, e.g. how the voltage  
 1633 at the end of a line varies with the load level and compensation of the voltage drop by tap  
 1634 adjustment.

1635 Table 122 shows all attributes of TapChangerController.

1636 **Table 122 – Attributes of ExtFACTS::TapChangerController**

name	mult	type	description
enabled	0..1	Boolean	(NC) inherited from: <a href="#">AutomationFunction</a>
type	0..1	String	(NC) inherited from: <a href="#">AutomationFunction</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

1637

1638 Table 123 shows all association ends of TapChangerController with other classes.

1639 **Table 123 – Association ends of ExtFACTS::TapChangerController with other classes**

mult from	name	mult to	type	description
0..1	TapChanger	0..*	TapChanger	(NC)
0..1	RegulatingCondEq	0..*	RegulatingCondEq	(NC) inherited from: <a href="#">EquipmentController</a>
0..1	HasPart	0..*	<a href="#">AutomationFunction</a>	(NC) inherited from: <a href="#">AutomationFunction</a>

mult from	name	mult to	type	description
0..1	FunctionBlock	0..*	<a href="#">FunctionBlock</a>	(NC) inherited from: <a href="#">AutomationFunction</a>
0..*	PartOf	0..1	<a href="#">AutomationFunction</a>	(NC) inherited from: <a href="#">AutomationFunction</a>
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

1640

1641 **3.9.22 (NC) ThyristorControlledSeriesCompensator**

1642 Inheritance path = [FACTSEquipment](#) : RegulatingCondEq : EnergyConnection :  
 1643 ConductingEquipment : Equipment : PowerSystemResource : IdentifiedObject :  
 1644 ExtEulIdentifiedObject

1645 Thyristor-controlled series capacitors (TCSC) is a type of flexible AC transmission system  
 1646 regulating equipment that is configured with controlled reactors in parallel with sections of a  
 1647 capacitor bank. This combination allows smooth control of the fundamental frequency  
 1648 capacitive reactance over a wide range. The thyristor valve contains a string of series connected  
 1649 high power thyristors. TCSC can control power flows in order to achieve eliminating of line  
 1650 overloads, reducing loop flows and minimising system losses.

1651 Table 124 shows all attributes of ThyristorControlledSeriesCompensator.

1652 **Table 124 – Attributes of ExtFACTS::ThyristorControlledSeriesCompensator**

name	mult	type	description
compensationImpedance	0..1	Impedance	The operated compensation impedance of the device. The attribute value shall be positive if compensation is in capacitive rating. The attribute value shall be negative if compensation is in inductive rating.
flexibleCapacitiveRating	0..1	Reactance	Flexible capacitive reactance that can be controlled by the controller at maximum capacitive reactive power. Shall always be positive.
flexibleInductiveRating	0..1	Reactance	Flexible inductive reactance that can be controlled by the controller at maximum inductive reactive power. Shall always be negative.
capacitiveRating	0..1	Reactance	inherited from: <a href="#">FACTSEquipment</a>
inductiveRating	0..1	Reactance	inherited from: <a href="#">FACTSEquipment</a>
slope	0..1	VoltagePerReactivePower	inherited from: <a href="#">FACTSEquipment</a>
q	0..1	ReactivePower	inherited from: <a href="#">FACTSEquipment</a>
controlEnabled	0..1	Boolean	inherited from: RegulatingCondEq
aggregate	0..1	Boolean	inherited from: Equipment
inService	0..1	Boolean	inherited from: Equipment

name	mult	type	description
networkAnalysisEnabled	0..1	Boolean	inherited from: Equipment
normallyInService	0..1	Boolean	inherited from: Equipment
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 125 shows all association ends of ThyristorControlledSeriesCompensator with other classes.

**Table 125 – Association ends of ExtFACTS::ThyristorControlledSeriesCompensator with other classes**

mult from	name	mult to	type	description
1..1	FACTSAction	0..*	<a href="#">FACTSAction</a>	(NC) inherited from: <a href="#">FACTSEquipment</a>
0..*	RegulatingControl	0..1	RegulatingControl	inherited from: RegulatingCondEq
0..*	BaseVoltage	0..1	BaseVoltage	inherited from: ConductingEquipment
1..1	SvStatus	0..*	SvStatus	inherited from: ConductingEquipment
0..*	ProtectionEquipments	0..*	ProtectionEquipment	inherited from: ConductingEquipment
1..1	Terminals	0..*	Terminal	inherited from: ConductingEquipment
0..1	RelayDynamics	0..*	RelayDynamics	inherited from: ConductingEquipment
0..*	AggregatedEquipment	0..1	Equipment	(NC) inherited from: Equipment
0..1	Faults	0..*	Fault	inherited from: Equipment
0..1	OperationalLimitSet	0..*	OperationalLimitSet	inherited from: Equipment
1..1	ContingencyEquipment	0..*	ContingencyEquipment	inherited from: Equipment
0..*	EquipmentContainer	0..1	EquipmentContainer	inherited from: Equipment
0..*	AdditionalEquipmentContainer	0..*	EquipmentContainer	inherited from: Equipment
0..1	DetailedModelDynamics	0..*	DetailedModelDynamics	inherited from: Equipment
0..1	DetailedEquipment	0..*	Equipment	(NC) inherited from: Equipment
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

**3.9.23 (NC) UnifiedPowerFlowController**

Inheritance path = [EquipmentController](#) : [AutomationFunction](#) : PowerSystemResource : IdentifiedObject : ExtEulIdentifiedObject

Unified power flow controller (UPFC) is providing fast-acting reactive power compensation on high-voltage electricity transmission networks.

Table 126 shows all attributes of UnifiedPowerFlowController.

**Table 126 – Attributes of ExtFACTS::UnifiedPowerFlowController**

name	mult	type	description
enabled	0..1	Boolean	(NC) inherited from: <a href="#">AutomationFunction</a>
type	0..1	String	(NC) inherited from: <a href="#">AutomationFunction</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 127 shows all association ends of UnifiedPowerFlowController with other classes.

**Table 127 – Association ends of ExtFACTS::UnifiedPowerFlowController with other classes**

mult from	name	mult to	type	description
0..1	RegulatingCondEq	0..*	RegulatingCondEq	(NC) inherited from: <a href="#">EquipmentController</a>
0..1	HasPart	0..*	<a href="#">AutomationFunction</a>	(NC) inherited from: <a href="#">AutomationFunction</a>
0..1	FunctionBlock	0..*	<a href="#">FunctionBlock</a>	(NC) inherited from: <a href="#">AutomationFunction</a>
0..*	PartOf	0..1	<a href="#">AutomationFunction</a>	(NC) inherited from: <a href="#">AutomationFunction</a>
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

**3.9.24 (NC) VoltageControlFunction**

Inheritance path = [ControlFunctionBlock](#) : [FunctionBlock](#) : IdentifiedObject : ExtEulIdentifiedObject

Voltage control function is a function block that calculate the controlled equipment operation point to archive the target voltage.

Table 128 shows all attributes of VoltageControlFunction.



1677

**Table 128 – Attributes of ExtFACTS::VoltageControlFunction**

name	mult	type	description
targetValue	0..1	Voltage	(NC) Target value for the voltage that the control function is calculating to archive by adjusting the operational setting to the controlled equipment.
isDiscrete	0..1	Boolean	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
targetDeadband	0..1	Float	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
maxAllowedTargetValue	0..1	PerCent	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
minAllowedTargetValue	0..1	PerCent	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
enabled	0..1	Boolean	(NC) inherited from: <a href="#">FunctionBlock</a>
priority	0..1	Integer	(NC) inherited from: <a href="#">FunctionBlock</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

1678

1679

Table 129 shows all association ends of VoltageControlFunction with other classes.

1680

**Table 129 – Association ends of ExtFACTS::VoltageControlFunction with other classes**

mult from	name	mult to	type	description
0..*	AutomationFunction	0..1	<a href="#">AutomationFunction</a>	(NC) inherited from: <a href="#">FunctionBlock</a>
0..1	Input	1..*	<a href="#">FunctionInputVariable</a>	(NC) inherited from: <a href="#">FunctionBlock</a>
0..1	FunctionOutputVariable	1..*	<a href="#">FunctionOutputVariable</a>	(NC) inherited from: <a href="#">FunctionBlock</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

1681

1682

**3.9.25 (NC) CompensatorControlModeKind enumeration**

1683

Kind of compensator controller mode.

1684

Table 130 shows all literals of CompensatorControlModeKind.

1685

**Table 130 – Literals of ExtFACTS::CompensatorControlModeKind**

literal	value	description
reactivePower		Reactive power control.
voltage		Voltage control.

1686

1687

**3.9.26 (NC) SubstationControllerModeKind enumeration**

1688

Kind of substation controller mode.

1689

Table 131 shows all literals of SubstationControllerModeKind.

1690

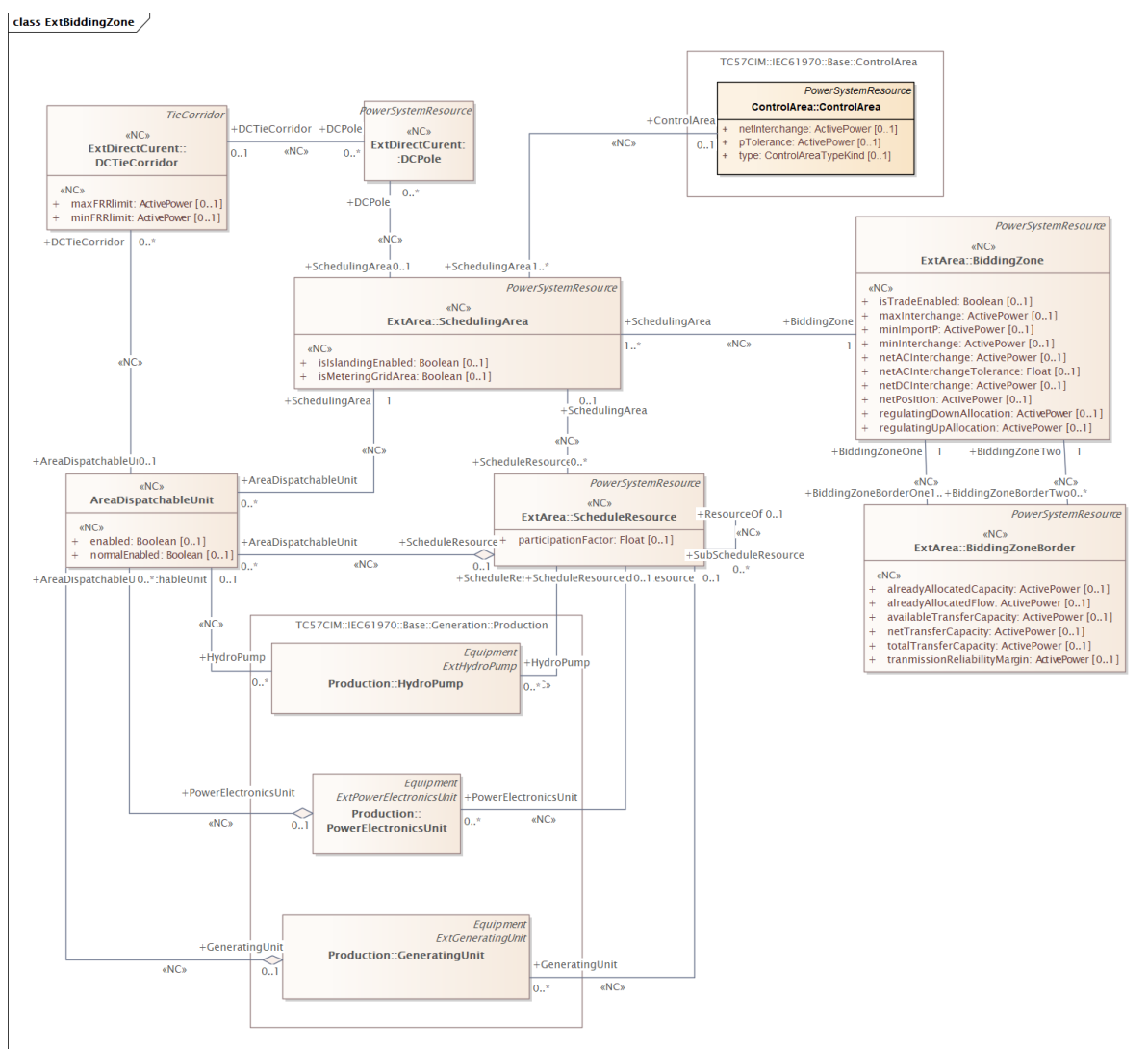
**Table 131 – Literals of ExtFACTS::SubstationControllerModeKind**

literal	value	description
reactivePower		Reactive power control is the primary control of the substation.
voltage		Voltage control is the primary control of the substation.
activePower		Active power control is the primary control of the substation..

1691

1692 **3.10 Package ExtGLSKs**1693 **3.10.1 General**

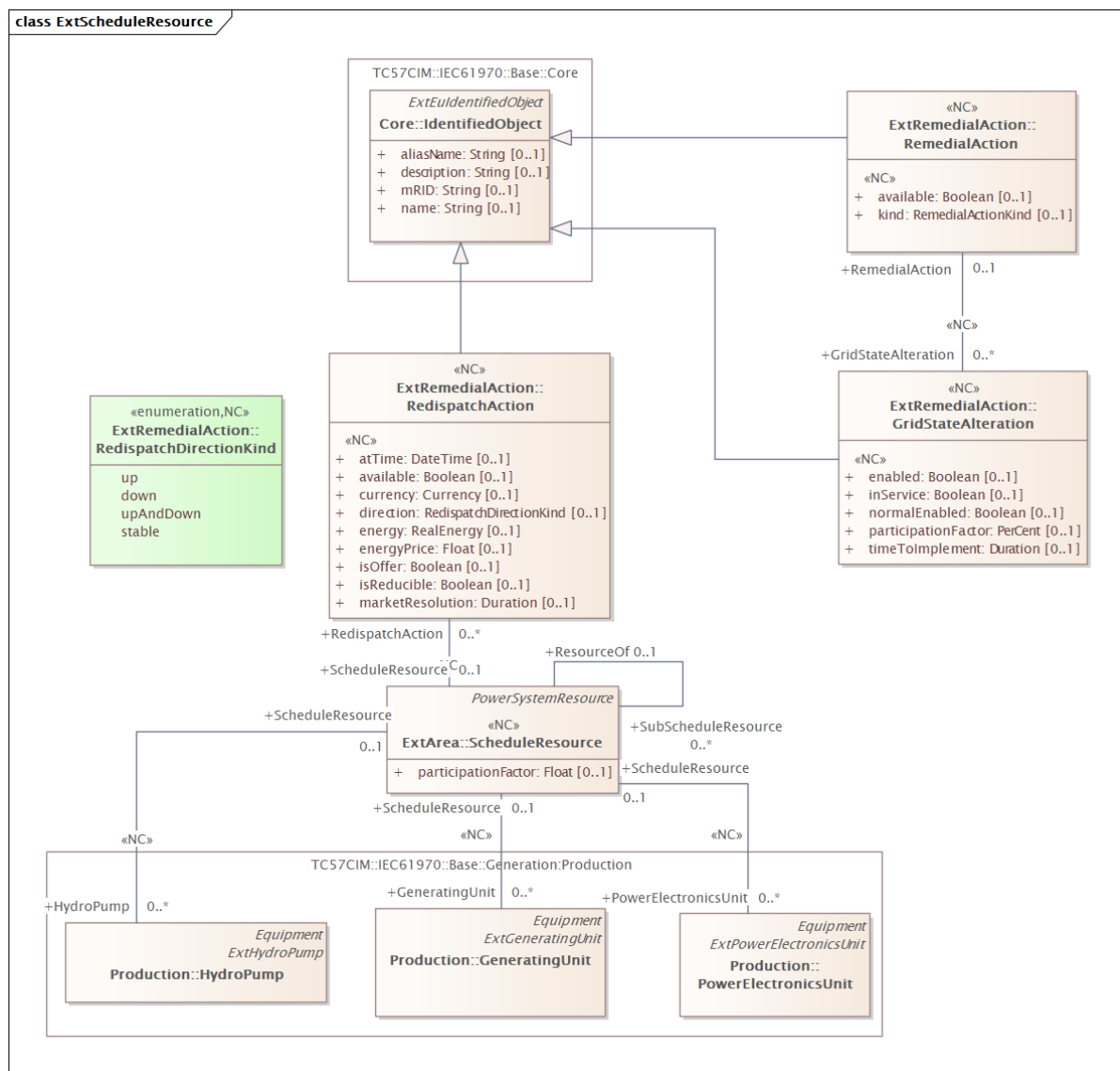
1694 This package contains the extensions related to the generation and load shift keys (GLSKs).



1695

1696 **Figure 10 – Class diagram ExtGLSKs::ExtBiddingZone**

1697 Figure 10: The diagram contains classes related to bidding zone.



**Figure 11 – Class diagram ExtGLSKs::ExtScheduleResource**

Figure 11: The diagram contains classes related to schedule resource.

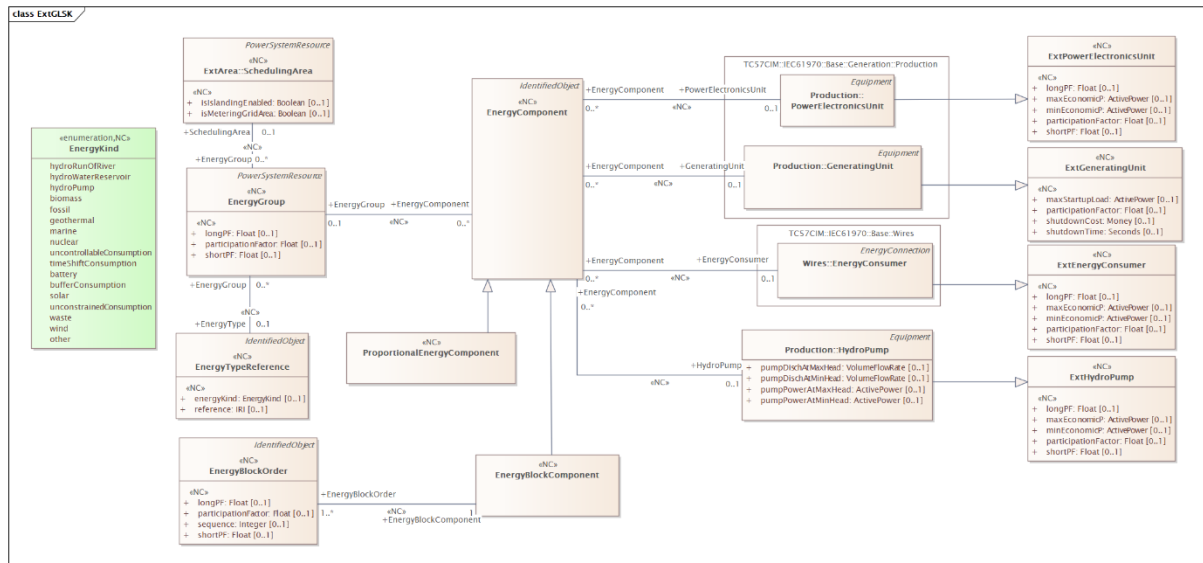


Figure 12 – Class diagram ExtGLSKs::ExtGLSK

Figure 12: The diagram contains classes related to GLSK.

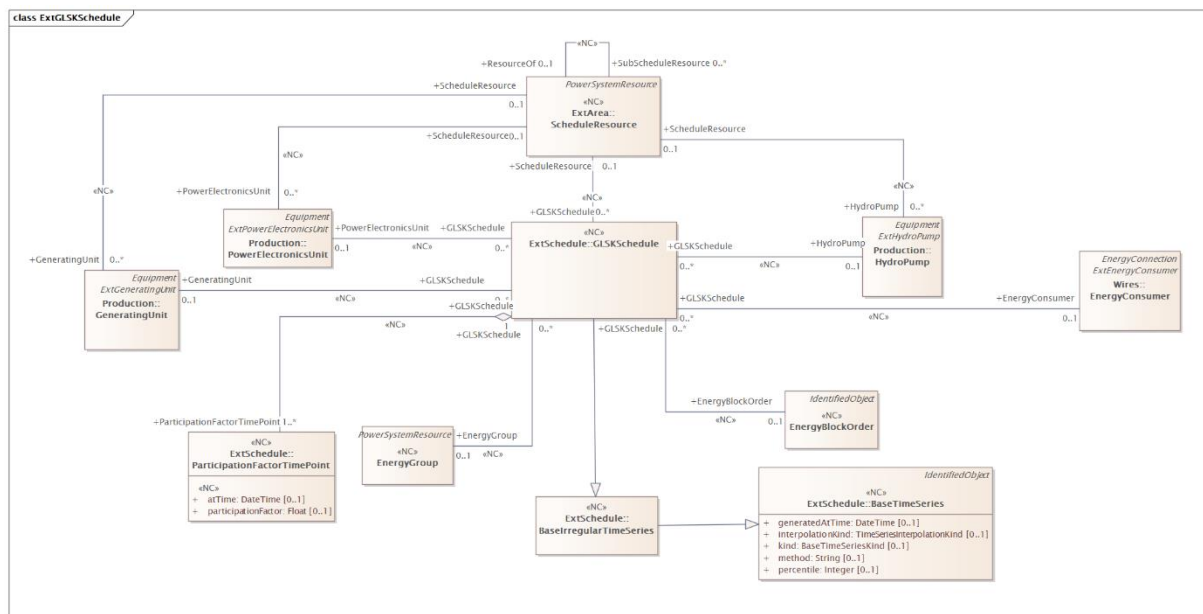
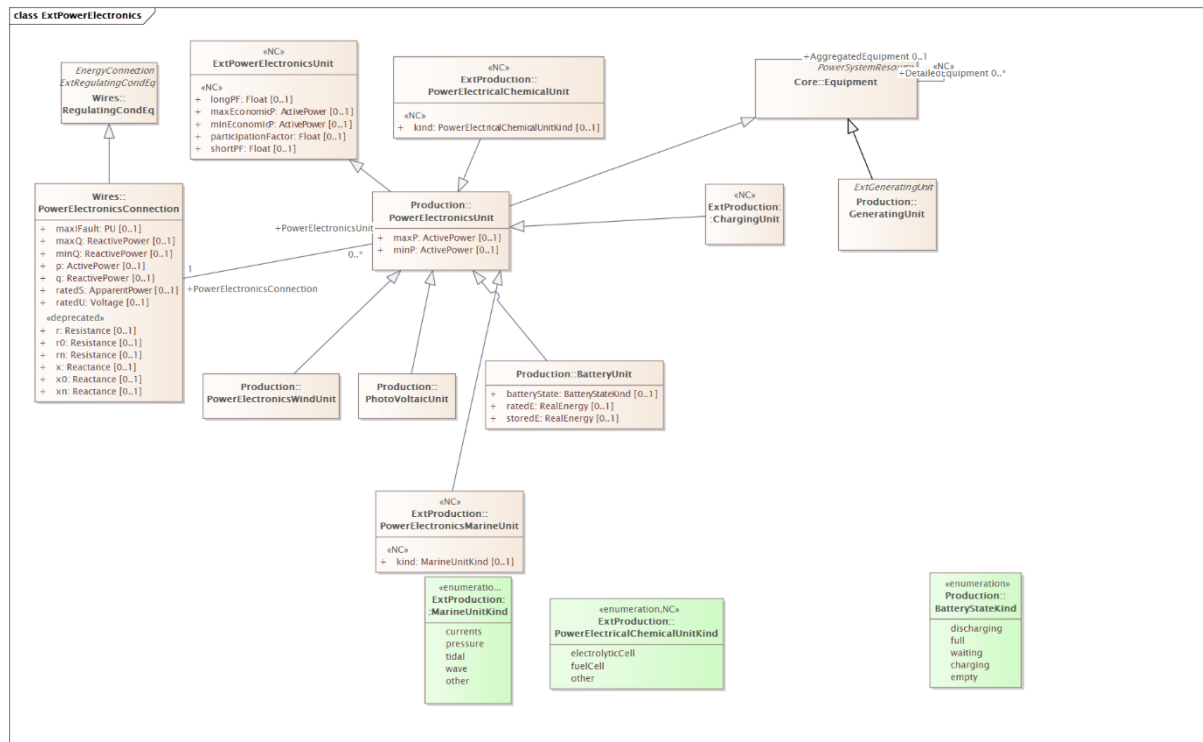


Figure 13 – Class diagram ExtGLSKs::ExtGLSKSchedule

Figure 13: The diagram contains classes related to GLSK schedule.



**Figure 14 – Class diagram ExtGLSKs::ExtPowerElectronics**

Figure 14: The diagram contains classes related to power electronics.

### 3.10.2 (NC) AreaDispatchableUnit root class

Allocates a given producing or consuming unit, including direct current corridor and collection of units, to a given control area (through the scheduling area) for supporting the control of the given area through dispatch instruction.

Table 132 shows all attributes of AreaDispatchableUnit.

**Table 132 – Attributes of ExtGLSKs::AreaDispatchableUnit**

name	mult	type	description
enabled	0..1	Boolean	(NC) Identifies if the unit is enabled to accept a dispatch instruction. If true, the unit is enabled to accept a dispatch instruction. If false, the unit has the capability, but it is not enabled to receive a dispatch instruction.
normalEnabled	0..1	Boolean	(NC) Identifies if the unit is normally enabled to accept a dispatch instruction. If true, the unit is enabled to accept a dispatch instruction. If false, the unit has the capability, but it is not enabled to receive a dispatch instruction.

Table 133 shows all association ends of AreaDispatchableUnit with other classes.

**Table 133 – Association ends of ExtGLSKs::AreaDispatchableUnit with other classes**

mult from	name	mult to	type	description
0..*	SchedulingArea	1..1	<a href="#">SchedulingArea</a>	(NC) The scheduling area that has this area dispatchable unit.
0..*	GeneratingUnit	0..1	GeneratingUnit	(NC) The generating unit that belongs to area dispatchable unit.

mult from	name	mult to	type	description
0..1	HydroPump	0..*	HydroPump	(NC) Hydro Pump which is associated with the area dispatchable unit.
0..*	PowerElectronicsUnit	0..1	PowerElectronicsUnit	(NC) The power electronics unit that belongs to this area dispatchable unit.
0..*	ScheduleResource	0..1	<a href="#">ScheduleResource</a>	(NC) The resource which is mFRR for the EnergySchedulingArea to which the AreaDispatchableUnit is connected. Note that this can be different than the area for the energy schedule.
0..1	DCTieCorridor	0..*	<a href="#">DCTieCorridor</a>	(NC) The DCTieCorridor which belongs to the AreaDispatchableUnit.

1719

1720 **3.10.3 (NC) EnergyBlockComponent**1721 Inheritance path = [EnergyComponent](#) : IdentifiedObject : ExtEulIdentifiedObject

1722 The energy block component is an energy component where the energy group active power is distributed according to the energy block order of each energy component in an energy group.

1723 Table 134 shows all attributes of EnergyBlockComponent.

1724

**Table 134 – Attributes of ExtGLSKs::EnergyBlockComponent**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

1726

1727 Table 135 shows all association ends of EnergyBlockComponent with other classes.

1728 **Table 135 – Association ends of ExtGLSKs::EnergyBlockComponent with other classes**

mult from	name	mult to	type	description
1..1	EnergyBlockOrder	1..*	<a href="#">EnergyBlockOrder</a>	(NC) The energy block order for this energy block component.
0..*	HydroPump	0..1	HydroPump	(NC) inherited from: <a href="#">EnergyComponent</a>
0..*	GeneratingUnit	0..1	GeneratingUnit	(NC) inherited from: <a href="#">EnergyComponent</a>
0..*	EnergyGroup	0..1	<a href="#">EnergyGroup</a>	(NC) inherited from: <a href="#">EnergyComponent</a>
0..*	PowerElectronicsUnit	0..1	PowerElectronicsUnit	(NC) inherited from: <a href="#">EnergyComponent</a>
0..*	EnergyConsumer	0..1	EnergyConsumer	(NC) inherited from: <a href="#">EnergyComponent</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

1729

1730 **3.10.4 (NC) EnergyBlockOrder**

1731 Inheritance path = IdentifiedObject : ExtEulIdentifiedObject

1732 The energy block order is a block (an amount) of active power that forms the sequence of active  
1733 power orders that are going to be distrusted to an energy block component.

1734 Table 136 shows all attributes of EnergyBlockOrder.

1735 **Table 136 – Attributes of ExtGLSKs::EnergyBlockOrder**

name	mult	type	description
sequence	0..1	Integer	(NC) The sequence order for a given block dispatch instruction. The sequence number need to be unique for a given block dispatch instruction, e.g. two order in the same instruction cannot have the same sequence.
longPF	0..1	Float	(NC) Block order long term economic participation factor.
participationFactor	0..1	Float	(NC) Situation economic participation factor.
shortPF	0..1	Float	(NC) Block order short term economic participation factor.
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

1736

1737 Table 137 shows all association ends of EnergyBlockOrder with other classes.

1738 **Table 137 – Association ends of ExtGLSKs::EnergyBlockOrder with other classes**

mult from	name	mult to	type	description
1..*	EnergyBlockComponent	1..1	<a href="#">EnergyBlockComponent</a>	(NC) The energy block component that has this energy block order.
0..1	GLSKSchedule	0..*	<a href="#">GLSKSchedule</a>	(NC) The GLSK schedule for a EnergyBlockOrder.
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

1739

1740 **3.10.5 (NC) EnergyComponent**

1741 Inheritance path = IdentifiedObject : ExtEulIdentifiedObject

1742 The energy component is an active power component for an energy producer or a consumer  
1743 that has the same energy characteristic, e.g. fuel type and technology.

1744 Table 138 shows all attributes of EnergyComponent.

1745 **Table 138 – Attributes of ExtGLSKs::EnergyComponent**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject



name	mult	type	description
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 139 shows all association ends of EnergyComponent with other classes.

**Table 139 – Association ends of ExtGLSKs::EnergyComponent with other classes**

mult from	name	mult to	type	description
0..*	HydroPump	0..1	HydroPump	(NC) The hydro pump that relates to this energy component.
0..*	GeneratingUnit	0..1	GeneratingUnit	(NC) The generating unit that is part of this energy component.
0..*	EnergyGroup	0..1	<a href="#">EnergyGroup</a>	(NC) The energy group that has this energy component.
0..*	PowerElectronicsUnit	0..1	PowerElectronicsUnit	(NC) The power electronics unit that relates to this energy component.
0..*	EnergyConsumer	0..1	EnergyConsumer	(NC) The energy consumer that relates to this energy component.
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.10.6 (NC) EnergyGroup

Inheritance path = PowerSystemResource : IdentifiedObject : ExtEulIdentifiedObject

An energy group is an aggregation of energy components which have the same energy characteristic, e.g. fuel type and technology. It can be used to distribute forecast of a given energy characteristic.

Table 140 shows all attributes of EnergyGroup.

**Table 140 – Attributes of ExtGLSKs::EnergyGroup**

name	mult	type	description
longPF	0..1	Float	(NC) Energy group long term economic participation factor.
participationFactor	0..1	Float	(NC) Situation economic participation factor.
shortPF	0..1	Float	(NC) Energy group short term economic participation factor.
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 141 shows all association ends of EnergyGroup with other classes.

**Table 141 – Association ends of ExtGLSKs::EnergyGroup with other classes**

mult from	name	mult to	type	description
0..*	SchedulingArea	0..1	<a href="#">SchedulingArea</a>	(NC) The scheduling area that has this energy group.
0..*	EnergyType	0..1	<a href="#">EnergyTypeReference</a>	(NC) The energy type that the energy group are defined by.
0..1	EnergyComponent	0..*	<a href="#">EnergyComponent</a>	(NC) The energy component that is part of this energy group.
0..1	GLSKSchedule	0..*	<a href="#">GLSKSchedule</a>	(NC) The GLSK schedule for an EnergyGroup.
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.10.7 (NC) EnergyTypeReference

Inheritance path = IdentifiedObject : ExtEulIdentifiedObject

An energy type reference refers to an energy characteristic that is needed for reporting, e.g. European Energy Certificate System (EECS). The kind of energy should be possible to be linked with different type of energy forecast, e.g. wind production for a given area based on wind forecast.

Table 142 shows all attributes of EnergyTypeReference.

**Table 142 – Attributes of ExtGLSKs::EnergyTypeReference**

name	mult	type	description
energyKind	0..1	<a href="#">EnergyKind</a>	(NC) The kind of energy type.
reference	0..1	NullCIM	(NC) The reference IRI or URI to the energy type.
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 143 shows all association ends of EnergyTypeReference with other classes.

1771 **Table 143 – Association ends of ExtGLSKs::EnergyTypeReference with other classes**

mult from	name	mult to	type	description
0..1	EnergyGroup	0..*	<a href="#">EnergyGroup</a>	(NC) The energy group that has this energy type.
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

1772

1773 **3.10.8 (NC) ExtEnergyConsumer root class**

1774

1775 Table 144 shows all attributes of ExtEnergyConsumer.

1776 **Table 144 – Attributes of ExtGLSKs::ExtEnergyConsumer**

name	mult	type	description
longPF	0..1	Float	(NC) Energy consumer long term economic participation factor.
maxEconomicP	0..1	ActivePower	(NC) Maximum high economic active power limit, that should not exceed the maximum operating active power limit.
minEconomicP	0..1	ActivePower	(NC) Low economic active power limit that shall be greater than or equal to the minimum operating active power limit.
participationFactor	0..1	Float	(NC) Situation economic participation factor.
shortPF	0..1	Float	(NC) Energy consumer short term economic participation factor.

1777

1778 **3.10.9 (NC) ExtGeneratingUnit root class**

1779

1780 Table 145 shows all attributes of ExtGeneratingUnit.

1781 **Table 145 – Attributes of ExtGLSKs::ExtGeneratingUnit**

name	mult	type	description
shutdownTime	0..1	Seconds	(NC) Time it takes to shutdown the unit.
shutdownCost	0..1	Money	(NC) The shutdown cost incurred for each shutdown of the GeneratingUnit.
maxStartupLoad	0..1	ActivePower	(NC) Maximum consumption by the generating unit as part of the startup process.
participationFactor	0..1	Float	(NC) Situation economic participation factor.

1782

1783 **3.10.10 (NC) ExtHydroPump root class**

1784

1785 Table 146 shows all attributes of ExtHydroPump.

1786

**Table 146 – Attributes of ExtGLSKs::ExtHydroPump**

name	mult	type	description
longPF	0..1	Float	(NC) Hydro pump long term economic participation factor.
maxEconomicP	0..1	ActivePower	(NC) Maximum high economic active power limit, that should not exceed the maximum operating active power limit.
minEconomicP	0..1	ActivePower	(NC) Low economic active power limit that shall be greater than or equal to the minimum operating active power limit.
participationFactor	0..1	Float	(NC) Situation economic participation factor.
shortPF	0..1	Float	(NC) Hydro pump short term economic participation factor.

1787

**3.10.11 (NC) ExtPowerElectronicsUnit root class**

1789 EU Network Code extension of PowerElectronicsUnit

1790 Table 147 shows all attributes of ExtPowerElectronicsUnit.

1791

**Table 147 – Attributes of ExtGLSKs::ExtPowerElectronicsUnit**

name	mult	type	description
longPF	0..1	Float	(NC) Power electronics unit long term economic participation factor.
maxEconomicP	0..1	ActivePower	(NC) Maximum high economic active power limit, that should not exceed the maximum operating active power limit.
minEconomicP	0..1	ActivePower	(NC) Low economic active power limit that shall be greater than or equal to the minimum operating active power limit.
participationFactor	0..1	Float	(NC) Situation economic participation factor.
shortPF	0..1	Float	(NC) Power electronics unit short term economic participation factor.

1792

**3.10.12 (NC) ProportionalEnergyComponent**1794 Inheritance path = [EnergyComponent](#) : IdentifiedObject : ExtEulIdentifiedObject

1795 The proportional energy component is an energy component where there is proportional distribution of the energy group active power between energy components in each energy group.

1796 Table 148 shows all attributes of ProportionalEnergyComponent.

1799

**Table 148 – Attributes of ExtGLSKs::ProportionalEnergyComponent**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

1800

1801 Table 149 shows all association ends of ProportionalEnergyComponent with other classes.

**Table 149 – Association ends of ExtGLSKs::ProportionalEnergyComponent with other classes**

mult from	name	mult to	type	description
0..*	HydroPump	0..1	HydroPump	(NC) inherited from: <a href="#">EnergyComponent</a>
0..*	GeneratingUnit	0..1	GeneratingUnit	(NC) inherited from: <a href="#">EnergyComponent</a>
0..*	EnergyGroup	0..1	<a href="#">EnergyGroup</a>	(NC) inherited from: <a href="#">EnergyComponent</a>
0..*	PowerElectronicsUnit	0..1	PowerElectronicsUnit	(NC) inherited from: <a href="#">EnergyComponent</a>
0..*	EnergyConsumer	0..1	EnergyConsumer	(NC) inherited from: <a href="#">EnergyComponent</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

**3.10.13 (NC) EnergyKind enumeration**

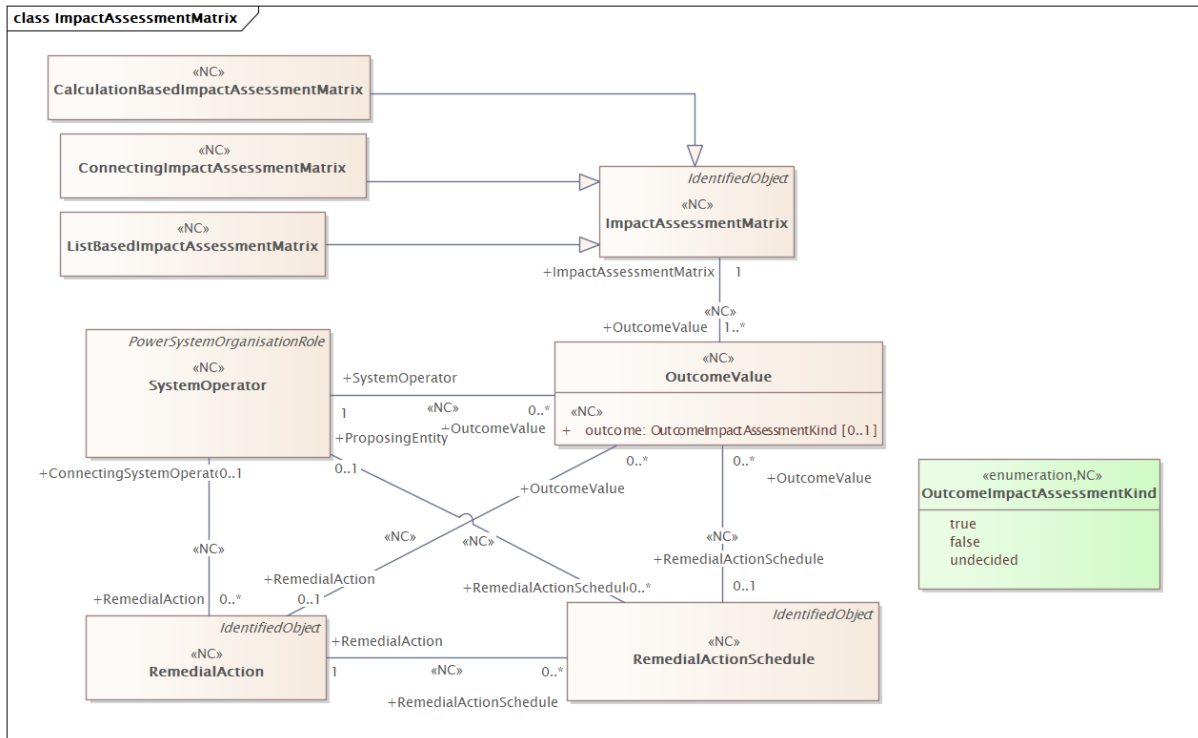
Energy group given by the needed categorization given by energy origination directive.  
Table 150 shows all literals of EnergyKind.

**Table 150 – Literals of ExtGLSKs::EnergyKind**

literal	value	description
hydroRunOfRiver		Hydro run of river.
hydroWaterReservoir		Hydro water reservoir.
hydroPump		Hydro pump.
biomass		Biomass.
fossil		Fossil.
geothermal		Geothermal.
marine		Marine.
nuclear		Nuclear.
uncontrollableConsumption		Uncontrollable consumption.
timeShiftConsumption		Time shift consumption.
battery		Battery storage.
bufferConsumption		Buffer consumption.
solar		Solar.
unconstrainedConsumption		Unconstrained consumption.
waste		Waste.
wind		Wind.
other		Other.

**3.11 Impact assessment matrix extensions****3.11.1 General**

This package contains the extensions related to the impact assessment matrix.



**Figure 15 – Class diagram ExtImpactAssessmentMatrix::ImpactAssessmentMatrix**

Figure 15: The diagram contains the classes related to the modelling of the impact assessment matrix.

### 3.11.2 (NC) CalculationBasedImpactAssessmentMatrix

Inheritance path = [ImpactAssessmentMatrix](#) : IdentifiedObject : ExtEulIdentifiedObject  
 Calculation based impact assessment matrix. It relates to the remedial action schedule.  
 Calculation-Based is the impact matrix determined by calculating the impact factors (eventually scaled by the intensity of the remedial action) and matching them against a threshold in a determined way described by the methodologies.  
 Table 151 shows all attributes of CalculationBasedImpactAssessmentMatrix.

**Table 151 – Attributes of  
ExtImpactAssessmentMatrix::CalculationBasedImpactAssessmentMatrix**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 152 shows all association ends of CalculationBasedImpactAssessmentMatrix with other classes.

**Table 152 – Association ends of  
ExtImpactAssessmentMatrix::CalculationBasedImpactAssessmentMatrix with other  
classes**

mult from	name	mult to	type	description
1..1	OutcomeValue	1..*	<a href="#">OutcomeValue</a>	(NC) inherited from: <a href="#">ImpactAssessmentMatrix</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.11.3 (NC) ConnectingImpactAssessmentMatrix

Inheritance path = [ImpactAssessmentMatrix](#) : IdentifiedObject : ExtEulIdentifiedObject

Connecting system operator matrix is the impact matrix indicating which system operators are connecting for that specific remedial action. The concept of connecting system operator for a remedial action is defined by CSAm Article 2.1(14).

Table 153 shows all attributes of ConnectingImpactAssessmentMatrix.

**Table 153 – Attributes of  
ExtImpactAssessmentMatrix::ConnectingImpactAssessmentMatrix**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 154 shows all association ends of ConnectingImpactAssessmentMatrix with other classes.

**Table 154 – Association ends of  
ExtImpactAssessmentMatrix::ConnectingImpactAssessmentMatrix with other classes**

mult from	name	mult to	type	description
1..1	OutcomeValue	1..*	<a href="#">OutcomeValue</a>	(NC) inherited from: <a href="#">ImpactAssessmentMatrix</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.11.4 (NC) ImpactAssessmentMatrix

Inheritance path = IdentifiedObject : ExtEulIdentifiedObject



1849 The result of an impact assessment analysis for each remedial action or remedial action  
1850 schedule onto the grid and operation of each system operator.  
1851 Table 155 shows all attributes of ImpactAssessmentMatrix.

1852 **Table 155 – Attributes of ExtImpactAssessmentMatrix::ImpactAssessmentMatrix**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

1853  
1854 Table 156 shows all association ends of ImpactAssessmentMatrix with other classes.

1855 **Table 156 – Association ends of ExtImpactAssessmentMatrix::ImpactAssessmentMatrix**  
1856 **with other classes**

mult from	name	mult to	type	description
1..1	OutcomeValue	1..*	<a href="#">OutcomeValue</a>	(NC) One of the values of the impact assessment matrix.
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

1857  
1858 **3.11.5 (NC) ListBasedImpactAssessmentMatrix**

1859 Inheritance path = [ImpactAssessmentMatrix](#) : IdentifiedObject : ExtEulIdentifiedObject  
1860 List-Based is the impact matrix determined by agreement of the system operators involved.  
1861 System operators jointly decide which Remedial Action (eventually scaled by the intensity of  
1862 the remedial action) is impacting.  
1863 Table 157 shows all attributes of ListBasedImpactAssessmentMatrix.

1864 **Table 157 – Attributes of**  
1865 **ExtImpactAssessmentMatrix::ListBasedImpactAssessmentMatrix**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

1866  
1867 Table 158 shows all association ends of ListBasedImpactAssessmentMatrix with other classes.

**Table 158 – Association ends of ExtImpactAssessmentMatrix::ListBasedImpactAssessmentMatrix with other classes**

mult from	name	mult to	type	description
1..1	OutcomeValue	1..*	<a href="#">OutcomeValue</a>	(NC) inherited from: <a href="#">ImpactAssessmentMatrix</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.11.6 (NC) OutcomeValue root class

The outcome of an impact assessment matrix.

Table 159 shows all attributes of OutcomeValue.

**Table 159 – Attributes of ExtImpactAssessmentMatrix::OutcomeValue**

name	mult	type	description
outcome	0..1	<a href="#">OutcomeImpactAssessmentKind</a>	(NC) Outcome value.

Table 160 shows all association ends of OutcomeValue with other classes.

**Table 160 – Association ends of ExtImpactAssessmentMatrix::OutcomeValue with other classes**

mult from	name	mult to	type	description
1..*	ImpactAssessmentMatrix	1..1	<a href="#">ImpactAssessmentMatrix</a>	(NC) the impact assessment matrix which has this value.
0..*	RemedialAction	0..1	<a href="#">RemedialAction</a>	(NC) The remedial action that has an outcome value.
0..*	RemedialActionSchedule	0..1	<a href="#">RemedialActionSchedule</a>	(NC) The remedial action schedule that has an outcome value.
0..*	SystemOperator	1..1	<a href="#">SystemOperator</a>	(NC) The system operator that has an outcome value.

### 3.11.7 (NC) OutcomeImpactAssessmentKind enumeration

Outcome impact assessments kinds.

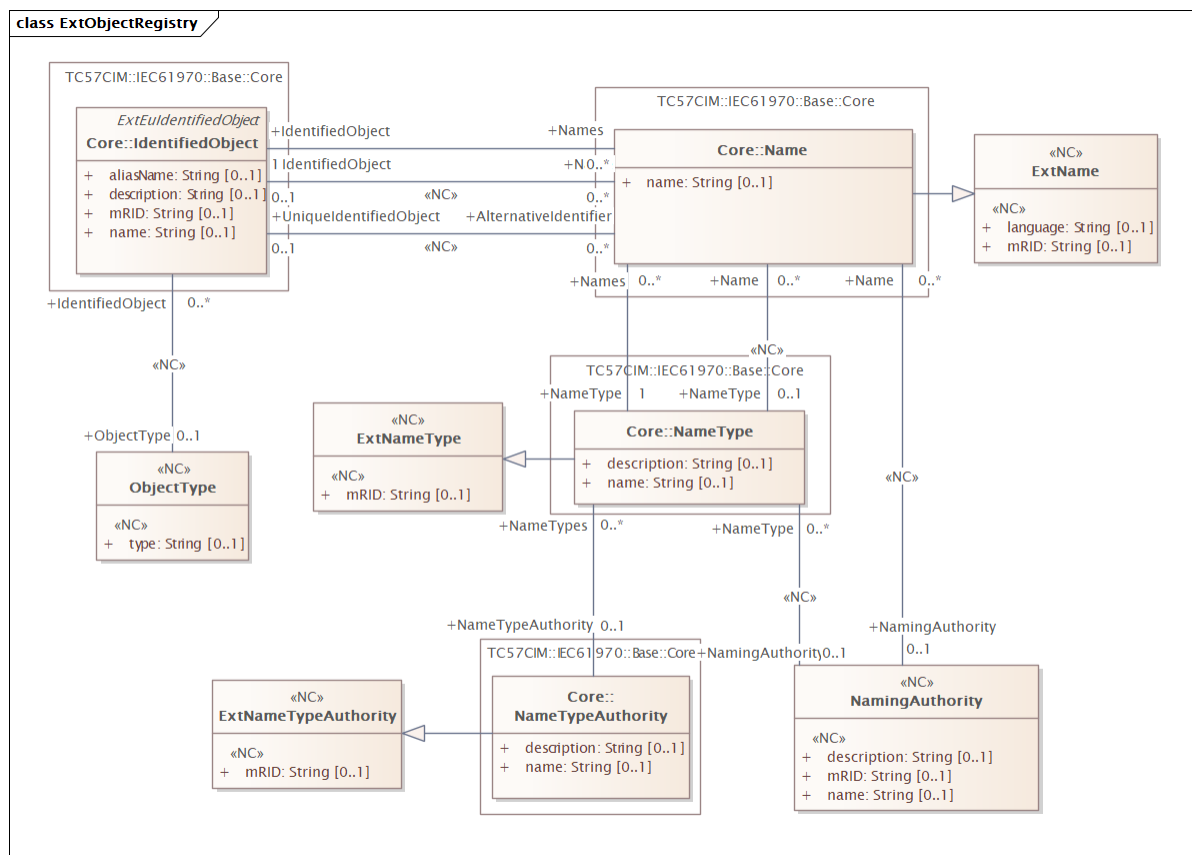
Table 161 shows all literals of OutcomeImpactAssessmentKind.

**Table 161 – Literals of ExtImpactAssessmentMatrix::OutcomeImpactAssessmentKind**

literal	value	description
true		True.
false		False.
undecided		Undecided. Used only for list-based impact assessment matrix.

1885 **3.12 Package ExtObjectRegistry**1886 **3.12.1 General**

1887 This package contains the extensions related to the object registry.

1888 **Figure 16 – Class diagram ExtObjectRegistry::ExtObjectRegistry**

1889 Figure 16: The diagram contains classes related to the object registry extension.

1891 **3.12.2 (NC) ExtName root class**

1892 Extension of Name.

1893 Table 162 shows all attributes of ExtName.

1894 **Table 162 – Attributes of ExtObjectRegistry::ExtName**

name	mult	type	description
language	0..1	String	(NC) Shall be specified as an IETF BCP 47 language tag (e.g. en-US). Applies to the Name.name attribute.  IETF language tags combine subtags from other standards such as ISO 639, ISO 15924, ISO 3166-1, and UN M.49. The tag structure has been standardized by the IETF in Best Current Practice (BCP) 47; the subtags are maintained by the IANA Language Subtag Registry.
mRID	0..1	String	(NC) Master resource identifier issued by a model authority. The mRID is unique within an exchange context. Global uniqueness is easily achieved by using a UUID, as specified in RFC 4122, for the mRID. The use of UUID is strongly recommended.

name	mult	type	description
			For CIMXML data files in RDF syntax conforming to IEC 61970-552, the mRID is mapped to rdf:ID or rdf:about attributes that identify CIM object elements.

1895

1896 **3.12.3 (NC) ExtNameType root class**

1897 An extension of NameType.

1898 Table 163 shows all attributes of ExtNameType.

1899

**Table 163 – Attributes of ExtObjectRegistry::ExtNameType**

name	mult	type	description
mRID	0..1	String	(NC) Master resource identifier issued by a model authority. The mRID is unique within an exchange context. Global uniqueness is easily achieved by using a UUID, as specified in RFC 4122, for the mRID. The use of UUID is strongly recommended.  For CIMXML data files in RDF syntax conforming to IEC 61970-552, the mRID is mapped to rdf:ID or rdf:about attributes that identify CIM object elements.

1900

1901 **3.12.4 (NC) ExtNameTypeAuthority root class**

1902 Extension of NameTypeAuthority.

1903 Table 164 shows all attributes of ExtNameTypeAuthority.

1904

**Table 164 – Attributes of ExtObjectRegistry::ExtNameTypeAuthority**

name	mult	type	description
mRID	0..1	String	(NC) Master resource identifier issued by a model authority. The mRID is unique within an exchange context. Global uniqueness is easily achieved by using a UUID, as specified in RFC 4122, for the mRID. The use of UUID is strongly recommended.  For CIMXML data files in RDF syntax conforming to IEC 61970-552, the mRID is mapped to rdf:ID or rdf:about attributes that identify CIM object elements.

1905

1906 **3.12.5 (NC) NamingAuthority root class**

1907 Authority responsible for creation and management of names of a given name type and/or name; typically an organization or an enterprise system.

1909 Table 165 shows all attributes of NamingAuthority.

1910

**Table 165 – Attributes of ExtObjectRegistry::NamingAuthority**

name	mult	type	description
description	0..1	String	(NC) Description of the name authority.
mRID	0..1	String	(NC) Master resource identifier issued by a model authority. The mRID is unique within an exchange context. Global uniqueness is easily achieved by using a UUID, as specified in RFC 4122, for the mRID. The use of UUID is strongly recommended.  For CIMXML data files in RDF syntax conforming to IEC 61970-552, the mRID is mapped to rdf:ID

name	mult	type	description
			or rdf:about attributes that identify CIM object elements.
name	0..1	String	(NC) Name of the name authority.

Table 166 shows all association ends of NamingAuthority with other classes.

**Table 166 – Association ends of ExtObjectRegistry::NamingAuthority with other classes**

mult from	name	mult to	type	description
0..1	NameType	0..*	NameType	(NC) All name types managed by this authority.
0..1	Name	0..*	Name	(NC) All names managed by this authority.

### 3.12.6 (NC) ObjectType root class

Identifies the specialised type of an object when the instance object is serialised using a generalised class. It may be useful when the object type is not otherwise included in the exchange. For example, a Meter may be serialised as an EndDevice in message exchanges and need to have the ObjectType.type be specified as 'Meter' to provide context to the message receiver.

Table 167 shows all attributes of ObjectType.

**Table 167 – Attributes of ExtObjectRegistry::ObjectType**

name	mult	type	description
type	0..1	String	(NC) The specialised type of an object when the instance object is serialised using a generalised class. For example, a Meter being serialised as an EndDevice in a message exchange should have the type attribute specified as 'Meter'.

Table 168 shows all association ends of ObjectType with other classes.

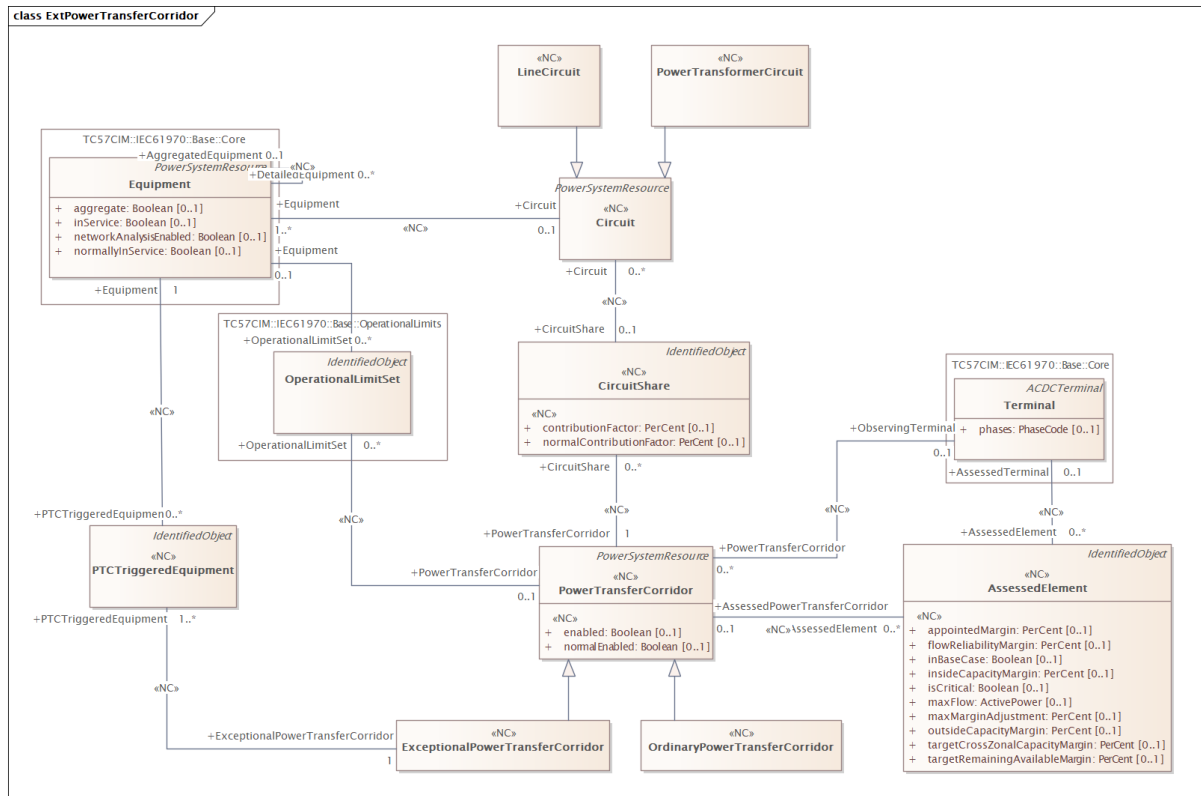
**Table 168 – Association ends of ExtObjectRegistry::ObjectType with other classes**

mult from	name	mult to	type	description
0..1	IdentifiedObject	0..*	IdentifiedObject	(NC) The IdentifiedObject whose type is identified by ObjectType.

## 3.13 Package ExtPowerTransferCorridor

### 3.13.1 General

This package contains the extensions related to the power transfer corridor.



**Figure 17 – Class diagram ExtPowerTransferCorridor::ExtPowerTransferCorridor**

Figure 17: The diagram contains classes related to power transfer corridor.

### 3.13.2 (NC) Circuit

Inheritance path = PowerSystemResource : IdentifiedObject : ExtEulIdentifiedObject

A circuit is a collection of equipment in a network graph that provide common stability limits. The relevant equipment is in general given by the identifying terminal. A software application that can do topology processing shall calculate the equipment belonging to the circuit, if there are no stability limits associated to it. In case of stability limits, the containment reflects the equipments that were used in the calculation/analysis. Table 169 shows all attributes of Circuit.

**Table 169 – Attributes of ExtPowerTransferCorridor::Circuit**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 170 shows all association ends of Circuit with other classes.

1944 **Table 170 – Association ends of ExtPowerTransferCorridor::Circuit with other classes**

mult from	name	mult to	type	description
0..1	Equipment	1..*	Equipment	(NC) The equipment which is part of the circuit. This includes all equipment related to the circuit (e.g. If the circuit is a transformer, the equipment could be all switching and auxiliary equipments related to the transformer). A BusbarSection shall not be part of the circuit.
0..*	CircuitShare	0..1	<a href="#">CircuitShare</a>	(NC) The share of this circuit.
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

1945

1946 **3.13.3 (NC) CircuitShare**

1947 Inheritance path = IdentifiedObject : ExtEulIdentifiedObject

1948 Defines the share of the circuit which is part of this power transfer corridor.

1949 Table 171 shows all attributes of CircuitShare.

1950 **Table 171 – Attributes of ExtPowerTransferCorridor::CircuitShare**

name	mult	type	description
contributionFactor	0..1	PerCent	(NC) Contribution factor for the circuit which is part of a power transfer corridor.
normalContributionFactor	0..1	PerCent	(NC) Normal contribution factor for the circuit which is part of a power transfer corridor.
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

1951

1952 Table 172 shows all association ends of CircuitShare with other classes.

1953 **Table 172 – Association ends of ExtPowerTransferCorridor::CircuitShare with other classes**

mult from	name	mult to	type	description
0..1	Circuit	0..*	<a href="#">Circuit</a>	(NC) The circuit that has a share.

1951

1952

1953

1954



mult from	name	mult to	type	description
0..*	PowerTransferCorridor	1..1	<a href="#">PowerTransferCorridor</a>	(NC) The power transfer corridor that has this circuit share.
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

1955

1956 **3.13.4 (NC) ExceptionalPowerTransferCorridor**

1957 Inheritance path = [PowerTransferCorridor](#) : PowerSystemResource : IdentifiedObject :  
 1958 ExtEulIdentifiedObject

1959 Potential power transfer corridor that can be triggered by equipment which changes its in  
 1960 service status or it is operating in an island.

1961 Table 173 shows all attributes of ExceptionalPowerTransferCorridor.

1962 **Table 173 – Attributes of ExtPowerTransferCorridor::ExceptionalPowerTransferCorridor**

name	mult	type	description
enabled	0..1	Boolean	(NC) inherited from: <a href="#">PowerTransferCorridor</a>
normalEnabled	0..1	Boolean	(NC) inherited from: <a href="#">PowerTransferCorridor</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

1963

1964 Table 174 shows all association ends of ExceptionalPowerTransferCorridor with other classes.

1965 **Table 174 – Association ends of**1966 **ExtPowerTransferCorridor::ExceptionalPowerTransferCorridor with other classes**

mult from	name	mult to	type	description
1..1	PTCTriggeredEquipment	1..*	<a href="#">PTCTriggeredEquipment</a>	(NC) The equipment that triggers this exception power transfer corridor.
0..1	OperationalLimitSet	0..*	OperationalLimitSet	(NC) inherited from: <a href="#">PowerTransferCorridor</a>
0..*	ObservingTerminal	0..1	Terminal	(NC) inherited from: <a href="#">PowerTransferCorridor</a>
0..1	AssessedElement	0..*	<a href="#">AssessedElement</a>	(NC) inherited from: <a href="#">PowerTransferCorridor</a>
1..1	CircuitShare	0..*	<a href="#">CircuitShare</a>	(NC) inherited from: <a href="#">PowerTransferCorridor</a>
1..1	PTCActivePowerSupport	0..*	<a href="#">PTCActivePowerSupport</a>	(NC) inherited from: <a href="#">PowerTransferCorridor</a>
1..1	PinPowerTransferCorridor	0..*	<a href="#">PinPowerTransferCorridor</a>	(NC) inherited from: <a href="#">PowerTransferCorridor</a>
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource

mult from	name	mult to	type	description
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

1967

1968 **3.13.5 (NC) LineCircuit**1969 Inheritance path = [Circuit](#) : PowerSystemResource : IdentifiedObject : ExtEulIdentifiedObject1970 A line circuit is a circuit that has at least one ACLineSegment and may or may not include  
1971 related switching and/or auxiliary equipment.

1972 Table 175 shows all attributes of LineCircuit.

1973

**Table 175 – Attributes of ExtPowerTransferCorridor::LineCircuit**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

1974

1975 Table 176 shows all association ends of LineCircuit with other classes.

**Table 176 – Association ends of ExtPowerTransferCorridor::LineCircuit with other classes**

mult from	name	mult to	type	description
0..1	Equipment	1..*	Equipment	(NC) inherited from: <a href="#">Circuit</a>
0..*	CircuitShare	0..1	<a href="#">CircuitShare</a>	(NC) inherited from: <a href="#">Circuit</a>
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

1974

1975

1976

1977

1978

1979 **3.13.6 (NC) OrdinaryPowerTransferCorridor**

1980 Inheritance path = [PowerTransferCorridor](#) : PowerSystemResource : IdentifiedObject :  
 1981 ExtEulIdentifiedObject

1982 Power transfer corridor defined for normal operating network.

1983 Table 177 shows all attributes of OrdinaryPowerTransferCorridor.

1984 **Table 177 – Attributes of ExtPowerTransferCorridor::OrdinaryPowerTransferCorridor**

name	mult	type	description
enabled	0..1	Boolean	(NC) inherited from: <a href="#">PowerTransferCorridor</a>
normalEnabled	0..1	Boolean	(NC) inherited from: <a href="#">PowerTransferCorridor</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

1985

1986 Table 178 shows all association ends of OrdinaryPowerTransferCorridor with other classes.

1987 **Table 178 – Association ends of**1988 **ExtPowerTransferCorridor::OrdinaryPowerTransferCorridor with other classes**

mult from	name	mult to	type	description
0..1	OperationalLimitSet	0..*	OperationalLimitSet	(NC) inherited from: <a href="#">PowerTransferCorridor</a>
0..*	ObservingTerminal	0..1	Terminal	(NC) inherited from: <a href="#">PowerTransferCorridor</a>
0..1	AssessedElement	0..*	<a href="#">AssessedElement</a>	(NC) inherited from: <a href="#">PowerTransferCorridor</a>
1..1	CircuitShare	0..*	<a href="#">CircuitShare</a>	(NC) inherited from: <a href="#">PowerTransferCorridor</a>
1..1	PTCActivePowerSupport	0..*	<a href="#">PTCActivePowerSupport</a>	(NC) inherited from: <a href="#">PowerTransferCorridor</a>
1..1	PinPowerTransferCorridor	0..*	<a href="#">PinPowerTransferCorridor</a>	(NC) inherited from: <a href="#">PowerTransferCorridor</a>
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

1989

1990 **3.13.7 (NC) PowerTransferCorridor**

1991 Inheritance path = PowerSystemResource : IdentifiedObject : ExtEulIdentifiedObject

1992 A power transfer corridor is defined as a set of circuits (transmission lines or transformers)  
1993 separating two portions of the power system, or a subset of circuits exposed to a substantial  
1994 portion of the transmission exchange between two parts of the system.

1995 Table 179 shows all attributes of PowerTransferCorridor.

1996 **Table 179 – Attributes of ExtPowerTransferCorridor::PowerTransferCorridor**

name	mult	type	description
enabled	0..1	Boolean	(NC) It enables/disables the monitoring/assessment of a power transfer corridor. True means that the monitoring of the power transfer corridor is assessed. False means the power transfer corridor is not assessed.
normalEnabled	0..1	Boolean	(NC) It is the normal enable/disable the monitoring/assessment of a power transfer corridor. True means that the monitoring of the power transfer corridor is assessed. False means the power transfer corridor is not assessed.
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

1997

1998 Table 180 shows all association ends of PowerTransferCorridor with other classes.

1999 **Table 180 – Association ends of ExtPowerTransferCorridor::PowerTransferCorridor with**  
2000 **other classes**

mult from	name	mult to	type	description
0..1	OperationalLimitSet	0..*	OperationalLimitSet	(NC) The operational limit set relevant for this power transfer corridor.
0..*	ObservingTerminal	0..1	Terminal	(NC) The terminal that identifies the power transfer corridor.
0..1	AssessedElement	0..*	<a href="#">AssessedElement</a>	(NC) The assessed element indicating that the power transfer corridor is assessed, i.e. monitored.
1..1	CircuitShare	0..*	<a href="#">CircuitShare</a>	(NC) The circuit share for this power transfer corridor.
1..1	PTCActivePowerSupport	0..*	<a href="#">PTCActivePowerSupport</a>	(NC) The active power capability associated with this PowerTransferCorridor.
1..1	PinPowerTransferCorridor	0..*	<a href="#">PinPowerTransferCorridor</a>	(NC) The pin that uses this input.
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource

mult from	name	mult to	type	description
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

2001

2002 **3.13.8 (NC) PowerTransformerCircuit**2003 Inheritance path = [Circuit](#) : PowerSystemResource : IdentifiedObject : ExtEulIdentifiedObject

2004 A power transformer circuit is a circuit that has at least one PowerTransformer and may or may not include related switching and/or auxiliary equipment.

2006 Table 181 shows all attributes of PowerTransformerCircuit.

2007 **Table 181 – Attributes of ExtPowerTransferCorridor::PowerTransformerCircuit**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

2008

2009 Table 182 shows all association ends of PowerTransformerCircuit with other classes.

2010 **Table 182 – Association ends of ExtPowerTransferCorridor::PowerTransformerCircuit**  
2011 **with other classes**

mult from	name	mult to	type	description
0..1	Equipment	1..*	Equipment	(NC) inherited from: <a href="#">Circuit</a>
0..*	CircuitShare	0..1	<a href="#">CircuitShare</a>	(NC) inherited from: <a href="#">Circuit</a>
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

2012

2013 **3.13.9 (NC) PTCTriggeredEquipment**

2014 Inheritance path = IdentifiedObject : ExtEulIdentifiedObject

2015 Equipment that is operating in an island or it is out of service.

2016 Table 183 shows all attributes of PTCTriggeredEquipment.

2017 **Table 183 – Attributes of ExtPowerTransferCorridor::PTCTriggeredEquipment**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEuIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEuIdentifiedObject

2018

2019 Table 184 shows all association ends of PTCTriggeredEquipment with other classes.

2020 **Table 184 – Association ends of ExtPowerTransferCorridor::PTCTriggeredEquipment**  
2021 **with other classes**

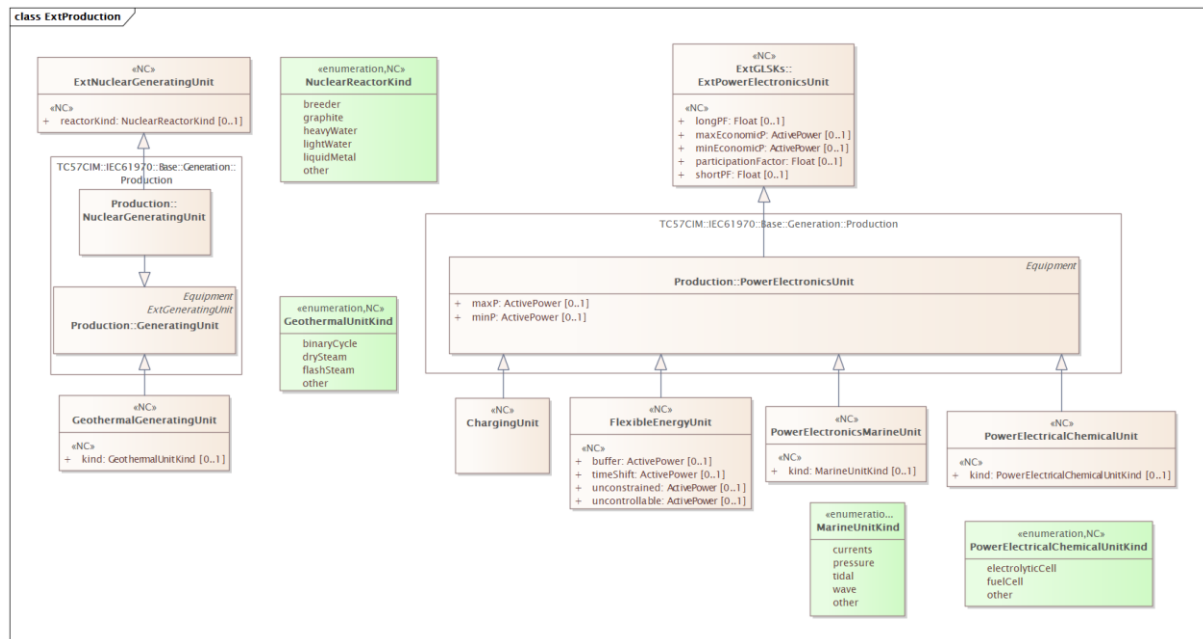
mult from	name	mult to	type	description
0..*	Equipment	1..1	Equipment	(NC) The equipment which is part of power transfer corridor triggering.
1..*	ExceptionalPowerTransferCorridor	1..1	<a href="#">ExceptionalPowerTransferCorridor</a>	(NC) The power transfer corridor which is triggered by this equipment.
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

2022

2023 **3.14 Package ExtProduction**

2024 **3.14.1 General**

2025 This package contains the extensions related to the production.



**Figure 18 – Class diagram ExtProduction::ExtProduction**

Figure 18: The diagram contains classes related to production.

### 3.14.2 (NC) ChargingUnit

Inheritance path = PowerElectronicsUnit : Equipment : PowerSystemResource : IdentifiedObject : ExtEulIdentifiedObject : [ExtPowerElectronicsUnit](#)

An unit that supplies electrical power for charging electrical non-stationary entities, e.g. electrical vehicle, trucks, buses, ferries, boat and airplanes. The characteristic is that the energy consumption is highly schedule dependent.

Table 185 shows all attributes of ChargingUnit.

**Table 185 – Attributes of ExtProduction::ChargingUnit**

name	mult	type	description
maxP	0..1	ActivePower	inherited from: PowerElectronicsUnit
minP	0..1	ActivePower	inherited from: PowerElectronicsUnit
aggregate	0..1	Boolean	inherited from: Equipment
inService	0..1	Boolean	inherited from: Equipment
networkAnalysisEnabled	0..1	Boolean	inherited from: Equipment
normallyInService	0..1	Boolean	inherited from: Equipment
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject
longPF	0..1	Float	(NC) inherited from: <a href="#">ExtPowerElectronicsUnit</a>
maxEconomicP	0..1	ActivePower	(NC) inherited from: <a href="#">ExtPowerElectronicsUnit</a>
minEconomicP	0..1	ActivePower	(NC) inherited from: <a href="#">ExtPowerElectronicsUnit</a>



name	mult	type	description
participationFactor	0..1	Float	(NC) inherited from: <a href="#">ExtPowerElectronicsUnit</a>
shortPF	0..1	Float	(NC) inherited from: <a href="#">ExtPowerElectronicsUnit</a>

Table 186 shows all association ends of ChargingUnit with other classes.

**Table 186 – Association ends of ExtProduction::ChargingUnit with other classes**

mult from	name	mult to	type	description
0..*	PowerElectronicsConnection	1..1	PowerElectronicsConnection	inherited from: PowerElectronicsUnit
0..*	AggregatedEquipment	0..1	Equipment	(NC) inherited from: Equipment
0..1	Faults	0..*	Fault	inherited from: Equipment
0..1	OperationalLimitSet	0..*	OperationalLimitSet	inherited from: Equipment
1..1	ContingencyEquipment	0..*	ContingencyEquipment	inherited from: Equipment
0..*	EquipmentContainer	0..1	EquipmentContainer	inherited from: Equipment
0..*	AdditionalEquipmentContainer	0..*	EquipmentContainer	inherited from: Equipment
0..1	DetailedModelDynamics	0..*	DetailedModelDynamics	inherited from: Equipment
0..1	DetailedEquipment	0..*	Equipment	(NC) inherited from: Equipment
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.14.3 (NC) ExtNuclearGeneratingUnit root class

European Network Code extension of NuclearGeneratingUnit.

Table 187 shows all attributes of ExtNuclearGeneratingUnit.

**Table 187 – Attributes of ExtProduction::ExtNuclearGeneratingUnit**

name	mult	type	description
reactorKind	0..1	<a href="#">NuclearReactorKind</a>	(NC) Kind of nuclear reactor.

### 3.14.4 (NC) FlexibleEnergyUnit

Inheritance path = PowerElectronicsUnit : Equipment : PowerSystemResource : IdentifiedObject : ExtEulIdentifiedObject : [ExtPowerElectronicsUnit](#)

Flexible consumer or embedded producer of energy. The unit can not be a net producer.

Table 188 shows all attributes of FlexibleEnergyUnit.

2051

**Table 188 – Attributes of ExtProduction::FlexibleEnergyUnit**

name	mult	type	description
uncontrollable	0..1	ActivePower	(NC) The effect, active power, that forms the base consumption for the unit. This is measured and expected consumption. Load sign convention is used, i.e. positive sign means flow out from a node.
timeShift	0..1	ActivePower	(NC) The effect, active power, that can be shifted from one pricing interval (market time unit) to another. It is expected to be a limited on the length of the shift. Example from household could be washing machine or dishwasher. Example from industry is the possible to shut down a machine for the relevant period. Load sign convention is used, i.e. positive sign means flow out from a node.
buffer	0..1	ActivePower	(NC) The effect, active power, that has the flexibility to operate as production and/or consumption. The buffer is bound. Example are heat pump, cooling system, embedded batteries including electric vehicle. Load sign convention is used, i.e. positive sign means flow out from a node.
unconstrained	0..1	ActivePower	(NC) The effect, active power, that has the flexibility to operate as production without any bound by a buffer. Example are alternative heating (wood, gas, diesel etc) or power generators. Load sign convention is used, i.e. positive sign means flow out from a node.
maxP	0..1	ActivePower	inherited from: PowerElectronicsUnit
minP	0..1	ActivePower	inherited from: PowerElectronicsUnit
aggregate	0..1	Boolean	inherited from: Equipment
inService	0..1	Boolean	inherited from: Equipment
networkAnalysisEnabled	0..1	Boolean	inherited from: Equipment
normallyInService	0..1	Boolean	inherited from: Equipment
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject
longPF	0..1	Float	(NC) inherited from: <a href="#">ExtPowerElectronicsUnit</a>
maxEconomicP	0..1	ActivePower	(NC) inherited from: <a href="#">ExtPowerElectronicsUnit</a>
minEconomicP	0..1	ActivePower	(NC) inherited from: <a href="#">ExtPowerElectronicsUnit</a>
participationFactor	0..1	Float	(NC) inherited from: <a href="#">ExtPowerElectronicsUnit</a>
shortPF	0..1	Float	(NC) inherited from: <a href="#">ExtPowerElectronicsUnit</a>

2052

2053

Table 189 shows all association ends of FlexibleEnergyUnit with other classes.

2054 **Table 189 – Association ends of ExtProduction::FlexibleEnergyUnit with other classes**

mult from	name	mult to	type	description
0..*	PowerElectronicsConnection	1..1	PowerElectronicsConnection	inherited from: PowerElectronicsUnit
0..*	AggregatedEquipment	0..1	Equipment	(NC) inherited from: Equipment
0..1	Faults	0..*	Fault	inherited from: Equipment
0..1	OperationalLimitSet	0..*	OperationalLimitSet	inherited from: Equipment
1..1	ContingencyEquipment	0..*	ContingencyEquipment	inherited from: Equipment
0..*	EquipmentContainer	0..1	EquipmentContainer	inherited from: Equipment
0..*	AdditionalEquipmentContainer	0..*	EquipmentContainer	inherited from: Equipment
0..1	DetailedModelDynamics	0..*	DetailedModelDynamics	inherited from: Equipment
0..1	DetailedEquipment	0..*	Equipment	(NC) inherited from: Equipment
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

2055

2056 **3.14.5 (NC) GeothermalGeneratingUnit**

2057 Inheritance path = GeneratingUnit : Equipment : PowerSystemResource : IdentifiedObject :

2058 ExtEulIdentifiedObject : [ExtGeneratingUnit](#)2059 Generating unit that is generating electrical power from geothermal energy. Technologies in  
2060 use include dry steam power stations, flash steam power stations and binary cycle power  
2061 stations.

2062 Table 190 shows all attributes of GeothermalGeneratingUnit.

2063 **Table 190 – Attributes of ExtProduction::GeothermalGeneratingUnit**

name	mult	type	description
kind	0..1	<a href="#">GeothermalUnitKind</a>	(NC) Kind of geothermal generating unit.
allocSpinResP	0..1	ActivePower	inherited from: GeneratingUnit
autoCntrlMarginP	0..1	ActivePower	inherited from: GeneratingUnit
baseP	0..1	ActivePower	inherited from: GeneratingUnit
controlDeadband	0..1	ActivePower	inherited from: GeneratingUnit
controlPulseHigh	0..1	Seconds	inherited from: GeneratingUnit
controlPulseLow	0..1	Seconds	inherited from: GeneratingUnit
controlResponseRate	0..1	ActivePowerChangeRate	inherited from: GeneratingUnit
efficiency	0..1	PerCent	inherited from: GeneratingUnit
genControlMode	0..1	GeneratorControlMode	inherited from: GeneratingUnit

name	mult	type	description
genControlSource	0..1	GeneratorControlSource	inherited from: GeneratingUnit
governorMPL	0..1	PU	inherited from: GeneratingUnit
governorSCD	0..1	PerCent	inherited from: GeneratingUnit
highControlLimit	0..1	ActivePower	inherited from: GeneratingUnit
initialIP	0..1	ActivePower	inherited from: GeneratingUnit
longPF	0..1	Float	inherited from: GeneratingUnit
lowControlLimit	0..1	ActivePower	inherited from: GeneratingUnit
lowerRampRate	0..1	ActivePowerChangeRate	inherited from: GeneratingUnit
maxEconomicP	0..1	ActivePower	inherited from: GeneratingUnit
maximumAllowableSpinningReserve	0..1	ActivePower	inherited from: GeneratingUnit
maxOperatingP	0..1	ActivePower	inherited from: GeneratingUnit
minEconomicP	0..1	ActivePower	inherited from: GeneratingUnit
minimumOffTime	0..1	Seconds	inherited from: GeneratingUnit
minOperatingP	0..1	ActivePower	inherited from: GeneratingUnit
modelDetail	0..1	Classification	inherited from: GeneratingUnit
nominalP	0..1	ActivePower	inherited from: GeneratingUnit
normalPF	0..1	Float	inherited from: GeneratingUnit
penaltyFactor	0..1	Float	inherited from: GeneratingUnit
raiseRampRate	0..1	ActivePowerChangeRate	inherited from: GeneratingUnit
ratedGrossMaxP	0..1	ActivePower	inherited from: GeneratingUnit
ratedGrossMinP	0..1	ActivePower	inherited from: GeneratingUnit
ratedNetMaxP	0..1	ActivePower	inherited from: GeneratingUnit
shortPF	0..1	Float	inherited from: GeneratingUnit
startupCost	0..1	Money	inherited from: GeneratingUnit
startupTime	0..1	Seconds	inherited from: GeneratingUnit
tieLinePF	0..1	Float	inherited from: GeneratingUnit
totalEfficiency	0..1	PerCent	inherited from: GeneratingUnit
variableCost	0..1	Money	inherited from: GeneratingUnit
aggregate	0..1	Boolean	inherited from: Equipment
inService	0..1	Boolean	inherited from: Equipment
networkAnalysisEnabled	0..1	Boolean	inherited from: Equipment
normallyInService	0..1	Boolean	inherited from: Equipment
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shutdownTime	0..1	Seconds	(NC) inherited from: <a href="#">ExtGeneratingUnit</a>
shutdownCost	0..1	Money	(NC) inherited from: <a href="#">ExtGeneratingUnit</a>

name	mult	type	description
maxStartupLoad	0..1	ActivePower	(NC) inherited from: <a href="#">ExtGeneratingUnit</a>
participationFactor	0..1	Float	(NC) inherited from: <a href="#">ExtGeneratingUnit</a>

Table 191 shows all association ends of GeothermalGeneratingUnit with other classes.

**Table 191 – Association ends of ExtProduction::GeothermalGeneratingUnit with other classes**

mult from	name	mult to	type	description
0..1	RotatingMachine	0..*	RotatingMachine	inherited from: GeneratingUnit
1..1	GenUnitOpCostCurves	0..*	GenUnitOpCostCurve	inherited from: GeneratingUnit
1..1	GenUnitOpSchedule	0..1	GenUnitOpSchedule	inherited from: GeneratingUnit
1..1	ControlAreaGeneratingUnit	0..*	ControlAreaGeneratingUnit	inherited from: GeneratingUnit
1..1	GrossToNetActivePowerCurves	0..*	GrossToNetActivePowerCurve	inherited from: GeneratingUnit
0..*	AggregatedEquipment	0..1	Equipment	(NC) inherited from: Equipment
0..1	Faults	0..*	Fault	inherited from: Equipment
0..1	OperationalLimitSet	0..*	OperationalLimitSet	inherited from: Equipment
1..1	ContingencyEquipment	0..*	ContingencyEquipment	inherited from: Equipment
0..*	EquipmentContainer	0..1	EquipmentContainer	inherited from: Equipment
0..*	AdditionalEquipmentContainer	0..*	EquipmentContainer	inherited from: Equipment
0..1	DetailedModelDynamics	0..*	DetailedModelDynamics	inherited from: Equipment
0..1	DetailedEquipment	0..*	Equipment	(NC) inherited from: Equipment
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.14.6 (NC) PowerElectricalChemicalUnit

Inheritance path = PowerElectronicsUnit : Equipment : PowerSystemResource : IdentifiedObject : ExtEulIdentifiedObject : [ExtPowerElectronicsUnit](#)

An unit capable of either generating electrical energy from chemical reactions or using electrical energy to cause chemical reactions.

Table 192 shows all attributes of PowerElectricalChemicalUnit.

2075

**Table 192 – Attributes of ExtProduction::PowerElectricalChemicalUnit**

name	mult	type	description
kind	0..1	<a href="#">PowerElectricalChemicalUnitKind</a>	(NC) Kind of power electrical chemical unit.
maxP	0..1	ActivePower	inherited from: PowerElectronicsUnit
minP	0..1	ActivePower	inherited from: PowerElectronicsUnit
aggregate	0..1	Boolean	inherited from: Equipment
inService	0..1	Boolean	inherited from: Equipment
networkAnalysisEnabled	0..1	Boolean	inherited from: Equipment
normallyInService	0..1	Boolean	inherited from: Equipment
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject
longPF	0..1	Float	(NC) inherited from: <a href="#">ExtPowerElectronicsUnit</a>
maxEconomicP	0..1	ActivePower	(NC) inherited from: <a href="#">ExtPowerElectronicsUnit</a>
minEconomicP	0..1	ActivePower	(NC) inherited from: <a href="#">ExtPowerElectronicsUnit</a>
participationFactor	0..1	Float	(NC) inherited from: <a href="#">ExtPowerElectronicsUnit</a>
shortPF	0..1	Float	(NC) inherited from: <a href="#">ExtPowerElectronicsUnit</a>

2076

2077

Table 193 shows all association ends of PowerElectricalChemicalUnit with other classes.

2078

**Table 193 – Association ends of ExtProduction::PowerElectricalChemicalUnit with other classes**

2079

mult from	name	mult to	type	description
0..*	PowerElectronicsConnection	1..1	PowerElectronicsConnection	inherited from: PowerElectronicsUnit
0..*	AggregatedEquipment	0..1	Equipment	(NC) inherited from: Equipment
0..1	Faults	0..*	Fault	inherited from: Equipment
0..1	OperationalLimitSet	0..*	OperationalLimitSet	inherited from: Equipment
1..1	ContingencyEquipment	0..*	ContingencyEquipment	inherited from: Equipment
0..*	EquipmentContainer	0..1	EquipmentContainer	inherited from: Equipment
0..*	AdditionalEquipmentContainer	0..*	EquipmentContainer	inherited from: Equipment
0..1	DetailedModelDynamics	0..*	DetailedModelDynamics	inherited from: Equipment
0..1	DetailedEquipment	0..*	Equipment	(NC) inherited from: Equipment
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource

mult from	name	mult to	type	description
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

2080

2081 **3.14.7 (NC) PowerElectronicsMarineUnit**

2082 Inheritance path = PowerElectronicsUnit : Equipment : PowerSystemResource :

2083 IdentifiedObject : ExtEulIdentifiedObject : [ExtPowerElectronicsUnit](#)

2084 An unit that capture energy from marine sources, e.g. waves, for generating electrical power.

2085 Table 194 shows all attributes of PowerElectronicsMarineUnit.

2086 **Table 194 – Attributes of ExtProduction::PowerElectronicsMarineUnit**

name	mult	type	description
kind	0..1	<a href="#">MarineUnitKind</a>	(NC) Kind of marine unit.
maxP	0..1	ActivePower	inherited from: PowerElectronicsUnit
minP	0..1	ActivePower	inherited from: PowerElectronicsUnit
aggregate	0..1	Boolean	inherited from: Equipment
inService	0..1	Boolean	inherited from: Equipment
networkAnalysisEnabled	0..1	Boolean	inherited from: Equipment
normallyInService	0..1	Boolean	inherited from: Equipment
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject
longPF	0..1	Float	(NC) inherited from: <a href="#">ExtPowerElectronicsUnit</a>
maxEconomicP	0..1	ActivePower	(NC) inherited from: <a href="#">ExtPowerElectronicsUnit</a>
minEconomicP	0..1	ActivePower	(NC) inherited from: <a href="#">ExtPowerElectronicsUnit</a>
participationFactor	0..1	Float	(NC) inherited from: <a href="#">ExtPowerElectronicsUnit</a>
shortPF	0..1	Float	(NC) inherited from: <a href="#">ExtPowerElectronicsUnit</a>

2087

2088 Table 195 shows all association ends of PowerElectronicsMarineUnit with other classes.

2089 **Table 195 – Association ends of ExtProduction::PowerElectronicsMarineUnit with other classes**

mult from	name	mult to	type	description
0..*	PowerElectronicsConnection	1..1	PowerElectronicsConnection	inherited from: PowerElectronicsUnit
0..*	AggregatedEquipment	0..1	Equipment	(NC) inherited from: Equipment
0..1	Faults	0..*	Fault	inherited from: Equipment

2087

2088

2089

2090

mult from	name	mult to	type	description
0..1	OperationalLimitSet	0..*	OperationalLimitSet	inherited from: Equipment
1..1	ContingencyEquipment	0..*	ContingencyEquipment	inherited from: Equipment
0..*	EquipmentContainer	0..1	EquipmentContainer	inherited from: Equipment
0..*	AdditionalEquipmentContainer	0..*	EquipmentContainer	inherited from: Equipment
0..1	DetailedModelDynamics	0..*	DetailedModelDynamics	inherited from: Equipment
0..1	DetailedEquipment	0..*	Equipment	(NC) inherited from: Equipment
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

2091

2092 **3.14.8 (NC) GeothermalUnitKind enumeration**

2093 Kind of geothermal.

2094 Table 196 shows all literals of GeothermalUnitKind.

2095 **Table 196 – Literals of ExtProduction::GeothermalUnitKind**

literal	value	description
binaryCycle		The moderately hot geothermal water is passed by a secondary fluid with a much lower boiling point than water.
drySteam		Uses geothermal steam of 150 degree Celsius or greater to turn turbines.
flashSteam		Pull deep, high-pressure hot water into lower-pressure tanks and use the resulting flashed steam to drive turbines.
other		Other type of geothermal generating unit.

2096

2097 **3.14.9 (NC) MarineUnitKind enumeration**

2098 Kind of marine energy capture.

2099 Table 197 shows all literals of MarineUnitKind.

2100 **Table 197 – Literals of ExtProduction::MarineUnitKind**

literal	value	description
currents		Capture energy from ocean current which are caused by forces like breaking waves, wind, Coriolis effect etc.
pressure		Capture energy from pressure.



literal	value	description
tidal		Capture energy from tidal power, which captures the energy of the current caused by the gravitational pull of the Sun and Moon.
wave		Capture energy from wind waves.
other		other way of capture energy from marine elements.

2101

2102 **3.14.10 (NC) NuclearReactorKind enumeration**

2103 Kind of nuclear reactor.

2104 Table 198 shows all literals of NuclearReactorKind.

2105 **Table 198 – Literals of ExtProduction::NuclearReactorKind**

literal	value	description
breeder		Reactor which the heat source is a nuclear reactor that generates more fissile material than it consumes.
graphite		Reactor which the heat source is a graphite-moderated reactor that is a nuclear reactor that uses carbon as a neutron moderator, which allows natural uranium to be used as nuclear fuel.
heavyWater		Reactor which the heat source is a pressurized heavy-water reactor (PHWR) that uses heavy water (deuterium oxide D <sub>2</sub> O) as its coolant and neutron moderator.
lightWater		Reactor which the heat source is a light-water reactor (LWR) that is a type of thermal-neutron reactor that uses normal water, as both its coolant and neutron moderator – furthermore a solid form of fissile elements is used as fuel.
liquidMetal		Reactor which is a liquid metal cooled nuclear reactor, liquid metal fast reactor or LMFR is an advanced type of nuclear reactor where the primary coolant is a liquid metal.
other		Other type of nuclear reactors.

2106

2107 **3.14.11 (NC) PowerElectricalChemicalUnitKind enumeration**

2108 Kind of power electrical chemical unit.

2109 Table 199 shows all literals of PowerElectricalChemicalUnitKind.

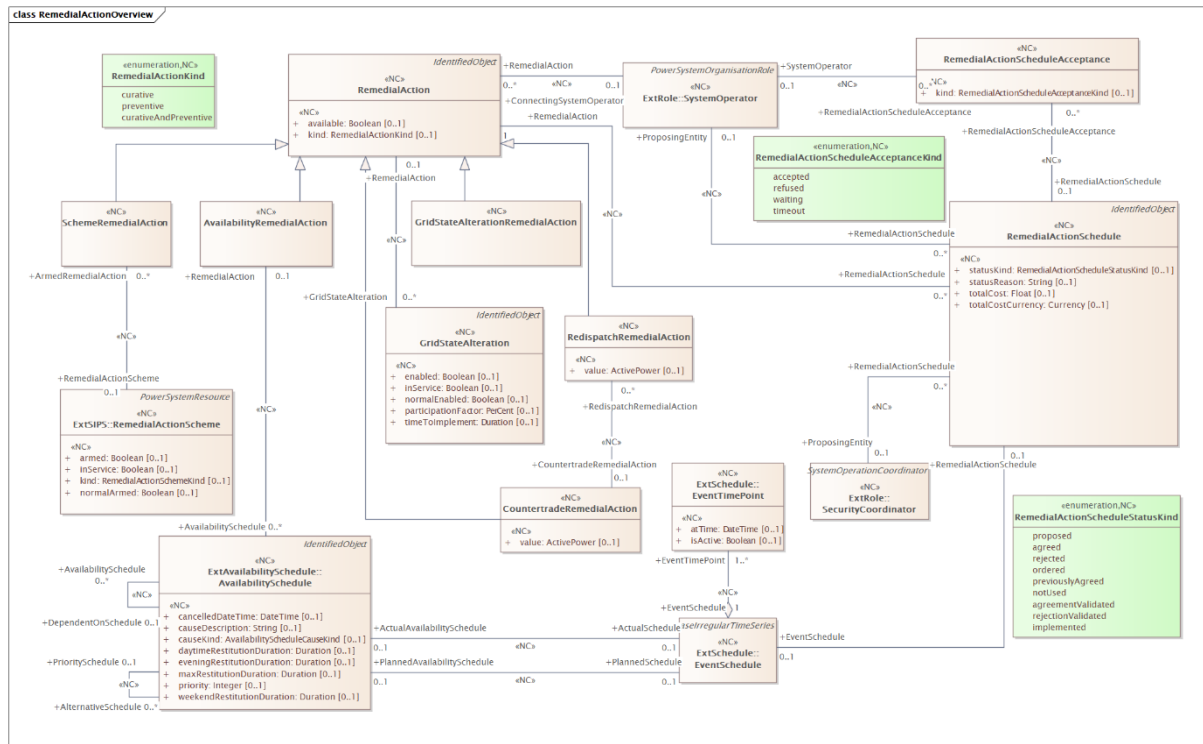
2110 **Table 199 – Literals of ExtProduction::PowerElectricalChemicalUnitKind**

literal	value	description
electrolyticCell		An electrolytic cell is an electrochemical cell that drives a non-spontaneous redox reaction through the application of electrical energy. Example are the decomposition of water into hydrogen and oxygen.
fuelCell		A fuel cell is an electrochemical cell that converts the chemical energy from a fuel into electricity through an electrochemical reaction of hydrogen fuel with oxygen or another oxidizing agent.
other		Other type of cell used in chemical reactions.

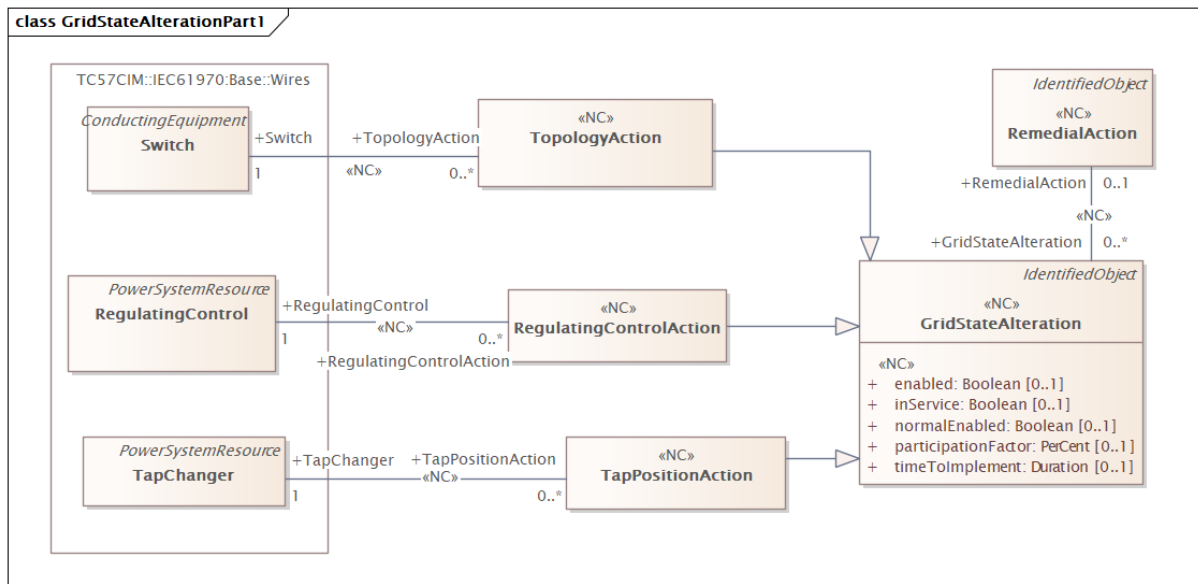
2111

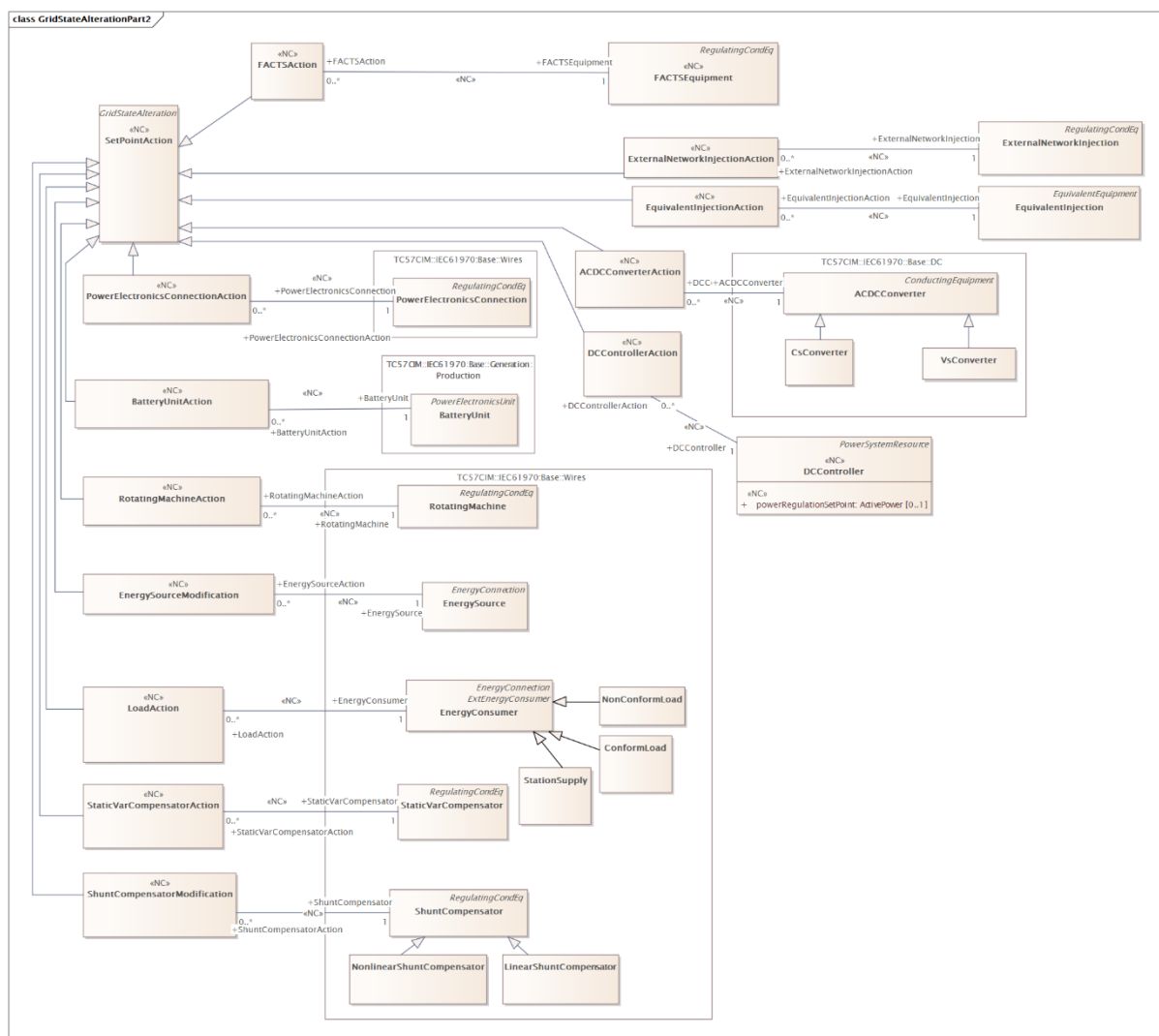
2112 **3.15 Remedial action extensions**2113 **3.15.1 General**

2114 This package contains the extensions related to the remedial action.

2115  
2116 **Figure 19 – Class diagram ExtRemedialAction::RemedialActionOverview**

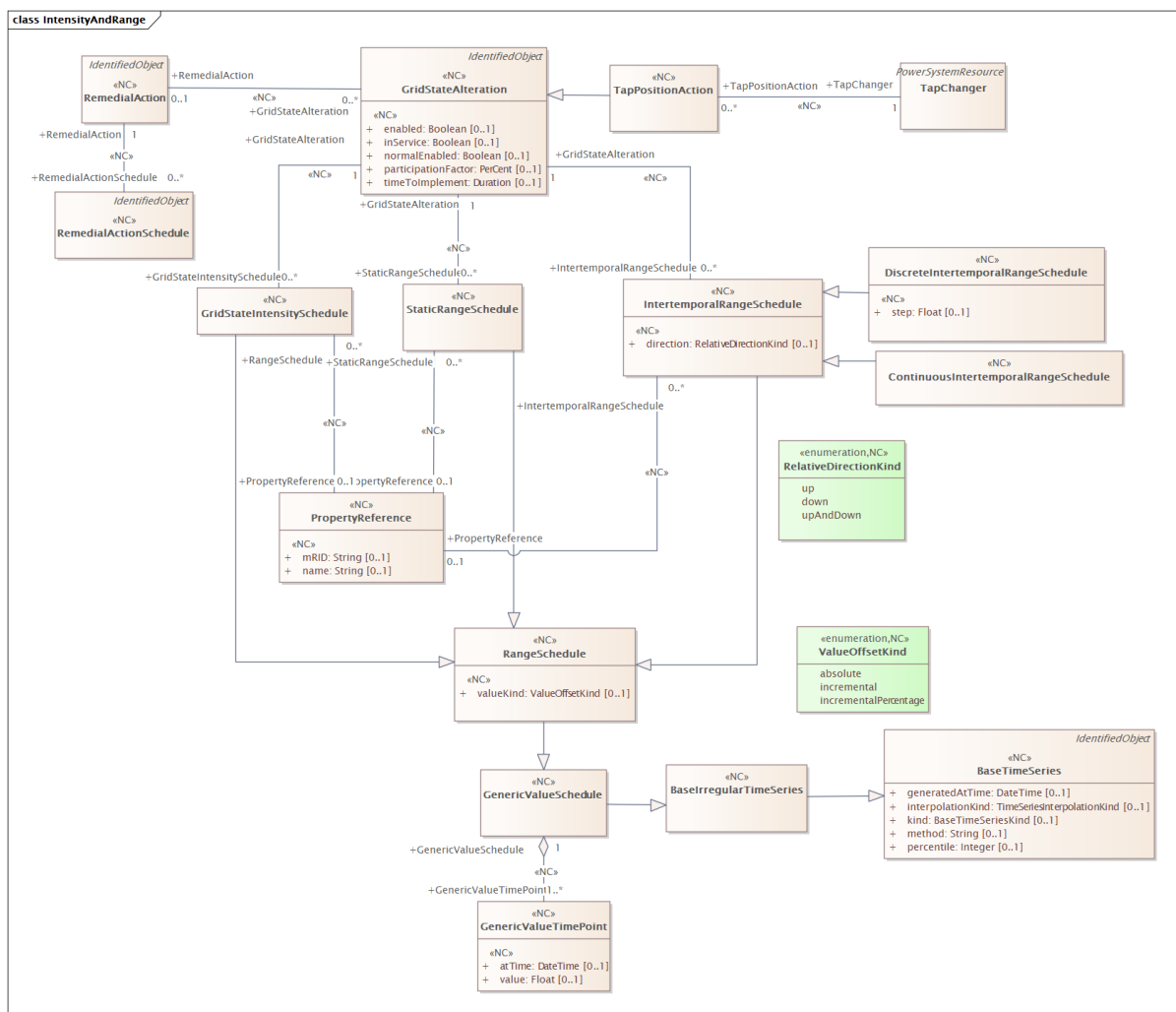
2117 Figure 19:

2118  
2119 **Figure 20 – Class diagram ExtRemedialAction::GridStateAlterationPart1**2120 Figure 20: This diagram contains extended classes for the purpose of the remedial action data  
2121 exchange.



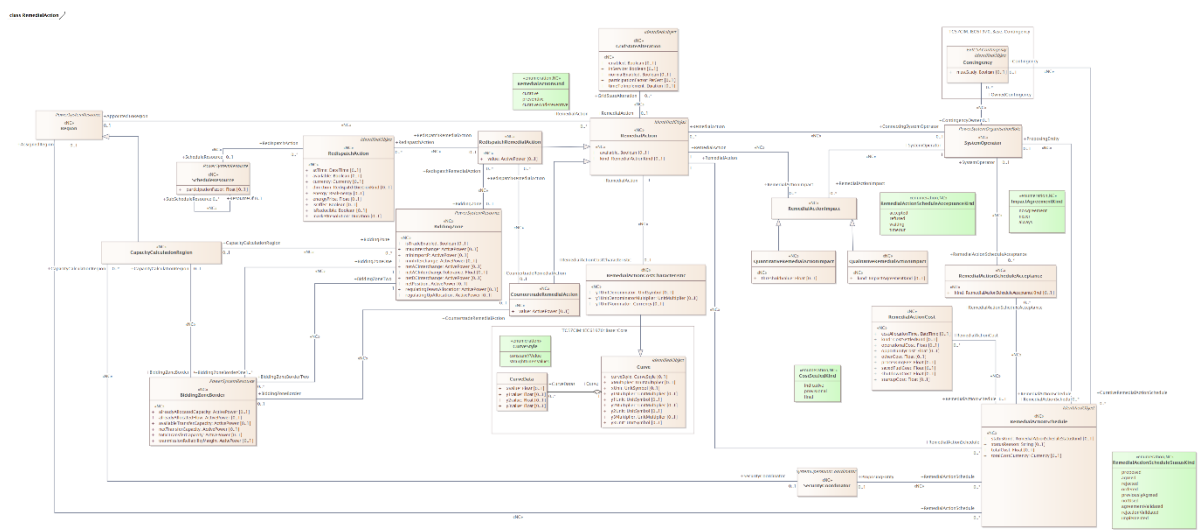
**Figure 21 – Class diagram ExtRemedialAction::GridStateAlterationPart2**

Figure 21: This diagram contains extended classes for the purpose of the remedial action data exchange.



**Figure 22 – Class diagram ExtRemedialAction::IntensityAndRange**

Figure 22: This diagram contains extended classes related to the modelling of static, dynamic ranges and intensity.



**Figure 23 – Class diagram ExtRemedialAction::RemedialAction**

Figure 23: The diagram contains main classes related to the remedial action.

### 3.15.2 (NC) ACDCCConverterAction

```
Inheritance path = SetPointAction : GridStateAlteration : IdentifiedObject : ExtEuIdentifiedObject
```

Alternate current Direct current (ACDC) converter action.

Table 200 shows all attributes of `ACDCConverterAction`.

### Table 200 – Attributes of ExtRemedialAction::ACDCConverterAction

name	mult	type	description
enabled	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
inService	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
normalEnabled	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
participationFactor	0..1	PerCent	(NC) inherited from: <a href="#">GridStateAlteration</a>
timeToImplement	0..1	Duration	(NC) inherited from: <a href="#">GridStateAlteration</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdetCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 201 shows all association ends of ACDCConverterAction with other classes.

**Table 201 – Association ends of ExtRemedialAction::ACDCConverterAction with other classes**

mult from	name	mult to	type	description
0..*	ACDCCConverter	1..1	ACDCCConverter	(NC) The ACDCCConverter that is associated with an action.
0..1	AvailabilityAction	0..*	<a href="#">AvailabilityAction</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>

mult from	name	mult to	type	description
0..*	GridStateAlterationCollection	0..1	<a href="#">GridStateAlterationCollection</a>	(NC) inherited from: <a href="#">GridStateAlterationCollection</a>
1..1	StaticRangeSchedule	0..*	<a href="#">StaticRangeSchedule</a>	(NC) inherited from: <a href="#">GridStateAlterationCollection</a>
1..1	GridStateIntensitySchedule	0..*	<a href="#">GridStateIntensitySchedule</a>	(NC) inherited from: <a href="#">GridStateAlterationCollection</a>
1..1	IntertemporalRangeSchedule	0..*	<a href="#">IntertemporalRangeSchedule</a>	(NC) inherited from: <a href="#">GridStateAlterationCollection</a>
0..*	RemedialAction	0..1	<a href="#">RemedialAction</a>	(NC) inherited from: <a href="#">GridStateAlterationCollection</a>
0..1	ControllableQuantity	0..*	<a href="#">ControllableQuantity</a>	(NC) inherited from: <a href="#">GridStateAlterationCollection</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

2143

2144 **3.15.3 (NC) AvailabilityRemedialAction**2145 Inheritance path = [RemedialAction](#) : IdentifiedObject : ExtEulIdentifiedObject

2146 Availability remedial action is a remedial action that cancel or reschedule an availability schedule.

2147 Table 202 shows all attributes of AvailabilityRemedialAction.

2148 **Table 202 – Attributes of ExtRemedialAction::AvailabilityRemedialAction**

name	mult	type	description
kind	0..1	<a href="#">RemedialActionKind</a>	(NC) inherited from: <a href="#">RemedialAction</a>
available	0..1	Boolean	(NC) inherited from: <a href="#">RemedialAction</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

2150

2151 Table 203 shows all association ends of AvailabilityRemedialAction with other classes.

2152 **Table 203 – Association ends of ExtRemedialAction::AvailabilityRemedialAction with other classes**

mult from	name	mult to	type	description
0..1	AvailabilitySchedule	0..*	<a href="#">AvailabilitySchedule</a>	(NC) Availability schedule that is part of the remedial action.
0..1	ContingencyWithRemedialAction	0..*	<a href="#">ContingencyWithRemedialAction</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..1	GridStateAlteration	0..*	<a href="#">GridStateAlteration</a>	(NC) inherited from: <a href="#">RemedialAction</a>
1..1	RemedialActionSchedule	0..*	<a href="#">RemedialActionSchedule</a>	(NC) inherited from: <a href="#">RemedialAction</a>

mult from	name	mult to	type	description
0..*	ImpactedOverlappingZone	0..1	<a href="#">OverlappingZone</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..*	AppointedToOverlappingZone	0..1	<a href="#">OverlappingZone</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..*	AppointedToRegion	0..1	<a href="#">Region</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..1	AssessedElementWithRemedialAction	0..*	<a href="#">AssessedElementWithRemedialAction</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..1	OutcomeValue	0..*	<a href="#">OutcomeValue</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..1	ControllableQuantity	0..*	<a href="#">ControllableQuantity</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..*	ConnectingSystemOperator	0..1	<a href="#">SystemOperator</a>	(NC) inherited from: <a href="#">RemedialAction</a>
1..1	RemedialActionCostCharacteristic	0..1	<a href="#">RemedialActionCostCharacteristic</a>	(NC) inherited from: <a href="#">RemedialAction</a>
1..1	RemedialActionImpact	0..*	<a href="#">RemedialActionImpact</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

2154

2155 **3.15.4 (NC) BatteryUnitAction**

2156 Inheritance path = [SetPointAction](#) : [GridStateAlteration](#) : IdentifiedObject :  
 2157 ExtEulIdentifiedObject

2158 Battery unit setpoint action.

2159 Table 204 shows all attributes of BatteryUnitAction.

2160

**Table 204 – Attributes of ExtRemedialAction::BatteryUnitAction**

name	mult	type	description
enabled	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
inService	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
normalEnabled	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
participationFactor	0..1	PerCent	(NC) inherited from: <a href="#">GridStateAlteration</a>
timeToImplement	0..1	Duration	(NC) inherited from: <a href="#">GridStateAlteration</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

2161

2162 Table 205 shows all association ends of BatteryUnitAction with other classes.

**Table 205 – Association ends of ExtRemedialAction::BatteryUnitAction with other classes**

mult from	name	mult to	type	description
0..*	BatteryUnit	1..1	BatteryUnit	(NC) The BatteryUnit that is associated with an action.
0..1	AvailabilityAction	0..*	<a href="#">AvailabilityAction</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..*	GridStateAlterationCollection	0..1	<a href="#">GridStateAlterationCollection</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	StaticRangeSchedule	0..*	<a href="#">StaticRangeSchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	GridStateIntensitySchedule	0..*	<a href="#">GridStateIntensitySchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	IntertemporalRangeSchedule	0..*	<a href="#">IntertemporalRangeSchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..*	RemedialAction	0..1	<a href="#">RemedialAction</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..1	ControllableQuantity	0..*	<a href="#">ControllableQuantity</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

**3.15.5 (NC) ContinuousIntertemporalRangeSchedule**

Inheritance path = [IntertemporalRangeSchedule](#) : [RangeSchedule](#) : [GenericValueSchedule](#) : [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : IdentifiedObject : ExtEulIdentifiedObject

It represents a continuous change in the schedule.

Table 206 shows all attributes of ContinuousIntertemporalRangeSchedule.

**Table 206 – Attributes of ExtRemedialAction::ContinuousIntertemporalRangeSchedule**

name	mult	type	description
direction	0..1	<a href="#">RelativeDirectionKind</a>	(NC) inherited from: <a href="#">IntertemporalRangeSchedule</a>
valueKind	0..1	<a href="#">ValueOffsetKind</a>	(NC) inherited from: <a href="#">RangeSchedule</a>
generatedAtTime	0..1	DateTime	inherited from: <a href="#">BaseTimeSeries</a>
interpolationKind	0..1	<a href="#">TimeSeriesInterpolationKind</a>	inherited from: <a href="#">BaseTimeSeries</a>
kind	0..1	<a href="#">BaseTimeSeriesKind</a>	inherited from: <a href="#">BaseTimeSeries</a>
method	0..1	String	inherited from: <a href="#">BaseTimeSeries</a>
percentile	0..1	Integer	inherited from: <a href="#">BaseTimeSeries</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject



2173 Table 207 shows all association ends of ContinuousIntertemporalRangeSchedule with other  
2174 classes.

2175 **Table 207 – Association ends of**  
2176 **ExtRemedialAction::ContinuousIntertemporalRangeSchedule with other classes**

mult from	name	mult to	type	description
0..*	GridStateAlteration	1..1	<a href="#">GridStateAlteration</a>	(NC) inherited from: <a href="#">IntertemporalRangeSchedule</a>
0..*	PropertyReference	0..1	<a href="#">PropertyReference</a>	(NC) inherited from: <a href="#">IntertemporalRangeSchedule</a>
1..1	GenericValueTimePoint	1..*	<a href="#">GenericValueTimePoint</a>	(NC) inherited from: <a href="#">GenericValueSchedule</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

2177  
2178 **3.15.6 (NC) CountertradeRemedialAction**  
2179 Inheritance path = [RemedialAction](#) : IdentifiedObject : ExtEulIdentifiedObject  
2180 Countertrade is a remedial action to relieve physical congestions where the location of activated  
2181 resources within the bidding zone is not known.  
2182 Table 208 shows all attributes of CountertradeRemedialAction.

2183 **Table 208 – Attributes of ExtRemedialAction::CountertradeRemedialAction**

name	mult	type	description
value	0..1	ActivePower	(NC) The amount of countertrade provided on the given border. Positive value indicates that the bidding zone with the BiddingZone.BiddingZoneBorderOne is increased. The bidding zone given by BiddingZone.BiddingZoneBorderTwo will decrease. Negative value would have the opposite effect.
kind	0..1	<a href="#">RemedialActionKind</a>	(NC) inherited from: <a href="#">RemedialAction</a>
available	0..1	Boolean	(NC) inherited from: <a href="#">RemedialAction</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

2184  
2185 Table 209 shows all association ends of CountertradeRemedialAction with other classes.

2186 **Table 209 – Association ends of ExtRemedialAction::CountertradeRemedialAction with**  
2187 **other classes**

mult from	name	mult to	type	description
0..1	RedispatchRemedialAction	0..*	<a href="#">RedispatchRemedialAction</a>	(NC)
0..1	BiddingZoneBorder	0..1	<a href="#">BiddingZoneBorder</a>	(NC) The BiddingZoneBorder where the countertrade is done.
0..1	ContingencyWithRemedialAction	0..*	<a href="#">ContingencyWithRemedialAction</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..1	GridStateAlteration	0..*	<a href="#">GridStateAlteration</a>	(NC) inherited from: <a href="#">RemedialAction</a>
1..1	RemedialActionSchedule	0..*	<a href="#">RemedialActionSchedule</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..*	ImpactedOverlappingZone	0..1	<a href="#">OverlappingZone</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..*	AppointedToOverlappingZone	0..1	<a href="#">OverlappingZone</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..*	AppointedToRegion	0..1	<a href="#">Region</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..1	AssessedElementWithRemedialAction	0..*	<a href="#">AssessedElementWithRemedialAction</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..1	OutcomeValue	0..*	<a href="#">OutcomeValue</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..1	ControllableQuantity	0..*	<a href="#">ControllableQuantity</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..*	ConnectingSystemOperator	0..1	<a href="#">SystemOperator</a>	(NC) inherited from: <a href="#">RemedialAction</a>
1..1	RemedialActionCostCharacteristic	0..1	<a href="#">RemedialActionCostCharacteristic</a>	(NC) inherited from: <a href="#">RemedialAction</a>
1..1	RemedialActionImpact	0..*	<a href="#">RemedialActionImpact</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

2188  
2189 **3.15.7 (NC) DCControllerAction**  
2190 Inheritance path = [SetPointAction](#) : [GridStateAlteration](#) : IdentifiedObject :  
2191 ExtEulIdentifiedObject  
2192 Direct current (DC) controller action.  
2193 Table 210 shows all attributes of DCControllerAction.

2194 **Table 210 – Attributes of ExtRemedialAction::DCControllerAction**

name	mult	type	description
enabled	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
inService	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
normalEnabled	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
participationFactor	0..1	PerCent	(NC) inherited from: <a href="#">GridStateAlteration</a>
timeToImplement	0..1	Duration	(NC) inherited from: <a href="#">GridStateAlteration</a>
aliasName	0..1	String	inherited from: IdentifiedObject

name	mult	type	description
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 211 shows all association ends of DCControllerAction with other classes.

**Table 211 – Association ends of ExtRemedialAction::DCControllerAction with other classes**

mult from	name	mult to	type	description
0..*	DCController	1..1	<a href="#">DCController</a>	(NC) The DCController that is associated with an action.
0..1	AvailabilityAction	0..*	<a href="#">AvailabilityAction</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..*	GridStateAlterationCollection	0..1	<a href="#">GridStateAlterationCollection</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	StaticRangeSchedule	0..*	<a href="#">StaticRangeSchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	GridStateIntensitySchedule	0..*	<a href="#">GridStateIntensitySchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	IntertemporalRangeSchedule	0..*	<a href="#">IntertemporalRangeSchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..*	RemedialAction	0..1	<a href="#">RemedialAction</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..1	ControllableQuantity	0..*	<a href="#">ControllableQuantity</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.15.8 (NC) DiscreteIntertemporalRangeSchedule

Inheritance path = [IntertemporalRangeSchedule](#) : [RangeSchedule](#) : [GenericValueSchedule](#) : [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : IdentifiedObject : ExtEulIdentifiedObject

It represents a discrete change in the schedule given by the step.

Table 212 shows all attributes of DiscreteIntertemporalRangeSchedule.

**Table 212 – Attributes of ExtRemedialAction::DiscreteIntertemporalRangeSchedule**

name	mult	type	description
step	0..1	Float	(NC) It defines the step of change.
direction	0..1	<a href="#">RelativeDirectionKind</a>	(NC) inherited from: <a href="#">IntertemporalRangeSchedule</a>
valueKind	0..1	<a href="#">ValueOffsetKind</a>	(NC) inherited from: <a href="#">RangeSchedule</a>
generatedAtTime	0..1	DateTime	inherited from: <a href="#">BaseTimeSeries</a>
interpolationKind	0..1	<a href="#">TimeSeriesInterpolationKind</a>	inherited from: <a href="#">BaseTimeSeries</a>
kind	0..1	<a href="#">BaseTimeSeriesKind</a>	inherited from: <a href="#">BaseTimeSeries</a>

name	mult	type	description
method	0..1	String	inherited from: <a href="#">BaseTimeSeries</a>
percentile	0..1	Integer	inherited from: <a href="#">BaseTimeSeries</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 213 shows all association ends of DiscreteIntertemporalRangeSchedule with other classes.

**Table 213 – Association ends of  
ExtRemedialAction::DiscreteIntertemporalRangeSchedule with other classes**

mult from	name	mult to	type	description
0..*	GridStateAlteration	1..1	<a href="#">GridStateAlteration</a>	(NC) inherited from: <a href="#">IntertemporalRangeSchedule</a>
0..*	PropertyReference	0..1	<a href="#">PropertyReference</a>	(NC) inherited from: <a href="#">IntertemporalRangeSchedule</a>
1..1	GenericValueTimePoint	1..*	<a href="#">GenericValueTimePoint</a>	(NC) inherited from: <a href="#">GenericValueSchedule</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.15.9 (NC) EnergySourceModification

Inheritance path = [SetPointAction](#) : [GridStateAlteration](#) : IdentifiedObject : ExtEulIdentifiedObject  
Energy source action.

Table 214 shows all attributes of EnergySourceModification.

**Table 214 – Attributes of ExtRemedialAction::EnergySourceModification**

name	mult	type	description
enabled	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
inService	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
normalEnabled	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
participationFactor	0..1	PerCent	(NC) inherited from: <a href="#">GridStateAlteration</a>
timeToImplement	0..1	Duration	(NC) inherited from: <a href="#">GridStateAlteration</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject

name	mult	type	description
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 215 shows all association ends of EnergySourceModification with other classes.

**Table 215 – Association ends of ExtRemedialAction::EnergySourceModification with other classes**

mult from	name	mult to	type	description
0..*	EnergySource	1..1	EnergySource	(NC) The EnergySource which is associated with an EnergySourceAction.
0..1	AvailabilityAction	0..*	<a href="#">AvailabilityAction</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..*	GridStateAlterationCollection	0..1	<a href="#">GridStateAlterationCollection</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	StaticRangeSchedule	0..*	<a href="#">StaticRangeSchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	GridStateIntensitySchedule	0..*	<a href="#">GridStateIntensitySchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	IntertemporalRangeSchedule	0..*	<a href="#">IntertemporalRangeSchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..*	RemedialAction	0..1	<a href="#">RemedialAction</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..1	ControllableQuantity	0..*	<a href="#">ControllableQuantity</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.15.10 (NC) EquivalentInjectionAction

Inheritance path = [SetPointAction](#) : [GridStateAlteration](#) : IdentifiedObject : ExtEulIdentifiedObject  
Equivalent injection action.

Table 216 shows all attributes of EquivalentInjectionAction.

**Table 216 – Attributes of ExtRemedialAction::EquivalentInjectionAction**

name	mult	type	description
enabled	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
inService	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
normalEnabled	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
participationFactor	0..1	PerCent	(NC) inherited from: <a href="#">GridStateAlteration</a>
timeToImplement	0..1	Duration	(NC) inherited from: <a href="#">GridStateAlteration</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject

name	mult	type	description
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 217 shows all association ends of EquivalentInjectionAction with other classes.

**Table 217 – Association ends of ExtRemedialAction::EquivalentInjectionAction with other classes**

mult from	name	mult to	type	description
0..*	EquivalentInjection	1..1	EquivalentInjection	(NC) The EquivalentInjection that is associated with an action.
0..1	AvailabilityAction	0..*	<a href="#">AvailabilityAction</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..*	GridStateAlterationCollection	0..1	<a href="#">GridStateAlterationCollection</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	StaticRangeSchedule	0..*	<a href="#">StaticRangeSchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	GridStateIntensitySchedule	0..*	<a href="#">GridStateIntensitySchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	IntertemporalRangeSchedule	0..*	<a href="#">IntertemporalRangeSchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..*	RemedialAction	0..1	<a href="#">RemedialAction</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..1	ControllableQuantity	0..*	<a href="#">ControllableQuantity</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.15.11 (NC) ExternalNetworkInjectionAction

Inheritance path = [SetPointAction](#) : [GridStateAlteration](#) : IdentifiedObject : ExtEulIdentifiedObject

External network injection action.

Table 218 shows all attributes of ExternalNetworkInjectionAction.

**Table 218 – Attributes of ExtRemedialAction::ExternalNetworkInjectionAction**

name	mult	type	description
enabled	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
inService	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
normalEnabled	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
participationFactor	0..1	PerCent	(NC) inherited from: <a href="#">GridStateAlteration</a>
timeToImplement	0..1	Duration	(NC) inherited from: <a href="#">GridStateAlteration</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

2241 Table 219 shows all association ends of ExternalNetworkInjectionAction with other classes.

2242 **Table 219 – Association ends of ExtRemedialAction::ExternalNetworkInjectionAction**  
2243 **with other classes**

mult from	name	mult to	type	description
0..*	ExternalNetworkInjection	1..1	ExternalNetworkInjection	(NC) The ExternalNetworkInjection that is associated with an action.
0..1	AvailabilityAction	0..*	<a href="#">AvailabilityAction</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..*	GridStateAlterationCollection	0..1	<a href="#">GridStateAlterationCollection</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	StaticRangeSchedule	0..*	<a href="#">StaticRangeSchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	GridStateIntensitySchedule	0..*	<a href="#">GridStateIntensitySchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	IntertemporalRangeSchedule	0..*	<a href="#">IntertemporalRangeSchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..*	RemedialAction	0..1	<a href="#">RemedialAction</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..1	ControllableQuantity	0..*	<a href="#">ControllableQuantity</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

2244

2245 **3.15.12 (NC) FACTSAction**

2246 Inheritance path = [SetPointAction](#) : [GridStateAlteration](#) : IdentifiedObject :

2247 ExtEulIdentifiedObject

2248 FACTS action.

2249 Table 220 shows all attributes of FACTSAction.

2250 **Table 220 – Attributes of ExtRemedialAction::FACTSAction**

name	mult	type	description
enabled	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
inService	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
normalEnabled	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
participationFactor	0..1	PerCent	(NC) inherited from: <a href="#">GridStateAlteration</a>
timeToImplement	0..1	Duration	(NC) inherited from: <a href="#">GridStateAlteration</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

2251

2252 Table 221 shows all association ends of FACTSAction with other classes.

2253 **Table 221 – Association ends of ExtRemedialAction::FACTSAction with other classes**

mult from	name	mult to	type	description
0..*	FACTSEquipment	1..1	<a href="#">FACTSEquipment</a>	(NC) ShuntCompensator that is associated with an action.
0..1	AvailabilityAction	0..*	<a href="#">AvailabilityAction</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..*	GridStateAlterationCollection	0..1	<a href="#">GridStateAlterationCollection</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	StaticRangeSchedule	0..*	<a href="#">StaticRangeSchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	GridStateIntensitySchedule	0..*	<a href="#">GridStateIntensitySchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	IntertemporalRangeSchedule	0..*	<a href="#">IntertemporalRangeSchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..*	RemedialAction	0..1	<a href="#">RemedialAction</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..1	ControllableQuantity	0..*	<a href="#">ControllableQuantity</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

2254

2255 **3.15.13 (NC) GridStateAlteration**

2256 Inheritance path = IdentifiedObject : ExtEulIdentifiedObject

2257 Grid state alteration is a change of values describing state (operating point) of one element in the grid model compared to the base case.

2259 Table 222 shows all attributes of GridStateAlteration.

2260 **Table 222 – Attributes of ExtRemedialAction::GridStateAlteration**

name	mult	type	description
enabled	0..1	Boolean	(NC) The status of the GridStateAlteration set by an operation or by a signal resulting from a control action.
inService	0..1	Boolean	(NC) Specifies the availability of the grid state alteration. If true, the grid state alteration is available for processing. if false, the grid state alteration is treated as if it is not in the model.
normalEnabled	0..1	Boolean	(NC) The default/normal value used when other active signal/values are missing.
participationFactor	0..1	PerCent	(NC) It defines the participation of this grid state alteration. If 0 this grid alteration does not participate. The sum of all participation factors for all grid state alterations associated with same remedial action shall be equal to 100%.
timeToImplement	0..1	Duration	(NC) Time to implement a grid state alteration.
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject



name	mult	type	description
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 223 shows all association ends of GridStateAlteration with other classes.

**Table 223 – Association ends of ExtRemedialAction::GridStateAlteration with other classes**

mult from	name	mult to	type	description
0..1	AvailabilityAction	0..*	<a href="#">AvailabilityAction</a>	(NC) Availability action describe the availability that affect this grid state alteration.
0..*	GridStateAlterationCollection	0..1	<a href="#">GridStateAlterationCollection</a>	(NC) The collection that has a GridStateAlteration.
1..1	StaticRangeSchedule	0..*	<a href="#">StaticRangeSchedule</a>	(NC) The StaticRangeSchedule associated with a given GridStateAlteration.
1..1	GridStateIntensitySchedule	0..*	<a href="#">GridStateIntensitySchedule</a>	(NC) The intensity associated with a given GridStateAlterationSchedule.
1..1	IntertemporalRangeSchedule	0..*	<a href="#">IntertemporalRangeSchedule</a>	(NC) The intertemporal range schedule associated with a given grid state alteration.
0..*	RemedialAction	0..1	<a href="#">RemedialAction</a>	(NC) The remedial action associated with a given grid state alteration.
0..1	ControllableQuantity	0..*	<a href="#">ControllableQuantity</a>	(NC) The controllable quantity associated with this grid state alteration.
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.15.14 (NC) GridStateAlterationRemedialAction

Inheritance path = [RemedialAction](#) : IdentifiedObject : ExtEulIdentifiedObject

Grid state alteration remedial action is a remedial action that describe one of many grid state alterations applied to a grid model state or particular scenario in order to resolve one or more Identified constraints.

Table 224 shows all attributes of GridStateAlterationRemedialAction.

**Table 224 – Attributes of ExtRemedialAction::GridStateAlterationRemedialAction**

name	mult	type	description
kind	0..1	<a href="#">RemedialActionKind</a>	(NC) inherited from: <a href="#">RemedialAction</a>
available	0..1	Boolean	(NC) inherited from: <a href="#">RemedialAction</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

2273  
2274 Table 225 shows all association ends of GridStateAlterationRemedialAction with other classes.

2275 **Table 225 – Association ends of ExtRemedialAction::GridStateAlterationRemedialAction**  
2276 **with other classes**

mult from	name	mult to	type	description
0..1	ContingencyWithRemedialAction	0..*	<a href="#">ContingencyWithRemedialAction</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..1	GridStateAlteration	0..*	<a href="#">GridStateAlteration</a>	(NC) inherited from: <a href="#">RemedialAction</a>
1..1	RemedialActionSchedule	0..*	<a href="#">RemedialActionSchedule</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..*	ImpactedOverlappingZone	0..1	<a href="#">OverlappingZone</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..*	AppointedToOverlappingZone	0..1	<a href="#">OverlappingZone</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..*	AppointedToRegion	0..1	<a href="#">Region</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..1	AssessedElementWithRemedialAction	0..*	<a href="#">AssessedElementWithRemedialAction</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..1	OutcomeValue	0..*	<a href="#">OutcomeValue</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..1	ControllableQuantity	0..*	<a href="#">ControllableQuantity</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..*	ConnectingSystemOperator	0..1	<a href="#">SystemOperator</a>	(NC) inherited from: <a href="#">RemedialAction</a>
1..1	RemedialActionCostCharacteristic	0..1	<a href="#">RemedialActionCostCharacteristic</a>	(NC) inherited from: <a href="#">RemedialAction</a>
1..1	RemedialActionImpact	0..*	<a href="#">RemedialActionImpact</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

2277  
2278 **3.15.15 (NC) GridStateIntensitySchedule**  
2279 Inheritance path = [RangeSchedule](#) : [GenericValueSchedule](#) : [BaseIrregularTimeSeries](#) :  
2280 [BaseTimeSeries](#) : IdentifiedObject : ExtEulIdentifiedObject  
2281 Defines the intensity applied for a given grid state alteration. It is primarily used in exchanges  
2282 related to the remedial action schedule. The value of the schedule will replace the value of the  
2283 attribute to which the schedule refers to.  
2284 Table 226 shows all attributes of GridStateIntensitySchedule.

2285 **Table 226 – Attributes of ExtRemedialAction::GridStateIntensitySchedule**

name	mult	type	description
valueKind	0..1	<a href="#">ValueOffsetKind</a>	(NC) inherited from: <a href="#">RangeSchedule</a>
generatedAtTime	0..1	DateTime	inherited from: <a href="#">BaseTimeSeries</a>
interpolationKind	0..1	<a href="#">TimeSeriesInterpolationKind</a>	inherited from: <a href="#">BaseTimeSeries</a>
kind	0..1	<a href="#">BaseTimeSeriesKind</a>	inherited from: <a href="#">BaseTimeSeries</a>
method	0..1	String	inherited from: <a href="#">BaseTimeSeries</a>

name	mult	type	description
percentile	0..1	Integer	inherited from: <a href="#">BaseTimeSeries</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 227 shows all association ends of GridStateIntensitySchedule with other classes.

**Table 227 – Association ends of ExtRemedialAction::GridStateIntensitySchedule with other classes**

mult from	name	mult to	type	description
0..*	GridStateAlteration	1..1	<a href="#">GridStateAlteration</a>	(NC) The grid state alteration which has intensity.
1..*	IntensityMeasurementReference	0..1	<a href="#">IntensityMeasurementReference</a>	(NC) The intensity measurement reference for this grid state intensity.
1..*	IntensityEquipmentReference	0..1	<a href="#">IntensityEquipmentReference</a>	(NC) The intensity equipment reference for this grid state intensity.
0..*	PropertyReference	0..1	<a href="#">PropertyReference</a>	(NC) The property reference for this range schedule.
1..1	GenericValueTimePoint	1..*	<a href="#">GenericValueTimePoint</a>	(NC) inherited from: <a href="#">GenericValueSchedule</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.15.16 (NC) IntertemporalRangeSchedule

Inheritance path = [RangeSchedule](#) : [GenericValueSchedule](#) : [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : IdentifiedObject : ExtEulIdentifiedObject

It represents the intertemporal range, which means that this is the maximum change of an attribute value between two time stamps or per time unit (e.g. hour). Both up and down directions are defined by the direction attribute, i.e. There are different schedules per direction. For instance the following example illustrates the approach:

- A tap changer related grid state alteration having two intertemporal range schedules.
- For a particular point in time, the value from up schedule is 6 and the value from down schedule is 3.
- Then, the GridStateIntensity for the same point in time cannot be more than plus 6 taps from the current, or more than minus 3 taps from the current.

Table 228 shows all attributes of IntertemporalRangeSchedule.

**Table 228 – Attributes of ExtRemedialAction::IntertemporalRangeSchedule**

name	mult	type	description
direction	0..1	<a href="#">RelativeDirectionKind</a>	(NC) Defines the direction of the value of the schedule.

name	mult	type	description
valueKind	0..1	<a href="#">ValueOffsetKind</a>	(NC) inherited from: <a href="#">RangeSchedule</a>
generatedAtTime	0..1	DateTime	inherited from: <a href="#">BaseTimeSeries</a>
interpolationKind	0..1	<a href="#">TimeSeriesInterpolationKind</a>	inherited from: <a href="#">BaseTimeSeries</a>
kind	0..1	<a href="#">BaseTimeSeriesKind</a>	inherited from: <a href="#">BaseTimeSeries</a>
method	0..1	String	inherited from: <a href="#">BaseTimeSeries</a>
percentile	0..1	Integer	inherited from: <a href="#">BaseTimeSeries</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 229 shows all association ends of IntertemporalRangeSchedule with other classes.

**Table 229 – Association ends of ExtRemedialAction::IntertemporalRangeSchedule with other classes**

mult from	name	mult to	type	description
0..*	GridStateAlteration	1..1	<a href="#">GridStateAlteration</a>	(NC) The grid state alteration which has an intertemporal range.
0..*	PropertyReference	0..1	<a href="#">PropertyReference</a>	(NC) The property reference for this intertemporal schedule.
1..1	GenericValueTimePoint	1..*	<a href="#">GenericValueTimePoint</a>	(NC) inherited from: <a href="#">GenericValueSchedule</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.15.17 (NC) LoadAction

Inheritance path = [SetPointAction](#) : [GridStateAlteration](#) : IdentifiedObject : ExtEulIdentifiedObject

Load action.

Table 230 shows all attributes of LoadAction.

**Table 230 – Attributes of ExtRemedialAction::LoadAction**

name	mult	type	description
enabled	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
inService	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
normalEnabled	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
participationFactor	0..1	PerCent	(NC) inherited from: <a href="#">GridStateAlteration</a>
timeToImplement	0..1	Duration	(NC) inherited from: <a href="#">GridStateAlteration</a>

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 231 shows all association ends of LoadAction with other classes.

**Table 231 – Association ends of ExtRemedialAction::LoadAction with other classes**

mult from	name	mult to	type	description
0..*	EnergyConsumer	1..1	EnergyConsumer	(NC) The EnergyConsumer that is associated with a load action.
0..1	AvailabilityAction	0..*	<a href="#">AvailabilityAction</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..*	GridStateAlterationCollection	0..1	<a href="#">GridStateAlterationCollection</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	StaticRangeSchedule	0..*	<a href="#">StaticRangeSchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	GridStateIntensitySchedule	0..*	<a href="#">GridStateIntensitySchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	IntertemporalRangeSchedule	0..*	<a href="#">IntertemporalRangeSchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..*	RemedialAction	0..1	<a href="#">RemedialAction</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..1	ControllableQuantity	0..*	<a href="#">ControllableQuantity</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.15.18 (NC) PowerElectronicsConnectionAction

Inheritance path = [SetPointAction](#) : [GridStateAlteration](#) : IdentifiedObject : ExtEulIdentifiedObject

Power electronics setpoint action.

Table 232 shows all attributes of PowerElectronicsConnectionAction.

**Table 232 – Attributes of ExtRemedialAction::PowerElectronicsConnectionAction**

name	mult	type	description
enabled	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
inService	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
normalEnabled	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
participationFactor	0..1	PerCent	(NC) inherited from: <a href="#">GridStateAlteration</a>
timeToImplement	0..1	Duration	(NC) inherited from: <a href="#">GridStateAlteration</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject

name	mult	type	description
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 233 shows all association ends of PowerElectronicsConnectionAction with other classes.

**Table 233 – Association ends of  
ExtRemedialAction::PowerElectronicsConnectionAction with other classes**

mult from	name	mult to	type	description
0..*	PowerElectronicsConnection	1..1	PowerElectronicsConnection	(NC) The PowerElectronicsConnection that is applied to an action.
0..1	AvailabilityAction	0..*	<a href="#">AvailabilityAction</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..*	GridStateAlterationCollection	0..1	<a href="#">GridStateAlterationCollection</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	StaticRangeSchedule	0..*	<a href="#">StaticRangeSchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	GridStateIntensitySchedule	0..*	<a href="#">GridStateIntensitySchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	IntertemporalRangeSchedule	0..*	<a href="#">IntertemporalRangeSchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..*	RemedialAction	0..1	<a href="#">RemedialAction</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..1	ControllableQuantity	0..*	<a href="#">ControllableQuantity</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.15.19 (NC) PropertyReference root class

The reference to a class and one of its properties.

Table 234 shows all attributes of PropertyReference.

**Table 234 – Attributes of ExtRemedialAction::PropertyReference**

name	mult	type	description
name	0..1	String	(NC) Describes the property as combination of the class and one of its attributes names (e.g. PowerElectronicsConnection.p ).
mRID	0..1	String	(NC) Master resource identifier issued by a model authority. The mRID is unique within an exchange context. Global uniqueness is easily achieved by using a UUID, as specified in RFC 4122, for the mRID. The use of UUID is strongly recommended.  For CIMXML data files in RDF syntax conforming to IEC 61970-552, the mRID is mapped to rdf:ID or rdf:about attributes that identify CIM object elements.

Table 235 shows all association ends of PropertyReference with other classes.

**Table 235 – Association ends of ExtRemedialAction::PropertyReference with other classes**

mult from	name	mult to	type	description
0..1	RangeSchedule	0..*	<a href="#">GridStateIntensitySchedule</a>	(NC) The range schedule for this property reference.
0..1	IntertemporalRangeSchedule	0..*	<a href="#">IntertemporalRangeSchedule</a>	(NC) The intertemporal schedule for this property reference.
0..1	IntensityEquipmentReference	0..*	<a href="#">IntensityEquipmentReference</a>	(NC)
1..1	PinEquipment	0..*	<a href="#">PinEquipment</a>	(NC)
0..1	StaticRangeSchedule	0..*	<a href="#">StaticRangeSchedule</a>	(NC) The static schedule for this property reference.
0..1	FunctionOutputVariable	0..*	<a href="#">FunctionOutputVariable</a>	(NC) Function output variable is the function output this property reference is used in.

**3.15.20 (NC) QualitativeRemedialActionImpact**

Inheritance path = [RemedialActionImpact](#)

It provides the qualitative impact for a remedial action.

Table 236 shows all attributes of QualitativeRemedialActionImpact.

**Table 236 – Attributes of ExtRemedialAction::QualitativeRemedialActionImpact**

name	mult	type	description
kind	0..1	<a href="#">ImpactAgreementKind</a>	(NC) The impact agreement kind.

Table 237 shows all association ends of QualitativeRemedialActionImpact with other classes.

**Table 237 – Association ends of ExtRemedialAction::QualitativeRemedialActionImpact with other classes**

mult from	name	mult to	type	description
0..*	RemedialAction	1..1	<a href="#">RemedialAction</a>	(NC) inherited from: <a href="#">RemedialActionImpact</a>
0..*	SystemOperator	1..1	<a href="#">SystemOperator</a>	(NC) inherited from: <a href="#">RemedialActionImpact</a>

**3.15.21 (NC) QuantitativeRemedialActionImpact**

Inheritance path = [RemedialActionImpact](#)

It provides the quantitative threshold for a remedial action. It is only applicable to quantifiable grid state alterations such as tap alteration, redispatch, target value alteration, but not status related alterations.

Table 238 shows all attributes of QuantitativeRemedialActionImpact.

**Table 238 – Attributes of ExtRemedialAction::QuantitativeRemedialActionImpact**

name	mult	type	description
thresholdValue	0..1	Float	(NC) The value is the threshold about which the System Operator is potentially impacted.

Table 239 shows all association ends of QuantitativeRemedialActionImpact with other classes.



**Table 239 – Association ends of ExtRemedialAction::QuantitativeRemedialActionImpact with other classes**

mult from	name	mult to	type	description
0..*	RemedialAction	1..1	<a href="#">RemedialAction</a>	(NC) inherited from: <a href="#">RemedialActionImpact</a>
0..*	SystemOperator	1..1	<a href="#">SystemOperator</a>	(NC) inherited from: <a href="#">RemedialActionImpact</a>

**3.15.22 (NC) RangeSchedule**

Inheritance path = [GenericValueSchedule](#) : [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) :

IdentifiedObject : ExtEulIdentifiedObject

Defines the range schedule for static or intertemporal schedule.

Table 240 shows all attributes of RangeSchedule.

**Table 240 – Attributes of ExtRemedialAction::RangeSchedule**

name	mult	type	description
valueKind	0..1	<a href="#">ValueOffsetKind</a>	(NC) The kind of value1 and value2 of the associated IrregularIntervalSchedule.
generatedAtTime	0..1	DateTime	inherited from: <a href="#">BaseTimeSeries</a>
interpolationKind	0..1	<a href="#">TimeSeriesInterpolationKind</a>	inherited from: <a href="#">BaseTimeSeries</a>
kind	0..1	<a href="#">BaseTimeSeriesKind</a>	inherited from: <a href="#">BaseTimeSeries</a>
method	0..1	String	inherited from: <a href="#">BaseTimeSeries</a>
percentile	0..1	Integer	inherited from: <a href="#">BaseTimeSeries</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 241 shows all association ends of RangeSchedule with other classes.

**Table 241 – Association ends of ExtRemedialAction::RangeSchedule with other classes**

mult from	name	mult to	type	description
1..1	GenericValueTimePoint	1..*	<a href="#">GenericValueTimePoint</a>	(NC) inherited from: <a href="#">GenericValueSchedule</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

**3.15.23 (NC) RedispatchAction**

Inheritance path = IdentifiedObject : ExtEulIdentifiedObject



2374 Redispatch action is an action to rearrange power schedules for a scheduled resource to obtain  
 2375 a feasible and safe operational state of the power electricity system.  
 2376 Table 242 shows all attributes of RedispatchAction.

2377 **Table 242 – Attributes of ExtRemedialAction::RedispatchAction**

name	mult	type	description
energy	0..1	RealEnergy	(NC) Defines the active power reserve.
direction	0..1	<a href="#">RedispatchDirectionKind</a>	(NC) Defined the direction.
isOffer	0..1	Boolean	(NC) Indicates if the reserve is an offer (true), otherwise it would be considered a need (false).
currency	0..1	Currency	(NC) Currency the energy price is given in.
energyPrice	0..1	Float	(NC) Energy price for the reserve action.
isReducible	0..1	Boolean	(NC) Indicates if the energy restoration reserve can be reduced. If true, the quantity may be reduced to the minimum active power for the resources. If false, it is not possible to reduce the quantity.
available	0..1	Boolean	(NC) Defines if the reserve action is available and can be used. If true, the reserve action is available and can be used. If false, the reserve action is defined, but not available to be used.
atTime	0..1	DateTime	(NC) The time the data is valid for.
marketResolution	0..1	Duration	(NC) This is the market resolution for the bid.
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

2378  
 2379 Table 243 shows all association ends of RedispatchAction with other classes.

2380 **Table 243 – Association ends of ExtRemedialAction::RedispatchAction with other**  
 2381 **classes**

mult from	name	mult to	type	description
0..*	ScheduleResource	0..1	<a href="#">ScheduleResource</a>	(NC) The schedule resource that has this redispatch action.
0..*	RedispatchRemedialAction	0..1	<a href="#">RedispatchRemedialAction</a>	(NC)
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

2382  
 2383 **3.15.24 (NC) RedispatchRemedialAction**  
 2384 Inheritance path = [RemedialAction](#) : IdentifiedObject : ExtEulIdentifiedObject

2385 Redispatch remedial action is a remedial action that through rearranging power schedules is  
2386 eliminating breaches of constraints.

2387 Table 244 shows all attributes of RedispatchRemedialAction.

2388 **Table 244 – Attributes of ExtRemedialAction::RedispatchRemedialAction**

name	mult	type	description
value	0..1	ActivePower	(NC) The amount of redispatch provided to a bidding zone. This will be distributed using the participation factor for each of the units in the bidding zone. Positive value indicates that the net position in the bidding zone is increased. Negative value indicates that the net position in the bidding zone is decreased.
kind	0..1	<a href="#">RemedialActionKind</a>	(NC) inherited from: <a href="#">RemedialAction</a>
available	0..1	Boolean	(NC) inherited from: <a href="#">RemedialAction</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

2389  
2390 Table 245 shows all association ends of RedispatchRemedialAction with other classes.

2391 **Table 245 – Association ends of ExtRemedialAction::RedispatchRemedialAction with**  
2392 **other classes**

mult from	name	mult to	type	description
0..*	BiddingZone	0..1	<a href="#">BiddingZone</a>	(NC)
0..1	RedispatchAction	0..*	<a href="#">RedispatchAction</a>	(NC)
0..*	CountertradeRemedialAction	0..1	<a href="#">CountertradeRemedialAction</a>	(NC)
0..1	ContingencyWithRemedialAction	0..*	<a href="#">ContingencyWithRemedialAction</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..1	GridStateAlteration	0..*	<a href="#">GridStateAlteration</a>	(NC) inherited from: <a href="#">RemedialAction</a>
1..1	RemedialActionSchedule	0..*	<a href="#">RemedialActionSchedule</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..*	ImpactedOverlappingZone	0..1	<a href="#">OverlappingZone</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..*	AppointedToOverlappingZone	0..1	<a href="#">OverlappingZone</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..*	AppointedToRegion	0..1	<a href="#">Region</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..1	AssessedElementWithRemedialAction	0..*	<a href="#">AssessedElementWithRemedialAction</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..1	OutcomeValue	0..*	<a href="#">OutcomeValue</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..1	ControllableQuantity	0..*	<a href="#">ControllableQuantity</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..*	ConnectingSystemOperator	0..1	<a href="#">SystemOperator</a>	(NC) inherited from: <a href="#">RemedialAction</a>

mult from	name	mult to	type	description
1..1	RemedialActionCostCharacteristic	0..1	<a href="#">RemedialActionCostCharacteristic</a>	(NC) inherited from: <a href="#">RemedialAction</a>
1..1	RemedialActionImpact	0..*	<a href="#">RemedialActionImpact</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

2393

2394 **3.15.25 (NC) RegulatingControlAction**2395 Inheritance path = [GridStateAlteration](#) : IdentifiedObject : ExtEulIdentifiedObject

2396 Control action means the set point change of a regulating control power system resource in the grid model compared to the base case.

2397 Table 246 shows all attributes of RegulatingControlAction.

2399 **Table 246 – Attributes of ExtRemedialAction::RegulatingControlAction**

name	mult	type	description
enabled	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
inService	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
normalEnabled	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
participationFactor	0..1	PerCent	(NC) inherited from: <a href="#">GridStateAlteration</a>
timeToImplement	0..1	Duration	(NC) inherited from: <a href="#">GridStateAlteration</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

2400

2401 Table 247 shows all association ends of RegulatingControlAction with other classes.

2402 **Table 247 – Association ends of ExtRemedialAction::RegulatingControlAction with other classes**

2403

mult from	name	mult to	type	description
0..*	RegulatingControl	1..1	RegulatingControl	(NC) The regulating control which has an action.
0..1	AvailabilityAction	0..*	<a href="#">AvailabilityAction</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..*	GridStateAlterationCollection	0..1	<a href="#">GridStateAlterationCollection</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	StaticRangeSchedule	0..*	<a href="#">StaticRangeSchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	GridStateIntensitySchedule	0..*	<a href="#">GridStateIntensitySchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	IntertemporalRangeSchedule	0..*	<a href="#">IntertemporalRangeSchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>

mult from	name	mult to	type	description
0..*	RemedialAction	0..1	<a href="#">RemedialAction</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..1	ControllableQuantity	0..*	<a href="#">ControllableQuantity</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.15.26 (NC) RemedialAction

Inheritance path = IdentifiedObject : ExtEuIdentifiedObject

Remedial action describes one or more actions that can be performed on a given power system model situation to eliminate one or more identified breaches of constraints. The remedial action can be costly, and have a cost characteristic, or non costly.

Table 248 shows all attributes of RemedialAction.

**Table 248 – Attributes of ExtRemedialAction::RemedialAction**

name	mult	type	description
kind	0..1	<a href="#">RemedialActionKind</a>	(NC) The kind of the remedial action.
available	0..1	Boolean	(NC) It identifies if the remedial action is available. True means available, False means unavailable.
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEuIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEuIdentifiedObject

Table 249 shows all association ends of RemedialAction with other classes.

**Table 249 – Association ends of ExtRemedialAction::RemedialAction with other classes**

mult from	name	mult to	type	description
0..1	ContingencyWithRemedialAction	0..*	<a href="#">ContingencyWithRemedialAction</a>	(NC) The contingency and remedial action combination.
0..1	GridStateAlteration	0..*	<a href="#">GridStateAlteration</a>	(NC) The grid state alteration which is part of the remedial action.
1..1	RemedialActionSchedule	0..*	<a href="#">RemedialActionSchedule</a>	(NC) The remedial action schedule associated with a remedial action, i.e. the assigning a schedule to a remedial action.
0..*	ImpactedOverlappingZone	0..1	<a href="#">OverlappingZone</a>	(NC) The impacted overlapping zone for this impacting remedial action.
0..*	AppointedToOverlappingZone	0..1	<a href="#">OverlappingZone</a>	(NC) The overlapping zone appointed to the remedial action.
0..*	AppointedToRegion	0..1	<a href="#">Region</a>	(NC) The region in which the remedial action is appointed.

mult from	name	mult to	type	description
0..1	AssessedElementWithRemedialAction	0..*	<a href="#">AssessedElementWithRemedialAction</a>	(NC) The assessed element and remedial action combination to be simulated for this remedial action.
0..1	OutcomeValue	0..*	<a href="#">OutcomeValue</a>	(NC) The outcome value associated with a remedial action.
0..1	ControllableQuantity	0..*	<a href="#">ControllableQuantity</a>	(NC) The controllable quantity for a remedial action.
0..*	ConnectingSystemOperator	0..1	<a href="#">SystemOperator</a>	(NC) System operator connected by remedial actions.
1..1	RemedialActionCostCharacteristic	0..1	<a href="#">RemedialActionCostCharacteristic</a>	(NC) The remedial action cost characteristic that is associated with a remedial action.
1..1	RemedialActionImpact	0..*	<a href="#">RemedialActionImpact</a>	(NC) This is the threshold for a given remedial action.
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

2415

2416 **3.15.27 (NC) RemedialActionCost root class**

2417 Remedial action cost is the total cost itemised cost by category and type for the remedial action.

2418 Table 250 shows all attributes of RemedialActionCost.

2419 **Table 250 – Attributes of ExtRemedialAction::RemedialActionCost**

name	mult	type	description
costAllocationTime	0..1	DateTime	(NC) Cost allocation time is the time the cost shall be allocated.
kind	0..1	<a href="#">CostSettledKind</a>	(NC) Remedial action cost category related to the confirmation of the cost in regards to changes.
operationalCost	0..1	Float	(NC) Operational cost is the total cost directly related to operate the unit according to the remedial action, e.g. fuel cost.
opportunityCost	0..1	Float	(NC) Opportunity cost is the total cost of potential earning that is missed due to performing the remedial action.
otherCost	0..1	Float	(NC) Other cost is the total cost that cannot be directly allocated to any of the other items.
processingFee	0..1	Float	(NC) Processing fee is the total cost for processing the remedial action.
savedFuelCost	0..1	Float	(NC) Saved fuel cost is the total saving due to not consuming the expected fuel as part of the remedial action.
shutdownCost	0..1	Float	(NC) Shutdown cost is the total cost for shutting down a unit as part of the remedial action.
startupCost	0..1	Float	(NC) Start-up cost is the total cost for activating the remedial action, e.g. if a generator needs to be started before it can perform the remedial action.

2420

2421 Table 251 shows all association ends of RemedialActionCost with other classes.

2422 **Table 251 – Association ends of ExtRemedialAction::RemedialActionCost with other**  
2423 **classes**

mult from	name	mult to	type	description
0..*	RemedialActionSchedule	0..1	<a href="#">RemedialActionSchedule</a>	(NC) Remedial action schedule for which this remedial action cost relates to.

2424

### 2425 3.15.28 (NC) RemedialActionCostCharacteristic

2426 Inheritance path = Curve : IdentifiedObject : ExtEulIdentifiedObject

2427 The cost characteristic for a remedial action.

2428 Table 252 shows all attributes of RemedialActionCostCharacteristic.

2429 **Table 252 – Attributes of ExtRemedialAction::RemedialActionCostCharacteristic**

name	mult	type	description
y1UnitNominator	0..1	Currency	(NC) The nominator of the Y1-axis units of measure.
y1UnitDenominator	0..1	UnitSymbol	(NC) The denominator of the Y1-axis units of measure.
y1UnitDenominatorMultiplier	0..1	UnitMultiplier	(NC) The multiplier of the denominator of the Y1-axis units of measure.
curveStyle	0..1	CurveStyle	inherited from: Curve
xMultiplier	0..1	UnitMultiplier	inherited from: Curve
xUnit	0..1	UnitSymbol	inherited from: Curve
y1Multiplier	0..1	UnitMultiplier	inherited from: Curve
y1Unit	0..1	UnitSymbol	inherited from: Curve
y2Multiplier	0..1	UnitMultiplier	inherited from: Curve
y2Unit	0..1	UnitSymbol	inherited from: Curve
y3Multiplier	0..1	UnitMultiplier	inherited from: Curve
y3Unit	0..1	UnitSymbol	inherited from: Curve
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

2430

2431 Table 253 shows all association ends of RemedialActionCostCharacteristic with other classes.

2432 **Table 253 – Association ends of ExtRemedialAction::RemedialActionCostCharacteristic**  
2433 **with other classes**

mult from	name	mult to	type	description
0..1	RemedialAction	1..1	<a href="#">RemedialAction</a>	(NC) The remedial action that has cost characteristic.
1..1	CurveDatas	0..*	CurveData	inherited from: Curve
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject

mult from	name	mult to	type	description
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

2434

2435 **3.15.29 (NC) RemedialActionImpact root class**

2436 It provides the remedial action impact.

2437 All grid alterations linked to the remedial action have to be of the same type.

2438 Table 254 shows all association ends of RemedialActionImpact with other classes.

2439 **Table 254 – Association ends of ExtRemedialAction::RemedialActionImpact with other**  
2440 **classes**

mult from	name	mult to	type	description
0..*	RemedialAction	1..1	<a href="#">RemedialAction</a>	(NC) The remedial action that has a threshold.
0..*	SystemOperator	1..1	<a href="#">SystemOperator</a>	(NC) The impacted System Operator that assigns a remedial action impact.

2441

2442 **3.15.30 (NC) RemedialActionSchedule**

2443 Inheritance path = IdentifiedObject : ExtEulIdentifiedObject

2444 A schedule for a determined remedial action.

2445 Table 255 shows all attributes of RemedialActionSchedule.

2446 **Table 255 – Attributes of ExtRemedialAction::RemedialActionSchedule**

name	mult	type	description
statusKind	0..1	<a href="#">RemedialActionScheduleStatusKind</a>	(NC) Indicates the status kind for the remedial action schedule.
statusReason	0..1	String	(NC) Description of reasoning for the status. For instance, in case of rejected remedial action, the reason for this rejection is described here.
totalCost	0..1	Float	(NC) Total cost of the remedial action.
totalCostCurrency	0..1	Currency	(NC) The currency of the total cost.
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

2447

2448 Table 256 shows all association ends of RemedialActionSchedule with other classes.

**Table 256 – Association ends of ExtRemedialAction::RemedialActionSchedule with other classes**

mult from	name	mult to	type	description
0..1	EventSchedule	0..1	<a href="#">EventSchedule</a>	Event schedule that describe the validity of the remedial action schedule.
0..*	ProposingEntity	0..1	<a href="#">SecurityCoordinator</a>	(NC) The security coordinator that is proposing this remedial action schedule.
0..*	ProposingEntity	0..1	<a href="#">SystemOperator</a>	(NC)
0..*	Contingency	0..1	Contingency	(NC) The contingency for a curative remedial action schedule.
0..*	OverlappingZone	0..*	<a href="#">OverlappingZone</a>	(NC) The overlapping zone for this overlapping remedial action schedule.
0..*	AssignedRegion	0..1	<a href="#">Region</a>	(NC) The assigned region for this remedial action schedule.
0..1	OutcomeValue	0..*	<a href="#">OutcomeValue</a>	(NC) The outcome value associated with a remedial action schedule.
0..*	RemedialAction	1..1	<a href="#">RemedialAction</a>	(NC) The remedial action that has a remedial action schedule associated.
0..1	RemedialActionCost	0..*	<a href="#">RemedialActionCost</a>	(NC) Remedial action cost related to this remedial schedule.
0..1	RemedialActionScheduleAcceptance	0..*	<a href="#">RemedialActionScheduleAcceptance</a>	(NC) The remedial action schedule acceptance related to a remedial action schedule.
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.15.31 (NC) RemedialActionScheduleAcceptance root class

It identifies if the remedial action schedule is accepted for a given system operator.

Table 257 shows all attributes of RemedialActionScheduleAcceptance.

**Table 257 – Attributes of ExtRemedialAction::RemedialActionScheduleAcceptance**

name	mult	type	description
kind	0..1	<a href="#">RemedialActionScheduleAcceptanceKind</a>	(NC) The kind of the remedial action acceptance.

Table 258 shows all association ends of RemedialActionScheduleAcceptance with other classes.

**Table 258 – Association ends of ExtRemedialAction::RemedialActionScheduleAcceptance with other classes**

mult from	name	mult to	type	description
0..*	RemedialActionSchedule	0..1	<a href="#">RemedialActionSchedule</a>	(NC) A remedial action schedule for which a remedial action schedule acceptance is reported.



mult from	name	mult to	type	description
0..*	SystemOperator	0..1	<a href="#">SystemOperator</a>	(NC) A system operator for which a remedial action schedule acceptances are reported.

2461

2462 **3.15.32 (NC) RotatingMachineAction**

2463 Inheritance path = [SetPointAction](#) : [GridStateAlteration](#) : IdentifiedObject :

2464 ExtEulIdentifiedObject

2465 Rotating machine action.

2466 Table 259 shows all attributes of RotatingMachineAction.

2467 **Table 259 – Attributes of ExtRemedialAction::RotatingMachineAction**

name	mult	type	description
enabled	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
inService	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
normalEnabled	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
participationFactor	0..1	PerCent	(NC) inherited from: <a href="#">GridStateAlteration</a>
timeToImplement	0..1	Duration	(NC) inherited from: <a href="#">GridStateAlteration</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

2468

2469 Table 260 shows all association ends of RotatingMachineAction with other classes.

2470 **Table 260 – Association ends of ExtRemedialAction::RotatingMachineAction with other**

2471 **classes**

mult from	name	mult to	type	description
0..*	RotatingMachine	1..1	RotatingMachine	(NC) The rotating machine that has an action.
0..1	AvailabilityAction	0..*	<a href="#">AvailabilityAction</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..*	GridStateAlterationCollection	0..1	<a href="#">GridStateAlterationCollection</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	StaticRangeSchedule	0..*	<a href="#">StaticRangeSchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	GridStateIntensitySchedule	0..*	<a href="#">GridStateIntensitySchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	IntertemporalRangeSchedule	0..*	<a href="#">IntertemporalRangeSchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..*	RemedialAction	0..1	<a href="#">RemedialAction</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..1	ControllableQuantity	0..*	<a href="#">ControllableQuantity</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject

mult from	name	mult to	type	description
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

2472

2473 **3.15.33 (NC) SetPointAction**2474 Inheritance path = [GridStateAlteration](#) : IdentifiedObject : ExtEulIdentifiedObject

2475 Setpoint action.

2476 Table 261 shows all attributes of SetPointAction.

2477

**Table 261 – Attributes of ExtRemedialAction::SetPointAction**

name	mult	type	description
enabled	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
inService	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
normalEnabled	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
participationFactor	0..1	PerCent	(NC) inherited from: <a href="#">GridStateAlteration</a>
timeToImplement	0..1	Duration	(NC) inherited from: <a href="#">GridStateAlteration</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

2478

2479 Table 262 shows all association ends of SetPointAction with other classes.

2480 **Table 262 – Association ends of ExtRemedialAction::SetPointAction with other classes**

mult from	name	mult to	type	description
0..1	AvailabilityAction	0..*	<a href="#">AvailabilityAction</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..*	GridStateAlterationCollection	0..1	<a href="#">GridStateAlterationCollection</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	StaticRangeSchedule	0..*	<a href="#">StaticRangeSchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	GridStateIntensitySchedule	0..*	<a href="#">GridStateIntensitySchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	IntertemporalRangeSchedule	0..*	<a href="#">IntertemporalRangeSchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..*	RemedialAction	0..1	<a href="#">RemedialAction</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..1	ControllableQuantity	0..*	<a href="#">ControllableQuantity</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

2481

2482 **3.15.34 (NC) SchemeRemedialAction**2483 Inheritance path = [RemedialAction](#) : IdentifiedObject : ExtEulIdentifiedObject

2484 Schema remedial action is remedial action that involves a scheme that can include conditional  
2485 logic and stages of grid alternation. The primary remedial action is the arming of these schemes,  
2486 that will then perform curative remedial action when the condition is met. System Integrity  
2487 Protection Scheme (SIPS) and Special Protection Scheme (SPS) are example of this.  
2488 Table 263 shows all attributes of SchemeRemedialAction.

2489 **Table 263 – Attributes of ExtRemedialAction::SchemeRemedialAction**

name	mult	type	description
kind	0..1	<a href="#">RemedialActionKind</a>	(NC) inherited from: <a href="#">RemedialAction</a>
available	0..1	Boolean	(NC) inherited from: <a href="#">RemedialAction</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

2490  
2491 Table 264 shows all association ends of SchemeRemedialAction with other classes.

2492 **Table 264 – Association ends of ExtRemedialAction::SchemeRemedialAction with other**  
2493 **classes**

mult from	name	mult to	type	description
0..*	RemedialActionScheme	0..1	<a href="#">RemedialActionScheme</a>	(NC) Remedial action scheme that has this armed remedial action.
0..1	ContingencyWithRemedialAction	0..*	<a href="#">ContingencyWithRemedialAction</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..1	GridStateAlteration	0..*	<a href="#">GridStateAlteration</a>	(NC) inherited from: <a href="#">RemedialAction</a>
1..1	RemedialActionSchedule	0..*	<a href="#">RemedialActionSchedule</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..*	ImpactedOverlappingZone	0..1	<a href="#">OverlappingZone</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..*	AppointedToOverlappingZone	0..1	<a href="#">OverlappingZone</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..*	AppointedToRegion	0..1	<a href="#">Region</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..1	AssessedElementWithRemedialAction	0..*	<a href="#">AssessedElementWithRemedialAction</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..1	OutcomeValue	0..*	<a href="#">OutcomeValue</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..1	ControllableQuantity	0..*	<a href="#">ControllableQuantity</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..*	ConnectingSystemOperator	0..1	<a href="#">SystemOperator</a>	(NC) inherited from: <a href="#">RemedialAction</a>
1..1	RemedialActionCostCharacteristic	0..1	<a href="#">RemedialActionCostCharacteristic</a>	(NC) inherited from: <a href="#">RemedialAction</a>
1..1	RemedialActionImpact	0..*	<a href="#">RemedialActionImpact</a>	(NC) inherited from: <a href="#">RemedialAction</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject

mult from	name	mult to	type	description
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

2494

2495 **3.15.35 (NC) ShuntCompensatorModification**2496 Inheritance path = [SetPointAction](#) : [GridStateAlteration](#) : IdentifiedObject :

2497 ExtEulIdentifiedObject

2498 Shunt compensator action.

2499 Table 265 shows all attributes of ShuntCompensatorModification.

2500 **Table 265 – Attributes of ExtRemedialAction::ShuntCompensatorModification**

name	mult	type	description
enabled	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
inService	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
normalEnabled	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
participationFactor	0..1	PerCent	(NC) inherited from: <a href="#">GridStateAlteration</a>
timeToImplement	0..1	Duration	(NC) inherited from: <a href="#">GridStateAlteration</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

2501

2502 Table 266 shows all association ends of ShuntCompensatorModification with other classes.

2503 **Table 266 – Association ends of ExtRemedialAction::ShuntCompensatorModification**  
2504 **with other classes**

mult from	name	mult to	type	description
0..*	ShuntCompensator	1..1	ShuntCompensator	(NC) The ShuntCompensator that is associated with an action.
0..1	AvailabilityAction	0..*	<a href="#">AvailabilityAction</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..*	GridStateAlterationCollection	0..1	<a href="#">GridStateAlterationCollection</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	StaticRangeSchedule	0..*	<a href="#">StaticRangeSchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	GridStateIntensitySchedule	0..*	<a href="#">GridStateIntensitySchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	IntertemporalRangeSchedule	0..*	<a href="#">IntertemporalRangeSchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..*	RemedialAction	0..1	<a href="#">RemedialAction</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..1	ControllableQuantity	0..*	<a href="#">ControllableQuantity</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

2505

2506 **3.15.36 (NC) StaticRangeSchedule**

2507 Inheritance path = [RangeSchedule](#) : [GenericValueSchedule](#) : [BaseIrregularTimeSeries](#) :  
 2508 [BaseTimeSeries](#) : IdentifiedObject : ExtEulIdentifiedObject

2509 Defines the static range, which means that this is the minimum and/or maximum of an attribute  
 2510 value. The value of the schedule will replace the value of the attribute to which the schedule  
 2511 refers to.

2512 For instance for a tap changer related grid state alteration for a particular point in time, if  
 2513 TapChanger.lowStep is to be restricted, the value of the schedule will represent that new  
 2514 TapChanger.lowStep.

2515 Table 267 shows all attributes of StaticRangeSchedule.

2516 **Table 267 – Attributes of ExtRemedialAction::StaticRangeSchedule**

name	mult	type	description
valueKind	0..1	<a href="#">ValueOffsetKind</a>	(NC) inherited from: <a href="#">RangeSchedule</a>
generatedAtTime	0..1	DateTime	inherited from: <a href="#">BaseTimeSeries</a>
interpolationKind	0..1	<a href="#">TimeSeriesInterpolationKind</a>	inherited from: <a href="#">BaseTimeSeries</a>
kind	0..1	<a href="#">BaseTimeSeriesKind</a>	inherited from: <a href="#">BaseTimeSeries</a>
method	0..1	String	inherited from: <a href="#">BaseTimeSeries</a>
percentile	0..1	Integer	inherited from: <a href="#">BaseTimeSeries</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

2517

2518 Table 268 shows all association ends of StaticRangeSchedule with other classes.

2519 **Table 268 – Association ends of ExtRemedialAction::StaticRangeSchedule with other**  
 2520 **classes**

mult from	name	mult to	type	description
0..*	GridStateAlteration	1..1	<a href="#">GridStateAlteration</a>	(NC) The grid state alteration which has static range.
0..*	PropertyReference	0..1	<a href="#">PropertyReference</a>	(NC) The property reference for this static schedule.
1..1	GenericValueTimePoint	1..*	<a href="#">GenericValueTimePoint</a>	(NC) inherited from: <a href="#">GenericValueSchedule</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

2521

2522 **3.15.37 (NC) StaticVarCompensatorAction**2523 Inheritance path = [SetPointAction](#) : [GridStateAlteration](#) : IdentifiedObject :

2524 ExtEulIdentifiedObject

2525 Static Var compensator action.

2526 Table 269 shows all attributes of StaticVarCompensatorAction.

2527 **Table 269 – Attributes of ExtRemedialAction::StaticVarCompensatorAction**

name	mult	type	description
enabled	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
inService	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
normalEnabled	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
participationFactor	0..1	PerCent	(NC) inherited from: <a href="#">GridStateAlteration</a>
timeToImplement	0..1	Duration	(NC) inherited from: <a href="#">GridStateAlteration</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

2528

2529 Table 270 shows all association ends of StaticVarCompensatorAction with other classes.

2530 **Table 270 – Association ends of ExtRemedialAction::StaticVarCompensatorAction with**  
2531 **other classes**

mult from	name	mult to	type	description
0..*	StaticVarCompensator	1..1	StaticVarCompensator	(NC) The StaticVarCompensator which is associated with an action.
0..1	AvailabilityAction	0..*	<a href="#">AvailabilityAction</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..*	GridStateAlterationCollection	0..1	<a href="#">GridStateAlterationCollection</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	StaticRangeSchedule	0..*	<a href="#">StaticRangeSchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	GridStateIntensitySchedule	0..*	<a href="#">GridStateIntensitySchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	IntertemporalRangeSchedule	0..*	<a href="#">IntertemporalRangeSchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..*	RemedialAction	0..1	<a href="#">RemedialAction</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..1	ControllableQuantity	0..*	<a href="#">ControllableQuantity</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

2532

2533 **3.15.38 (NC) TapPositionAction**2534 Inheritance path = [GridStateAlteration](#) : IdentifiedObject : ExtEulIdentifiedObject

2535 Tap position action represents a change of a tap changer position in the grid model compared  
2536 to the base case.

2537 Table 271 shows all attributes of TapPositionAction.

2538 **Table 271 – Attributes of ExtRemedialAction::TapPositionAction**

name	mult	type	description
enabled	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
inService	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
normalEnabled	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
participationFactor	0..1	PerCent	(NC) inherited from: <a href="#">GridStateAlteration</a>
timeToImplement	0..1	Duration	(NC) inherited from: <a href="#">GridStateAlteration</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

2539

2540 Table 272 shows all association ends of TapPositionAction with other classes.

2541 **Table 272 – Association ends of ExtRemedialAction::TapPositionAction with other**  
2542 **classes**

mult from	name	mult to	type	description
0..*	TapChanger	1..1	TapChanger	(NC) The tap changer that has a tap position action associated.
0..1	AvailabilityAction	0..*	<a href="#">AvailabilityAction</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..*	GridStateAlterationCollection	0..1	<a href="#">GridStateAlterationCollection</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	StaticRangeSchedule	0..*	<a href="#">StaticRangeSchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	GridStateIntensitySchedule	0..*	<a href="#">GridStateIntensitySchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	IntertemporalRangeSchedule	0..*	<a href="#">IntertemporalRangeSchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..*	RemedialAction	0..1	<a href="#">RemedialAction</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..1	ControllableQuantity	0..*	<a href="#">ControllableQuantity</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

2543

### 2544 3.15.39 (NC) TopologyAction

2545 Inheritance path = [GridStateAlteration](#) : IdentifiedObject : ExtEulIdentifiedObject

2546 Topology action means the connection or disconnection of a switch in the grid model compared  
2547 to the base case.

2548 Table 273 shows all attributes of TopologyAction.



2549

**Table 273 – Attributes of ExtRemedialAction::TopologyAction**

name	mult	type	description
enabled	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
inService	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
normalEnabled	0..1	Boolean	(NC) inherited from: <a href="#">GridStateAlteration</a>
participationFactor	0..1	PerCent	(NC) inherited from: <a href="#">GridStateAlteration</a>
timeToImplement	0..1	Duration	(NC) inherited from: <a href="#">GridStateAlteration</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

2550

2551

Table 274 shows all association ends of TopologyAction with other classes.

2552

**Table 274 – Association ends of ExtRemedialAction::TopologyAction with other classes**

mult from	name	mult to	type	description
0..*	Switch	1..1	Switch	(NC) The switch that has a topology action associated.
0..1	AvailabilityAction	0..*	<a href="#">AvailabilityAction</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..*	GridStateAlterationCollection	0..1	<a href="#">GridStateAlterationCollection</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	StaticRangeSchedule	0..*	<a href="#">StaticRangeSchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	GridStateIntensitySchedule	0..*	<a href="#">GridStateIntensitySchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
1..1	IntertemporalRangeSchedule	0..*	<a href="#">IntertemporalRangeSchedule</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..*	RemedialAction	0..1	<a href="#">RemedialAction</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..1	ControllableQuantity	0..*	<a href="#">ControllableQuantity</a>	(NC) inherited from: <a href="#">GridStateAlteration</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

2553

2554

**3.15.40 (NC) CostSettledKind enumeration**

2555

Kind describing how settled the cost is in regards to changes.

2556

Table 275 shows all literals of CostSettledKind.

2557

**Table 275 – Literals of ExtRemedialAction::CostSettledKind**

literal	value	description
indicative		Indicative cost.
provisional		Provisional cost.



literal	value	description
final		Final cost. For instance, the cost is not expected to be changed on a later stage.

2558

2559 **3.15.41 (NC) ImpactAgreementKind enumeration**

2560 The impact agreement for the remedial action.

2561 Table 276 shows all literals of ImpactAgreementKind.

2562 **Table 276 – Literals of ExtRemedialAction::ImpactAgreementKind**

literal	value	description
noAgreement		No agreement is reached on the qualitative impact of a remedial action.
never		An agreement is reached that a remedial action is never impacting.
always		An agreement is reached that the remedial action is always impacting whichever the intensity.

2563

2564 **3.15.42 (NC) RedispatchDirectionKind enumeration**

2565 Kind of direction of the redispatch.

2566 Table 277 shows all literals of RedispatchDirectionKind.

2567 **Table 277 – Literals of ExtRemedialAction::RedispatchDirectionKind**

literal	value	description
up		Up signifies that the available power can be used by the Purchasing area to increase energy.
down		Down signifies that the available power can be used by the Purchasing area to decrease energy.
upAndDown		Up and Down signifies that the UP and Down values are equal.
stable		The direction at a given instant in time is considered to be stable.

2568

2569 **3.15.43 (NC) RelativeDirectionKind enumeration**

2570 Kinds of direction of the manual frequency restoration reserves action.

2571 Table 278 shows all literals of RelativeDirectionKind.

2572 **Table 278 – Literals of ExtRemedialAction::RelativeDirectionKind**

literal	value	description
up		Up signifies that the available power can be used by the Purchasing area to increase energy.
down		Down signifies that the available power can be used by the Purchasing area to decrease energy.
upAndDown		Up and Down signifies that the UP and Down values are equal.

2573

2574 **3.15.44 (NC) RemedialActionScheduleAcceptanceKind enumeration**

2575 The kind of acceptance for a remedial action schedule.

2576 Table 279 shows all literals of RemedialActionScheduleAcceptanceKind.

2577 **Table 279 – Literals of ExtRemedialAction::RemedialActionScheduleAcceptanceKind**

literal	value	description
accepted		The acceptance of remedial action schedule is concluded and accepted.
refused		The acceptance of the remedial action schedule is concluded and refused.
waiting		The acceptance of the remedial action schedule is waiting (in progress).
timeout		The acceptance of the remedial action schedule was not completed due to timeout.

2578

2579 **3.15.45 (NC) RemedialActionKind enumeration**

2580 The different kinds for a remedial action.

2581 Table 280 shows all literals of RemedialActionKind.

2582 **Table 280 – Literals of ExtRemedialAction::RemedialActionKind**

literal	value	description
curative		Remedial action is curative.
preventive		Remedial action is preventive.
curativeAndPreventive		Remedial action is curative and preventive.

2583

2584 **3.15.46 (NC) RemedialActionScheduleStatusKind enumeration**

2585 Remedial action schedule status kinds.

2586 Table 281 shows all literals of RemedialActionScheduleStatusKind.

2587 **Table 281 – Literals of ExtRemedialAction::RemedialActionScheduleStatusKind**

literal	value	description
proposed		Proposed remedial action schedule.
agreed		Agreed remedial action schedule.
rejected		Rejected remedial action schedule.
ordered		Ordered remedial action schedule.
previouslyAgreed		Previously agreed remedial action schedule.
notUsed		Not used remedial action schedule.
agreementValidated		The agreement is validated for the remedial action schedule.
rejectionValidated		The rejection is validated for the remedial action schedule.
implemented		An ordered remedial action is implemented.

2588

2589 **3.15.47 (NC) ValueOffsetKind enumeration**

2590 The kind of the value offset.

2591 Table 282 shows all literals of ValueOffsetKind.

2592 **Table 282 – Literals of ExtRemedialAction::ValueOffsetKind**

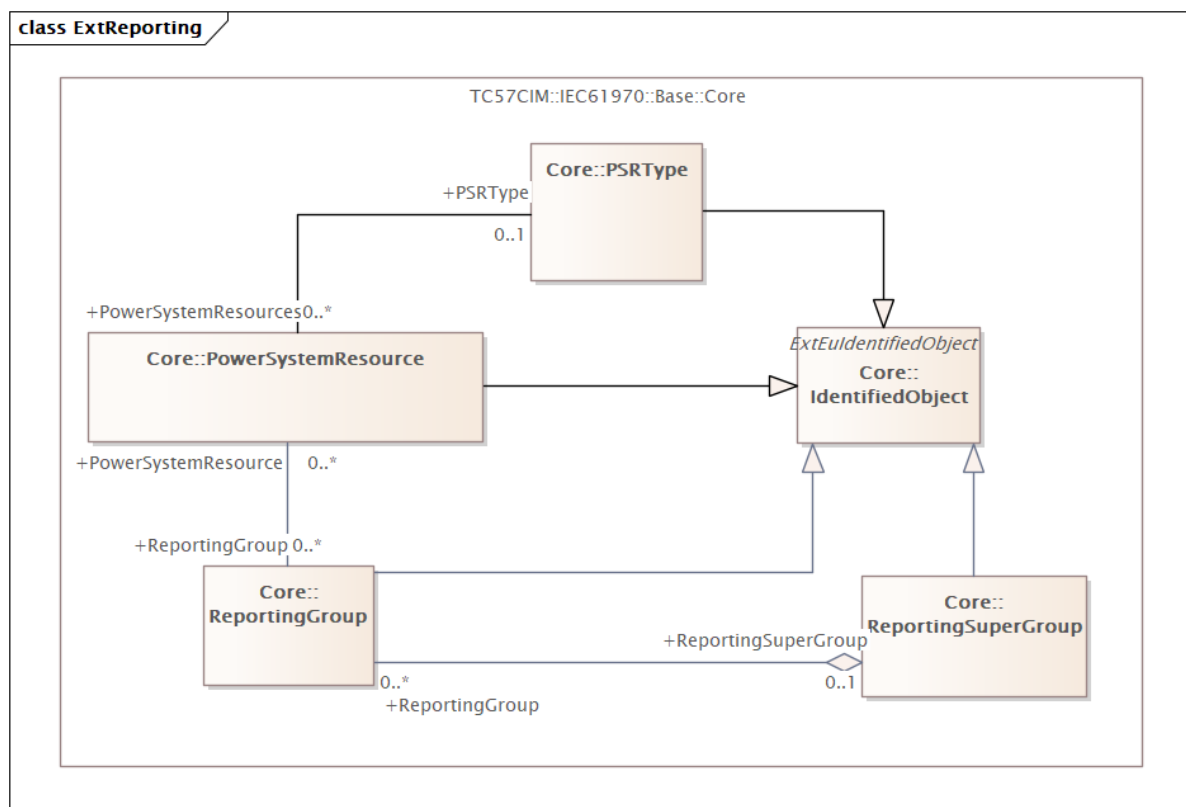
literal	value	description
absolute		Absolute value.
incremental		Incremental value.
incrementalPercentage		Percentage of the current value.

2593

### 2594 3.16 Package ExtRole

#### 2595 3.16.1 General

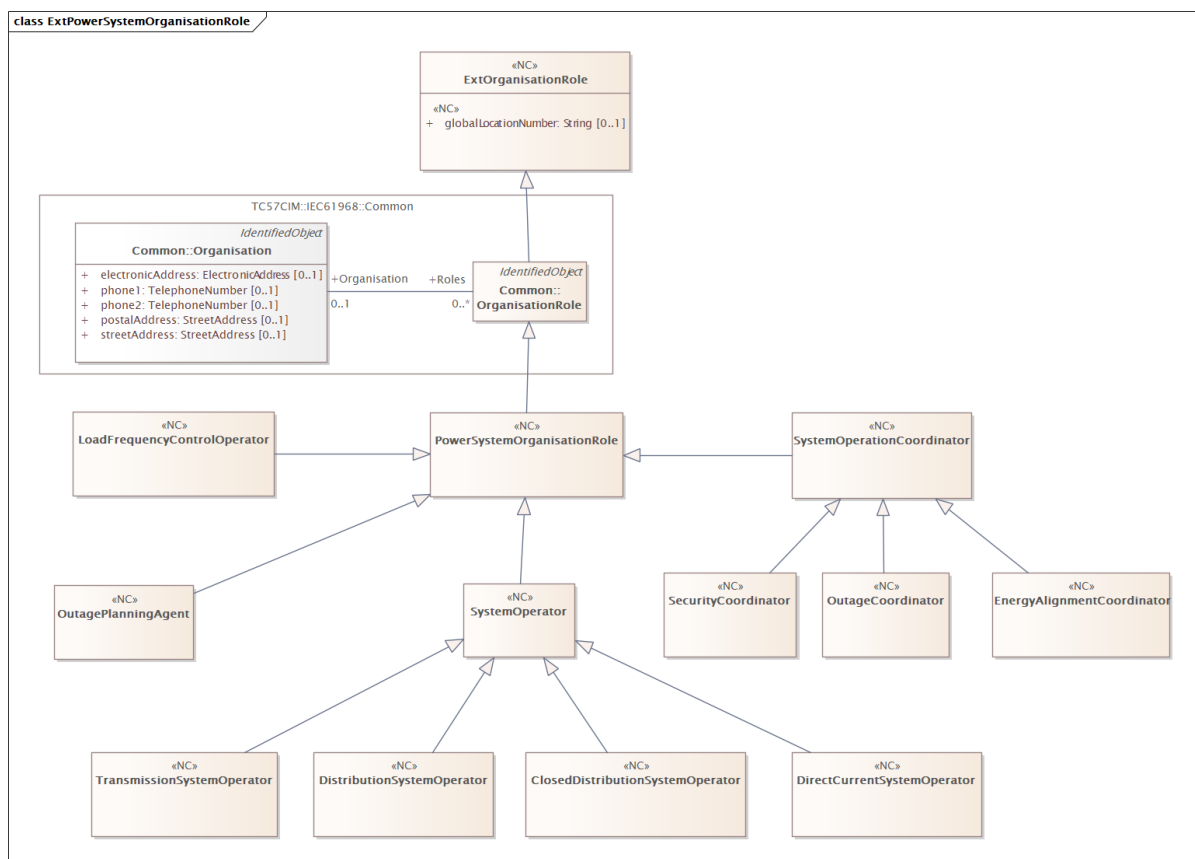
2596 This package contains the extensions related to the roles.



2597

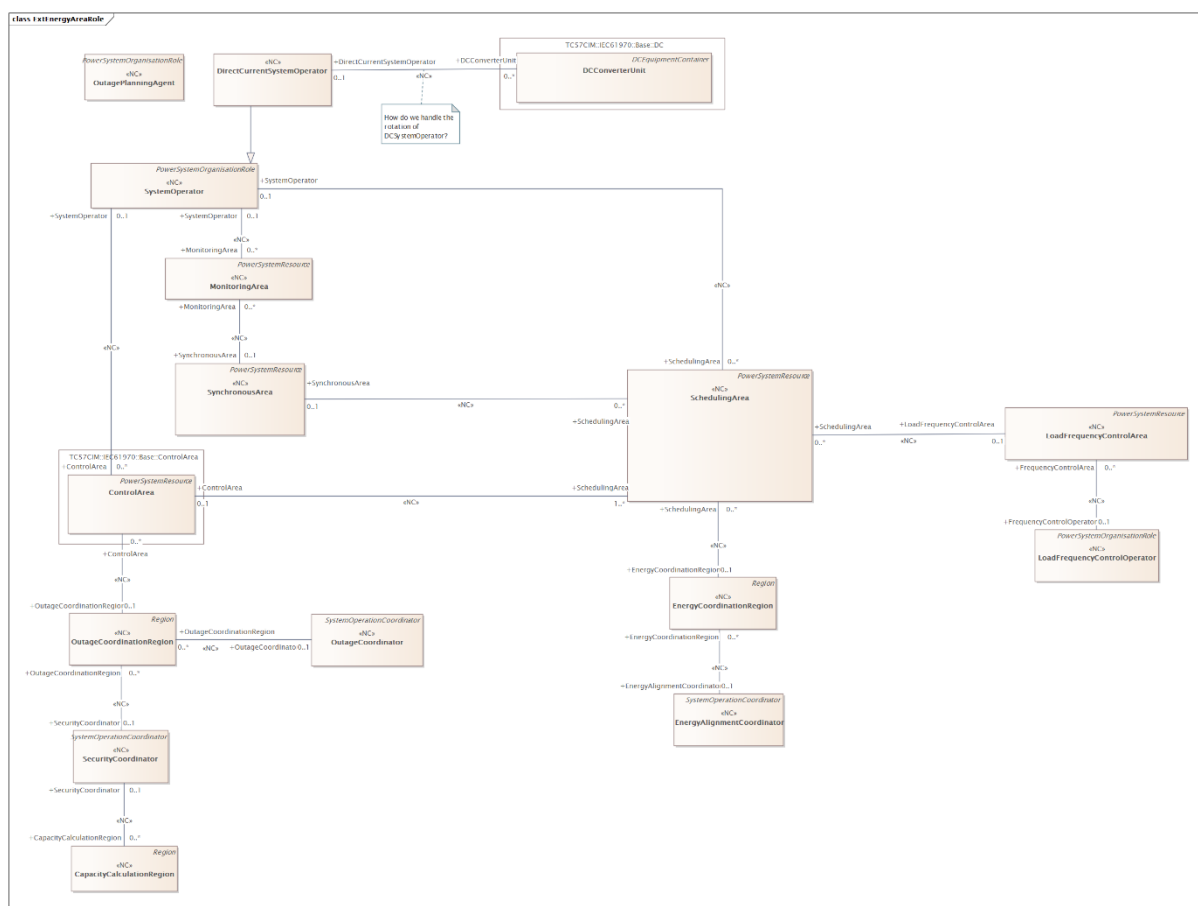
2598 **Figure 24 – Class diagram ExtRole::ExtReporting**

2599 Figure 24: This diagram shows the common model for ad-hoc reporting.



**Figure 25 – Class diagram ExtRole::ExtPowerSystemOrganisationRole**

Figure 25: The diagram contains classes related to power system organization role.



**Figure 26 – Class diagram ExtRole::ExtEnergyAreaRole**

Figure 26: The diagram contains classes related to energy area role.

### 3.16.2 (NC) ClosedDistributionSystemOperator

Inheritance path = [SystemOperator](#) : [PowerSystemOrganisationRole](#) : OrganisationRole : IdentifiedObject : ExtEulIdentifiedObject : [ExtOrganisationRole](#)

A system operator which distributes electricity (or gas) within a geographically confined industrial, commercial or shared services and does not supply household customers.

Table 283 shows all attributes of ClosedDistributionSystemOperator.

**Table 283 – Attributes of ExtRole::ClosedDistributionSystemOperator**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject
globalLocationNumber	0..1	String	(NC) inherited from: <a href="#">ExtOrganisationRole</a>

Table 284 shows all association ends of ClosedDistributionSystemOperator with other classes.

**Table 284 – Association ends of ExtRole::ClosedDistributionSystemOperator with other classes**

mult from	name	mult to	type	description
0..1	MonitoringArea	0..*	<a href="#">MonitoringArea</a>	(NC) inherited from: <a href="#">SystemOperator</a>
0..1	SchedulingArea	0..*	<a href="#">SchedulingArea</a>	(NC) inherited from: <a href="#">SystemOperator</a>
1..1	OutcomeValue	0..*	<a href="#">OutcomeValue</a>	(NC) inherited from: <a href="#">SystemOperator</a>
0..1	RemedialAction	0..*	<a href="#">RemedialAction</a>	(NC) inherited from: <a href="#">SystemOperator</a>
0..1	ControlArea	0..*	ControlArea	(NC) inherited from: <a href="#">SystemOperator</a>
0..1	OwnedContingency	0..*	Contingency	(NC) inherited from: <a href="#">SystemOperator</a>
0..1	AssessedElement	0..*	<a href="#">AssessedElement</a>	(NC) inherited from: <a href="#">SystemOperator</a>
1..1	RemedialActionImpact	0..*	<a href="#">RemedialActionImpact</a>	(NC) inherited from: <a href="#">SystemOperator</a>
0..1	RemedialActionSchedule	0..*	<a href="#">RemedialActionSchedule</a>	(NC) inherited from: <a href="#">SystemOperator</a>
0..1	RemedialActionScheduleAcceptance	0..*	<a href="#">RemedialActionScheduleAcceptance</a>	(NC) inherited from: <a href="#">SystemOperator</a>
0..*	Organisation	0..1	Organisation	inherited from: OrganisationRole
0..1	ConfigurationEvents	0..*	ConfigurationEvent	inherited from: OrganisationRole
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

**3.16.3 (NC) DirectCurrentSystemOperator**

Inheritance path = [SystemOperator](#) : [PowerSystemOrganisationRole](#) : OrganisationRole : IdentifiedObject : ExtEulIdentifiedObject : [ExtOrganisationRole](#)

System operator of the direct current pole. There are typically one or two system operators that are operating either the control area at one side or the control areas at both sides of the direct current pole. In some cases it is operated by an operator from the connected control areas.

Table 285 shows all attributes of DirectCurrentSystemOperator.

**Table 285 – Attributes of ExtRole::DirectCurrentSystemOperator**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject
globalLocationNumber	0..1	String	(NC) inherited from: <a href="#">ExtOrganisationRole</a>

Table 286 shows all association ends of DirectCurrentSystemOperator with other classes.

**Table 286 – Association ends of ExtRole::DirectCurrentSystemOperator with other classes**

mult from	name	mult to	type	description
0..1	DCCConverterUnit	0..*	DCCConverterUnit	(NC) The DC converter unit operated by this direct current system operator.
0..1	MonitoringArea	0..*	<a href="#">MonitoringArea</a>	(NC) inherited from: <a href="#">SystemOperator</a>
0..1	SchedulingArea	0..*	<a href="#">SchedulingArea</a>	(NC) inherited from: <a href="#">SystemOperator</a>
1..1	OutcomeValue	0..*	<a href="#">OutcomeValue</a>	(NC) inherited from: <a href="#">SystemOperator</a>
0..1	RemedialAction	0..*	<a href="#">RemedialAction</a>	(NC) inherited from: <a href="#">SystemOperator</a>
0..1	ControlArea	0..*	ControlArea	(NC) inherited from: <a href="#">SystemOperator</a>
0..1	OwnedContingency	0..*	Contingency	(NC) inherited from: <a href="#">SystemOperator</a>
0..1	AssessedElement	0..*	<a href="#">AssessedElement</a>	(NC) inherited from: <a href="#">SystemOperator</a>
1..1	RemedialActionImpact	0..*	<a href="#">RemedialActionImpact</a>	(NC) inherited from: <a href="#">SystemOperator</a>
0..1	RemedialActionSchedule	0..*	<a href="#">RemedialActionSchedule</a>	(NC) inherited from: <a href="#">SystemOperator</a>
0..1	RemedialActionScheduleAcceptance	0..*	<a href="#">RemedialActionScheduleAcceptance</a>	(NC) inherited from: <a href="#">SystemOperator</a>
0..*	Organisation	0..1	Organisation	inherited from: OrganisationRole
0..1	ConfigurationEvents	0..*	ConfigurationEvent	inherited from: OrganisationRole
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

**3.16.4 (NC) DistributionSystemOperator**

Inheritance path = [SystemOperator](#) : [PowerSystemOrganisationRole](#) : OrganisationRole : IdentifiedObject : ExtEulIdentifiedObject : [ExtOrganisationRole](#)

A system operator that is responsible for operating of energy distribution network from transmission level down to low voltage levels including the connection to household.

Table 287 shows all attributes of DistributionSystemOperator.

**Table 287 – Attributes of ExtRole::DistributionSystemOperator**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject
globalLocationNumber	0..1	String	(NC) inherited from: <a href="#">ExtOrganisationRole</a>

Table 288 shows all association ends of DistributionSystemOperator with other classes.

**Table 288 – Association ends of ExtRole::DistributionSystemOperator with other classes**

mult from	name	mult to	type	description
0..1	MonitoringArea	0..*	<a href="#">MonitoringArea</a>	(NC) inherited from: <a href="#">SystemOperator</a>
0..1	SchedulingArea	0..*	<a href="#">SchedulingArea</a>	(NC) inherited from: <a href="#">SystemOperator</a>
1..1	OutcomeValue	0..*	<a href="#">OutcomeValue</a>	(NC) inherited from: <a href="#">SystemOperator</a>
0..1	RemedialAction	0..*	<a href="#">RemedialAction</a>	(NC) inherited from: <a href="#">SystemOperator</a>
0..1	ControlArea	0..*	ControlArea	(NC) inherited from: <a href="#">SystemOperator</a>
0..1	OwnedContingency	0..*	Contingency	(NC) inherited from: <a href="#">SystemOperator</a>
0..1	AssessedElement	0..*	<a href="#">AssessedElement</a>	(NC) inherited from: <a href="#">SystemOperator</a>
1..1	RemedialActionImpact	0..*	<a href="#">RemedialActionImpact</a>	(NC) inherited from: <a href="#">SystemOperator</a>
0..1	RemedialActionSchedule	0..*	<a href="#">RemedialActionSchedule</a>	(NC) inherited from: <a href="#">SystemOperator</a>
0..1	RemedialActionScheduleAcceptance	0..*	<a href="#">RemedialActionScheduleAcceptance</a>	(NC) inherited from: <a href="#">SystemOperator</a>
0..*	Organisation	0..1	Organisation	inherited from: OrganisationRole
0..1	ConfigurationEvents	0..*	ConfigurationEvent	inherited from: OrganisationRole
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

**3.16.5 (NC) EnergyAlignmentCoordinator**

Inheritance path = [SystemOperationCoordinator](#) : [PowerSystemOrganisationRole](#) : OrganisationRole : IdentifiedObject : ExtEulIdentifiedObject : [ExtOrganisationRole](#)

A role that is responsible for alignment of forecast and schedule energy to a given energy coordination region.

Table 289 shows all attributes of EnergyAlignmentCoordinator.

**Table 289 – Attributes of ExtRole::EnergyAlignmentCoordinator**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject
globalLocationNumber	0..1	String	(NC) inherited from: <a href="#">ExtOrganisationRole</a>

Table 290 shows all association ends of EnergyAlignmentCoordinator with other classes.



**Table 290 – Association ends of ExtRole::EnergyAlignmentCoordinator with other classes**

mult from	name	mult to	type	description
0..1	EnergyCoordinationRegion	0..*	<a href="#">EnergyCoordinationRegion</a>	(NC) The energy coordination region that has this energy alignment coordinator.
0..*	Organisation	0..1	Organisation	inherited from: OrganisationRole
0..1	ConfigurationEvents	0..*	ConfigurationEvent	inherited from: OrganisationRole
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

**3.16.6 (NC) ExtOrganisationRole root class**

Organisation role CSA extension class.

Table 291 shows all attributes of ExtOrganisationRole.

**Table 291 – Attributes of ExtRole::ExtOrganisationRole**

name	mult	type	description
globalLocationNumber	0..1	String	(NC) The Global Location Number (GLN) is part of the GS1 systems of standards. GLN is a 13-digit number structured that include GS1 Company Prefix, Location Reference (N1-N12) and Check Digit (N13). GS1 is a neutral, not-for-profit, international organisation that develops and maintains standards for supply and demand chains across multiple sectors.

**3.16.7 (NC) LoadFrequencyControlOperator**

Inheritance path = [PowerSystemOrganisationRole](#) : OrganisationRole : IdentifiedObject : ExtEulIdentifiedObject : [ExtOrganisationRole](#)

A role that is responsible for operational security by operating the load frequency control (LFC) mechanism.

Table 292 shows all attributes of LoadFrequencyControlOperator.

**Table 292 – Attributes of ExtRole::LoadFrequencyControlOperator**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject
globalLocationNumber	0..1	String	(NC) inherited from: <a href="#">ExtOrganisationRole</a>

Table 293 shows all association ends of LoadFrequencyControlOperator with other classes.

**Table 293 – Association ends of ExtRole::LoadFrequencyControlOperator with other classes**

mult from	name	mult to	type	description
0..1	FrequencyControlArea	0..*	<a href="#">LoadFrequencyControlArea</a>	(NC) The frequency control area that has this frequency control operator.
0..*	Organisation	0..1	Organisation	inherited from: OrganisationRole
0..1	ConfigurationEvents	0..*	ConfigurationEvent	inherited from: OrganisationRole
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

**3.16.8 (NC) OutageCoordinator**

Inheritance path = [SystemOperationCoordinator](#) : [PowerSystemOrganisationRole](#) : OrganisationRole : IdentifiedObject : ExtEulIdentifiedObject : [ExtOrganisationRole](#)

A role that coordinates the planned availability status of relevant power system equipment to meet the need by the asset owner or operator and the security of the power system.

Table 294 shows all attributes of OutageCoordinator.

**Table 294 – Attributes of ExtRole::OutageCoordinator**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject
globalLocationNumber	0..1	String	(NC) inherited from: <a href="#">ExtOrganisationRole</a>

Table 295 shows all association ends of OutageCoordinator with other classes.

**Table 295 – Association ends of ExtRole::OutageCoordinator with other classes**

mult from	name	mult to	type	description
0..1	OutageCoordinationRegion	0..*	<a href="#">OutageCoordinationRegion</a>	(NC) The outage coordination region that has this outage coordinator.
0..*	Organisation	0..1	Organisation	inherited from: OrganisationRole
0..1	ConfigurationEvents	0..*	ConfigurationEvent	inherited from: OrganisationRole
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

2683 **3.16.9 (NC) OutagePlanningAgent**

2684 Inheritance path = [PowerSystemOrganisationRole](#) : OrganisationRole : IdentifiedObject :  
 2685 ExtEulIdentifiedObject : [ExtOrganisationRole](#)

2686 An entity with the task of planning the availability status of a relevant power generating module,  
 2687 a relevant demand facility or a relevant grid element.

2688 Table 296 shows all attributes of OutagePlanningAgent.

2689 **Table 296 – Attributes of ExtRole::OutagePlanningAgent**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject
globalLocationNumber	0..1	String	(NC) inherited from: <a href="#">ExtOrganisationRole</a>

2690

2691 Table 297 shows all association ends of OutagePlanningAgent with other classes.

2692 **Table 297 – Association ends of ExtRole::OutagePlanningAgent with other classes**

mult from	name	mult to	type	description
0..*	Organisation	0..1	Organisation	inherited from: OrganisationRole
0..1	ConfigurationEvents	0..*	ConfigurationEvent	inherited from: OrganisationRole
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

2693

2694 **3.16.10 (NC) PowerSystemOrganisationRole**

2695 Inheritance path = OrganisationRole : IdentifiedObject : ExtEulIdentifiedObject :  
 2696 [ExtOrganisationRole](#)

2697 A role that is responsible for the functional operational of a power system resource.

2698 Table 298 shows all attributes of PowerSystemOrganisationRole.

2699 **Table 298 – Attributes of ExtRole::PowerSystemOrganisationRole**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject
globalLocationNumber	0..1	String	(NC) inherited from: <a href="#">ExtOrganisationRole</a>

2700

2701 Table 299 shows all association ends of PowerSystemOrganisationRole with other classes.

2702 **Table 299 – Association ends of ExtRole::PowerSystemOrganisationRole with other**  
2703 **classes**

mult from	name	mult to	type	description
0..*	Organisation	0..1	Organisation	inherited from: OrganisationRole
0..1	ConfigurationEvents	0..*	ConfigurationEvent	inherited from: OrganisationRole
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

2704

### 2705 3.16.11 (NC) SecurityCoordinator

2706 Inheritance path = [SystemOperationCoordinator](#) : [PowerSystemOrganisationRole](#) :  
2707 OrganisationRole : IdentifiedObject : ExtEulIdentifiedObject : [ExtOrganisationRole](#)

2708 A role that coordinates the relevant remedial actions and their optimisation to ensure efficient  
2709 use to achieve required operational security of the power system.

2710 Table 300 shows all attributes of SecurityCoordinator.

2711 **Table 300 – Attributes of ExtRole::SecurityCoordinator**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject
globalLocationNumber	0..1	String	(NC) inherited from: <a href="#">ExtOrganisationRole</a>

2712

2713 Table 301 shows all association ends of SecurityCoordinator with other classes.

2714 **Table 301 – Association ends of ExtRole::SecurityCoordinator with other classes**

mult from	name	mult to	type	description
0..1	CapacityCalculationRegion	0..*	<a href="#">CapacityCalculationRegion</a>	(NC) The capacity calculation region operated by this security coordinator.
0..1	OutageCoordinationRegion	0..*	<a href="#">OutageCoordinationRegion</a>	(NC) The outage coordination region that has this security coordinator.
0..1	RemedialActionSchedule	0..*	<a href="#">RemedialActionSchedule</a>	(NC) Remedial action schedule for this security coordinator.
0..*	Organisation	0..1	Organisation	inherited from: OrganisationRole
0..1	ConfigurationEvents	0..*	ConfigurationEvent	inherited from: OrganisationRole
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject

mult from	name	mult to	type	description
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

2715

2716 **3.16.12 (NC) SystemOperationCoordinator**

2717 Inheritance path = [PowerSystemOrganisationRole](#) : OrganisationRole : IdentifiedObject :  
 2718 ExtEulIdentifiedObject : [ExtOrganisationRole](#)

2719 A role that coordinates relevant information and impact in regards to operating the power  
 2720 system.

2721 Table 302 shows all attributes of SystemOperationCoordinator.

2722 **Table 302 – Attributes of ExtRole::SystemOperationCoordinator**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject
globalLocationNumber	0..1	String	(NC) inherited from: <a href="#">ExtOrganisationRole</a>

2723

2724 Table 303 shows all association ends of SystemOperationCoordinator with other classes.

2725 **Table 303 – Association ends of ExtRole::SystemOperationCoordinator with other**  
 2726 **classes**

mult from	name	mult to	type	description
0..*	Organisation	0..1	Organisation	inherited from: OrganisationRole
0..1	ConfigurationEvents	0..*	ConfigurationEvent	inherited from: OrganisationRole
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

2727

2728 **3.16.13 (NC) TransmissionSystemOperator**

2729 Inheritance path = [SystemOperator](#) : [PowerSystemOrganisationRole](#) : OrganisationRole :  
 2730 IdentifiedObject : ExtEulIdentifiedObject : [ExtOrganisationRole](#)

2731 A system operator role that is responsible for operating of an energy transmission network.

2732 Table 304 shows all attributes of TransmissionSystemOperator.

2733 **Table 304 – Attributes of ExtRole::TransmissionSystemOperator**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject

name	mult	type	description
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject
globalLocationNumber	0..1	String	(NC) inherited from: <a href="#">ExtOrganisationRole</a>

Table 305 shows all association ends of TransmissionSystemOperator with other classes.

**Table 305 – Association ends of ExtRole::TransmissionSystemOperator with other classes**

mult from	name	mult to	type	description
0..1	MonitoringArea	0..*	<a href="#">MonitoringArea</a>	(NC) inherited from: <a href="#">SystemOperator</a>
0..1	SchedulingArea	0..*	<a href="#">SchedulingArea</a>	(NC) inherited from: <a href="#">SystemOperator</a>
1..1	OutcomeValue	0..*	<a href="#">OutcomeValue</a>	(NC) inherited from: <a href="#">SystemOperator</a>
0..1	RemedialAction	0..*	<a href="#">RemedialAction</a>	(NC) inherited from: <a href="#">SystemOperator</a>
0..1	ControlArea	0..*	ControlArea	(NC) inherited from: <a href="#">SystemOperator</a>
0..1	OwnedContingency	0..*	Contingency	(NC) inherited from: <a href="#">SystemOperator</a>
0..1	AssessedElement	0..*	<a href="#">AssessedElement</a>	(NC) inherited from: <a href="#">SystemOperator</a>
1..1	RemedialActionImpact	0..*	<a href="#">RemedialActionImpact</a>	(NC) inherited from: <a href="#">SystemOperator</a>
0..1	RemedialActionSchedule	0..*	<a href="#">RemedialActionSchedule</a>	(NC) inherited from: <a href="#">SystemOperator</a>
0..1	RemedialActionScheduleAcceptance	0..*	<a href="#">RemedialActionScheduleAcceptance</a>	(NC) inherited from: <a href="#">SystemOperator</a>
0..*	Organisation	0..1	Organisation	inherited from: OrganisationRole
0..1	ConfigurationEvents	0..*	ConfigurationEvent	inherited from: OrganisationRole
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.16.14 (NC) SystemOperator

Inheritance path = [PowerSystemOrganisationRole](#) : OrganisationRole : IdentifiedObject : ExtEulIdentifiedObject : [ExtOrganisationRole](#)  
System operator.

Table 306 shows all attributes of SystemOperator.

**Table 306 – Attributes of ExtRole::SystemOperator**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject

name	mult	type	description
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject
globalLocationNumber	0..1	String	(NC) inherited from: <a href="#">ExtOrganisationRole</a>

Table 307 shows all association ends of SystemOperator with other classes.

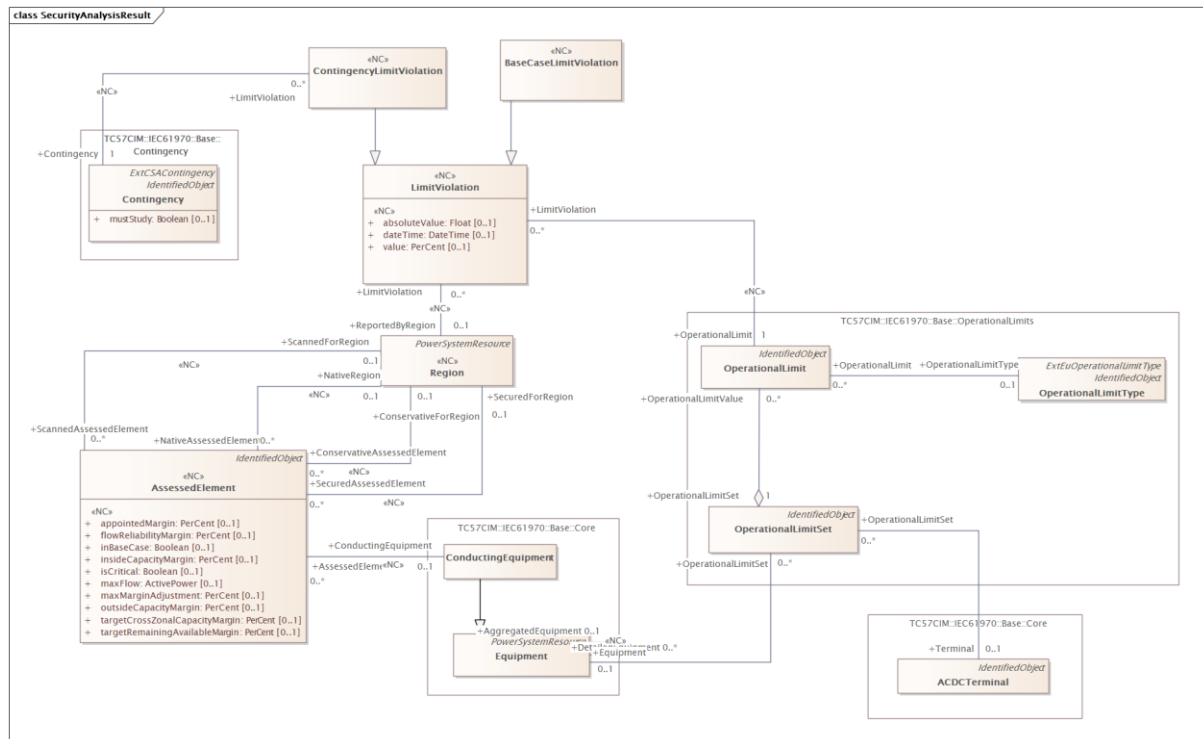
**Table 307 – Association ends of ExtRole::SystemOperator with other classes**

mult from	name	mult to	type	description
0..1	MonitoringArea	0..*	<a href="#">MonitoringArea</a>	(NC) The monitoring area that is operated by this system operator.
0..1	SchedulingArea	0..*	<a href="#">SchedulingArea</a>	(NC) The scheduling area that is operated by this system operator.
1..1	OutcomeValue	0..*	<a href="#">OutcomeValue</a>	(NC) Impact assessment outcome value for this system operator.
0..1	RemedialAction	0..*	<a href="#">RemedialAction</a>	(NC) Remedial action defined by this system operator.
0..1	ControlArea	0..*	ControlArea	(NC) The control area that is related to this system operator.
0..1	OwnedContingency	0..*	Contingency	(NC) Contingency owned by this system operator.
0..1	AssessedElement	0..*	<a href="#">AssessedElement</a>	(NC) All relevant network elements on which operational security violations need to be managed in a coordinated way.
1..1	RemedialActionImpact	0..*	<a href="#">RemedialActionImpact</a>	(NC) The remedial action impact for a given System Operator.
0..1	RemedialActionSchedule	0..*	<a href="#">RemedialActionSchedule</a>	(NC)
0..1	RemedialActionScheduleAcceptance	0..*	<a href="#">RemedialActionScheduleAcceptance</a>	(NC) Remedial action schedule acceptance related to a system operator.
0..*	Organisation	0..1	Organisation	inherited from: OrganisationRole
0..1	ConfigurationEvents	0..*	ConfigurationEvent	inherited from: OrganisationRole
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.17 Security analysis result extensions

#### 3.17.1 General

This package contains the extensions related to the security analysis result.



**Figure 27 – Class diagram ExtSecurityAnalysisResult::SecurityAnalysisResult**

Figure 27: The diagram contains classes related to the security analysis result.

### 3.17.2 (NC) BaseCaseLimitViolation

Inheritance path = LimitViolation

Limit violation for base case.

Table 308 shows all attributes of BaseCaseLimitViolation.

### Table 308 – Attributes of ExtSecurityAnalysisResult::BaseCaseLimitViolation

name	mult	type	description
value	0..1	PerCent	(NC) inherited from: <a href="#">LimitViolation</a>
absoluteValue	0..1	Float	(NC) inherited from: <a href="#">LimitViolation</a>
dateTime	0..1	DateTime	(NC) inherited from: <a href="#">LimitViolation</a>

Table 309 shows all association ends of BaseCaseLimitViolation with other classes.

**Table 309 – Association ends of ExtSecurityAnalysisResult::BaseCaseLimitViolation with other classes**

mult from	name	mult to	type	description
0..*	OperationalLimit	1..1	OperationalLimit	(NC) inherited from: <a href="#">LimitViolation</a>
0..*	ReportedByRegion	0..1	<a href="#">Region</a>	(NC) inherited from: <a href="#">LimitViolation</a>

### 3.17.3 (NC) ContingencyLimitViolation

Inheritance path = LimitViolation

Limit violation for contingency.

Table 310 shows all attributes of ContingencyLimitViolation.



2769 **Table 310 – Attributes of ExtSecurityAnalysisResult::ContingencyLimitViolation**

name	mult	type	description
value	0..1	PerCent	(NC) inherited from: <a href="#">LimitViolation</a>
absoluteValue	0..1	Float	(NC) inherited from: <a href="#">LimitViolation</a>
dateTime	0..1	DateTime	(NC) inherited from: <a href="#">LimitViolation</a>

2770  
2771 Table 311 shows all association ends of ContingencyLimitViolation with other classes.

2772 **Table 311 – Association ends of ExtSecurityAnalysisResult::ContingencyLimitViolation**  
2773 **with other classes**

mult from	name	mult to	type	description
0..*	Contingency	1..1	Contingency	(NC) The contingency that has this limit violation.
0..*	OperationalLimit	1..1	OperationalLimit	(NC) inherited from: <a href="#">LimitViolation</a>
0..*	ReportedByRegion	0..1	<a href="#">Region</a>	(NC) inherited from: <a href="#">LimitViolation</a>

2774  
2775 **3.17.4 (NC) LimitViolation root class**

2776 Limit violation.

2777 Table 312 shows all attributes of LimitViolation.

2778 **Table 312 – Attributes of ExtSecurityAnalysisResult::LimitViolation**

name	mult	type	description
value	0..1	PerCent	(NC) The value of the limit violation in percent related to the value of the operational limit that is violated. For instance, if the operational limit is 1000 A and the current flow is 1100 A the value is reported as 110 %.
absoluteValue	0..1	Float	(NC) Absolute value which results from a power flow calculation. For instance, if the operational limit is 1000 A and the current flow is 1100 A the absoluteValue is reported as 1100 A.
dateTime	0..1	DateTime	(NC) The date and time of the scenario time that was studied and at which the limit violation occurred.

2779  
2780 Table 313 shows all association ends of LimitViolation with other classes.

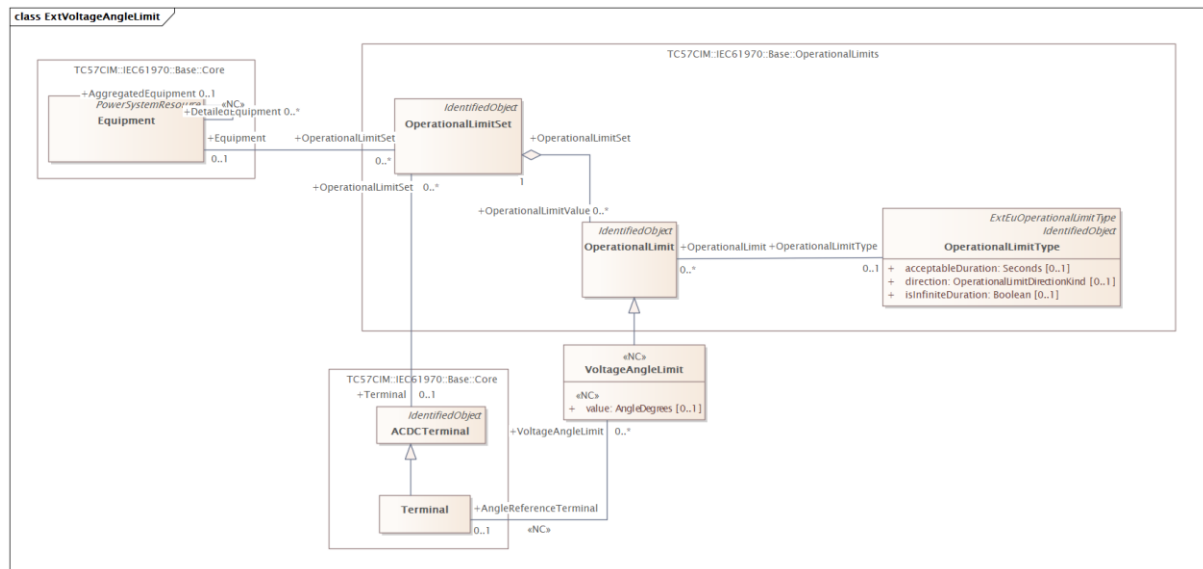
2781 **Table 313 – Association ends of ExtSecurityAnalysisResult::LimitViolation with other**  
2782 **classes**

mult from	name	mult to	type	description
0..*	OperationalLimit	1..1	OperationalLimit	(NC) The operational limit that has this limit violation.
0..*	ReportedByRegion	0..1	<a href="#">Region</a>	(NC) The region which reports this limit violation.

2783  
2784 **3.18 Package ExtSecurityLimit**

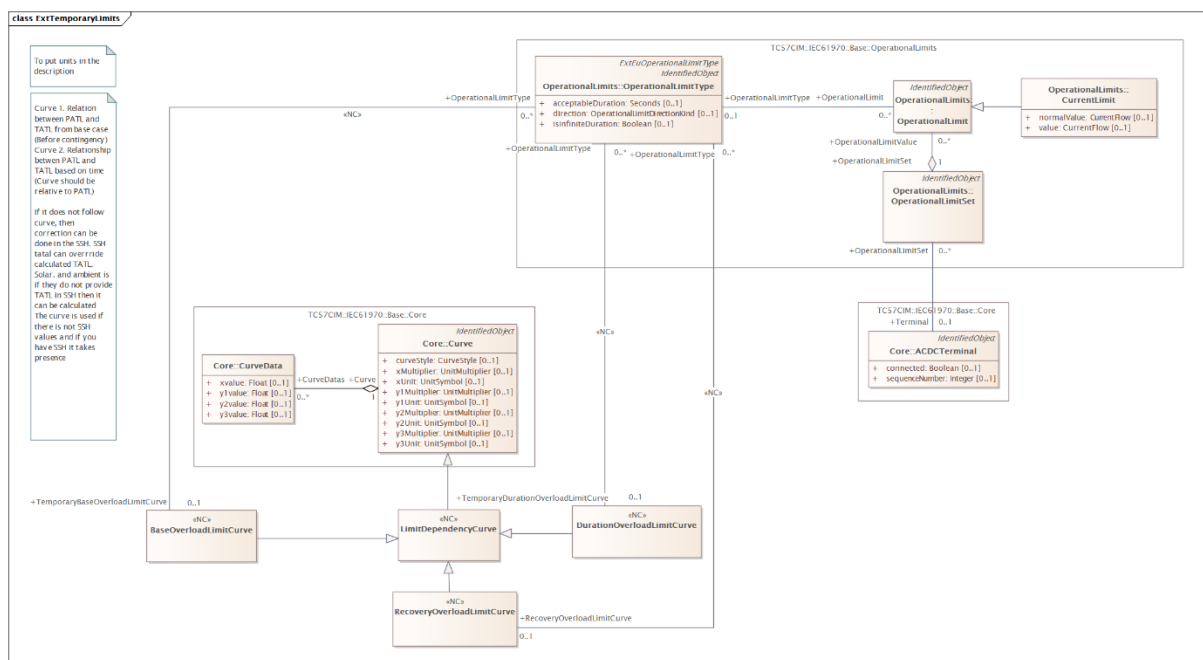
2785 **3.18.1 General**

2786 This package contains the extensions related to the security limits.



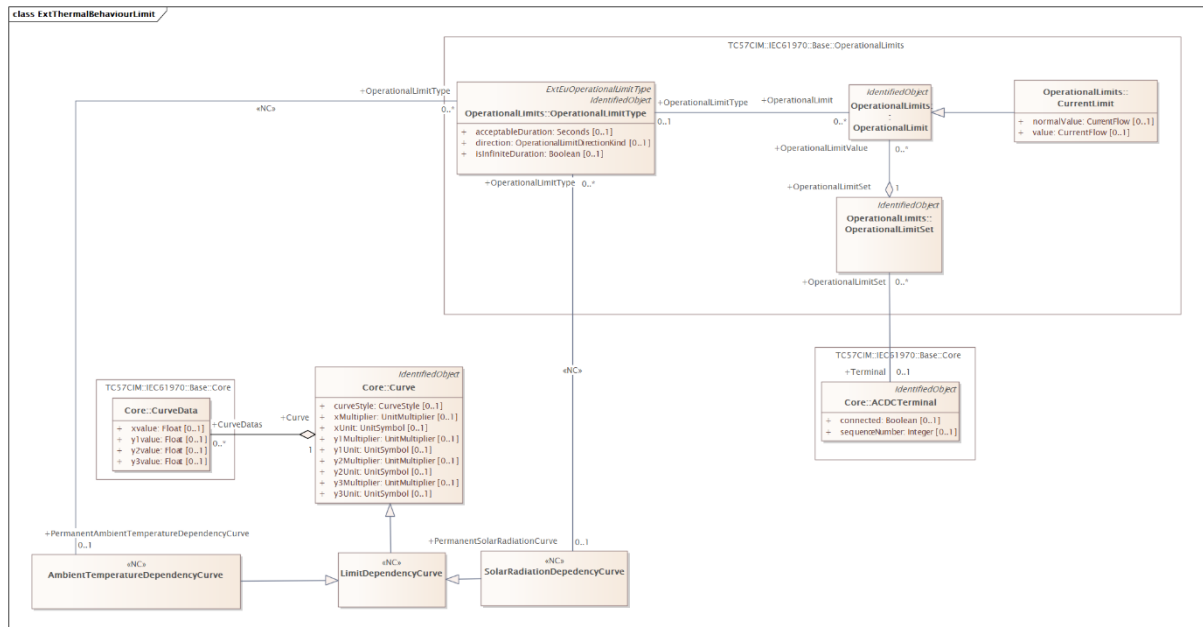
**Figure 28 – Class diagram ExtSecurityLimit::ExtVoltageAngleLimit**

Figure 28: The diagram contains classes related to voltage angle limit.



**Figure 29 – Class diagram ExtSecurityLimit::ExtTemporaryLimits**

Figure 29: The diagram contains classes related to temporary limits.



**Figure 30 – Class diagram ExtSecurityLimit::ExtThermalBehaviourLimit**

Figure 30: The diagram contains classes related to thermal behaviour limit.

### 3.18.2 (NC) AmbientTemperatureDependencyCurve

Inheritance path = [LimitDependencyCurve](#) : [Curve](#) : [IdentifiedObject](#) : [ExtEuIdentifiedObject](#)

A curve or functional relationship between the ambient temperature independent variable (X-axis) and relative temperature dependent (Y-axis) variables.

Table 314 shows all attributes of AmbientTemperatureDependencyCurve.

**Table 314 – Attributes of ExtSecurityLimit::AmbientTemperatureDependencyCurve**

name	mult	type	description
curveStyle	0..1	CurveStyle	inherited from: Curve
xMultiplier	0..1	UnitMultiplier	inherited from: Curve
xUnit	0..1	UnitSymbol	inherited from: Curve
y1Multiplier	0..1	UnitMultiplier	inherited from: Curve
y1Unit	0..1	UnitSymbol	inherited from: Curve
y2Multiplier	0..1	UnitMultiplier	inherited from: Curve
y2Unit	0..1	UnitSymbol	inherited from: Curve
y3Multiplier	0..1	UnitMultiplier	inherited from: Curve
y3Unit	0..1	UnitSymbol	inherited from: Curve
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEuIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEuIdentifiedObject

Table 315 shows all association ends of AmbientTemperatureDependencyCurve with other classes.

**Table 315 – Association ends of  
ExtSecurityLimit::AmbientTemperatureDependencyCurve with other classes**

mult from	name	mult to	type	description
0..1	OperationalLimitType	0..*	OperationalLimitType	(NC) The operational limit type that has this permanent ambient temperature dependency curve.
1..1	CurveDatas	0..*	CurveData	inherited from: Curve
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.18.3 (NC) BaseOverloadLimitCurve

Inheritance path = [LimitDependencyCurve](#) : Curve : IdentifiedObject : ExtEulIdentifiedObject

A curve or functional relationship between

- the relative loading - current loading over permanent loading (PATL) independent variable (X-axis), and

- temporary overloading (TATL) limiting dependent (Y-axis) variables.

Table 316 shows all attributes of BaseOverloadLimitCurve.

**Table 316 – Attributes of ExtSecurityLimit::BaseOverloadLimitCurve**

name	mult	type	description
curveStyle	0..1	CurveStyle	inherited from: Curve
xMultiplier	0..1	UnitMultiplier	inherited from: Curve
xUnit	0..1	UnitSymbol	inherited from: Curve
y1Multiplier	0..1	UnitMultiplier	inherited from: Curve
y1Unit	0..1	UnitSymbol	inherited from: Curve
y2Multiplier	0..1	UnitMultiplier	inherited from: Curve
y2Unit	0..1	UnitSymbol	inherited from: Curve
y3Multiplier	0..1	UnitMultiplier	inherited from: Curve
y3Unit	0..1	UnitSymbol	inherited from: Curve
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 317 shows all association ends of BaseOverloadLimitCurve with other classes.

2818 **Table 317 – Association ends of ExtSecurityLimit::BaseOverloadLimitCurve with other**  
2819 **classes**

mult from	name	mult to	type	description
0..1	OperationalLimitType	0..*	OperationalLimitType	(NC) The operational limit type that has this temporary base overload limit curve.
1..1	CurveDatas	0..*	CurveData	inherited from: Curve
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

2820

2821 **3.18.4 (NC) DurationOverloadLimitCurve**2822 Inheritance path = [LimitDependencyCurve](#) : Curve : IdentifiedObject : ExtEulIdentifiedObject

2823 A curve or functional relationship between

2824 - the overload duration independent variable (X-axis), and

2825 - temporary overloading (TATL) limiting dependent (Y-axis) variables.

2826 Table 318 shows all attributes of DurationOverloadLimitCurve.

2827 **Table 318 – Attributes of ExtSecurityLimit::DurationOverloadLimitCurve**

name	mult	type	description
curveStyle	0..1	CurveStyle	inherited from: Curve
xMultiplier	0..1	UnitMultiplier	inherited from: Curve
xUnit	0..1	UnitSymbol	inherited from: Curve
y1Multiplier	0..1	UnitMultiplier	inherited from: Curve
y1Unit	0..1	UnitSymbol	inherited from: Curve
y2Multiplier	0..1	UnitMultiplier	inherited from: Curve
y2Unit	0..1	UnitSymbol	inherited from: Curve
y3Multiplier	0..1	UnitMultiplier	inherited from: Curve
y3Unit	0..1	UnitSymbol	inherited from: Curve
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

2828

2829 Table 319 shows all association ends of DurationOverloadLimitCurve with other classes.

**Table 319 – Association ends of ExtSecurityLimit::DurationOverloadLimitCurve with other classes**

mult from	name	mult to	type	description
0..1	OperationalLimitType	0..*	OperationalLimitType	(NC) The operational limit type that has this temporary duration overload limit curve.
1..1	CurveDatas	0..*	CurveData	inherited from: Curve
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

**3.18.5 (NC) LimitDependencyCurve**

Inheritance path = Curve : IdentifiedObject : ExtEulIdentifiedObject

A curve or functional relationship between an independent variable (X-axis) and limiting dependent (Y-axis) variables.

Table 320 shows all attributes of LimitDependencyCurve.

**Table 320 – Attributes of ExtSecurityLimit::LimitDependencyCurve**

name	mult	type	description
curveStyle	0..1	CurveStyle	inherited from: Curve
xMultiplier	0..1	UnitMultiplier	inherited from: Curve
xUnit	0..1	UnitSymbol	inherited from: Curve
y1Multiplier	0..1	UnitMultiplier	inherited from: Curve
y1Unit	0..1	UnitSymbol	inherited from: Curve
y2Multiplier	0..1	UnitMultiplier	inherited from: Curve
y2Unit	0..1	UnitSymbol	inherited from: Curve
y3Multiplier	0..1	UnitMultiplier	inherited from: Curve
y3Unit	0..1	UnitSymbol	inherited from: Curve
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 321 shows all association ends of LimitDependencyCurve with other classes.

**Table 321 – Association ends of ExtSecurityLimit::LimitDependencyCurve with other classes**

mult from	name	mult to	type	description
1..1	CurveDatas	0..*	CurveData	inherited from: Curve
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject

mult from	name	mult to	type	description
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.18.6 (NC) RecoveryOverloadLimitCurve

Inheritance path = [LimitDependencyCurve](#) : Curve : IdentifiedObject : ExtEulIdentifiedObject

The relation between the recovery time and an overload limit.

Table 322 shows all attributes of RecoveryOverloadLimitCurve.

**Table 322 – Attributes of ExtSecurityLimit::RecoveryOverloadLimitCurve**

name	mult	type	description
curveStyle	0..1	CurveStyle	inherited from: Curve
xMultiplier	0..1	UnitMultiplier	inherited from: Curve
xUnit	0..1	UnitSymbol	inherited from: Curve
y1Multiplier	0..1	UnitMultiplier	inherited from: Curve
y1Unit	0..1	UnitSymbol	inherited from: Curve
y2Multiplier	0..1	UnitMultiplier	inherited from: Curve
y2Unit	0..1	UnitSymbol	inherited from: Curve
y3Multiplier	0..1	UnitMultiplier	inherited from: Curve
y3Unit	0..1	UnitSymbol	inherited from: Curve
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 323 shows all association ends of RecoveryOverloadLimitCurve with other classes.

**Table 323 – Association ends of ExtSecurityLimit::RecoveryOverloadLimitCurve with other classes**

mult from	name	mult to	type	description
0..1	OperationalLimitType	0..*	OperationalLimitType	(NC) The operational limit type which has recovery time characteristic.
1..1	CurveDatas	0..*	CurveData	inherited from: Curve
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

2854 **3.18.7 (NC) SolarRadiationDependencyCurve**2855 Inheritance path = [LimitDependencyCurve](#) : Curve : IdentifiedObject : ExtEulIdentifiedObject

2856 A curve or functional relationship between

2857 - the solar radiation independent variable (X-axis), and

2858 - relative dependent (Y-axis) variables.

2859 Table 324 shows all attributes of SolarRadiationDependencyCurve.

2860 **Table 324 – Attributes of ExtSecurityLimit::SolarRadiationDependencyCurve**

name	mult	type	description
curveStyle	0..1	CurveStyle	inherited from: Curve
xMultiplier	0..1	UnitMultiplier	inherited from: Curve
xUnit	0..1	UnitSymbol	inherited from: Curve
y1Multiplier	0..1	UnitMultiplier	inherited from: Curve
y1Unit	0..1	UnitSymbol	inherited from: Curve
y2Multiplier	0..1	UnitMultiplier	inherited from: Curve
y2Unit	0..1	UnitSymbol	inherited from: Curve
y3Multiplier	0..1	UnitMultiplier	inherited from: Curve
y3Unit	0..1	UnitSymbol	inherited from: Curve
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

2861  
2862 Table 325 shows all association ends of SolarRadiationDependencyCurve with other classes.2863 **Table 325 – Association ends of ExtSecurityLimit::SolarRadiationDependencyCurve with**  
2864 **other classes**

mult from	name	mult to	type	description
0..1	OperationalLimitType	0..*	OperationalLimitType	(NC) The operational limit type that has this permanent solar radiation curve.
1..1	CurveDatas	0..*	CurveData	inherited from: Curve
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

2865  
2866 **3.18.8 (NC) VoltageAngleLimit**

2867 Inheritance path = OperationalLimit : IdentifiedObject : ExtEulIdentifiedObject

2868 The voltage angle limit for a two terminal ConductingEquipment. The association  
2869 OperationalLimitSet.Terminal shall be instantiated for Terminal with sequenceNumber equal to  
2870 1.

2871 Table 326 shows all attributes of VoltageAngleLimit.



2872

**Table 326 – Attributes of ExtSecurityLimit::VoltageAngleLimit**

name	mult	type	description
value	0..1	AngleDegrees	(NC) The difference in angle degrees between Terminal with sequenceNumber equal to 1 and the Terminal referenced by the association VoltageAngleLimit.AngleReferenceTerminal. The value can be positive, negative or zero depending on the angle difference between the two terminals.
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEuIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEuIdentifiedObject

2873

2874

Table 327 shows all association ends of VoltageAngleLimit with other classes.

2875

**Table 327 – Association ends of ExtSecurityLimit::VoltageAngleLimit with other classes**

mult from	name	mult to	type	description
0..*	AngleReferenceTerminal	0..1	Terminal	(NC) The angle reference terminal for the voltage angle limit.
0..*	OperationalLimitSet	1..1	OperationalLimitSet	inherited from: OperationalLimit
0..*	OperationalLimitType	0..1	OperationalLimitType	inherited from: OperationalLimit
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

2876

2877

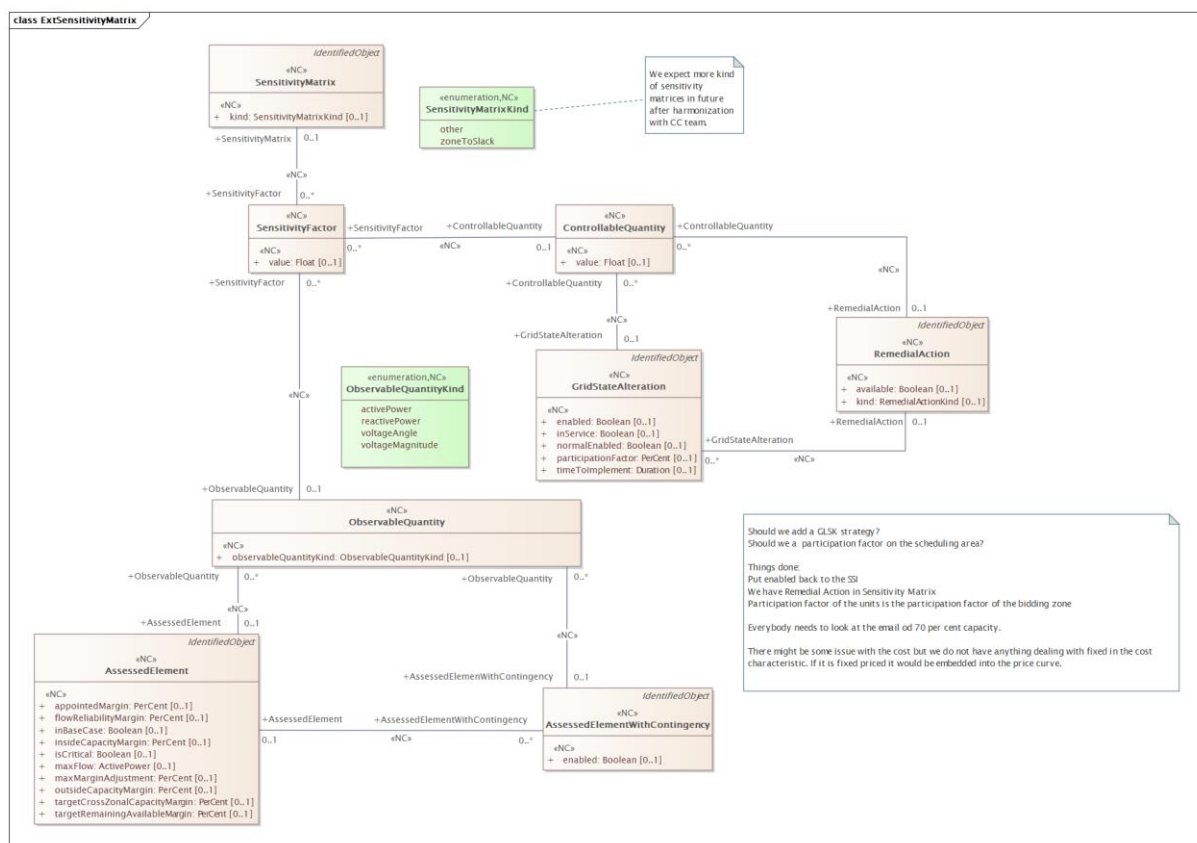
**3.19 Package ExtSensitivityMatrix**

2878

**3.19.1 General**

2879

This package contains extensions related to sensitivity matrix.



**Figure 31 – Class diagram ExtSensitivityMatrix::ExtSensitivityMatrix**

Figure 31: The diagram contains classes related to sensitivity matrix.

### 3.19.2 (NC) ControllableQuantity root class

Controllable quantity is a set point quantity on a grid state alteration or on a remedial action. Table 328 shows all attributes of ControllableQuantity.

**Table 328 – Attributes of ExtSensitivityMatrix::ControllableQuantity**

name	mult	type	description
value	0..1	Float	(NC) The value of the change applied to the property reference associated with the observable quantity for the purpose of the calculation of the sensitivity factor. The value can be integer, float or boolean. In case of boolean 1 equals true and 0 equals false.

Table 329 shows all association ends of ControllableQuantity with other classes.

**Table 329 – Association ends of ExtSensitivityMatrix::ControllableQuantity with other classes**

mult from	name	mult to	type	description
0..*	GridStateAlteration	0..1	<a href="#">GridStateAlteration</a>	(NC) The grid state alteration for this controllable quantity.
0..*	RemedialAction	0..1	<a href="#">RemedialAction</a>	(NC) Remedial action which is associated with the controllable quantity.

mult from	name	mult to	type	description
0..1	SensitivityFactor	0..*	<a href="#">SensitivityFactor</a>	(NC) The sensitivity factor associated with a controllable quantity.

2891

2892 **3.19.3 (NC) ObservableQuantity root class**2893 Observable quantity is an electrical quantity on an assessed element or an assessed element  
2894 with contingency.

2895 Table 330 shows all attributes of ObservableQuantity.

2896 **Table 330 – Attributes of ExtSensitivityMatrix::ObservableQuantity**

name	mult	type	description
observableQuantityKind	0..1	<a href="#">ObservableQuantityKind</a>	(NC) Kind of observable quantity.

2897

2898 Table 331 shows all association ends of ObservableQuantity with other classes.

2899 **Table 331 – Association ends of ExtSensitivityMatrix::ObservableQuantity with other**  
2900 **classes**

mult from	name	mult to	type	description
0..*	AssessedElement	0..1	<a href="#">AssessedElement</a>	(NC) The assessed element with contingency associated with this observable quantity.
0..*	AssessedElementWithContingency	0..1	<a href="#">AssessedElementWithContingency</a>	(NC) The assessed element with contingency associated with this observable quantity.
0..1	SensitivityFactor	0..*	<a href="#">SensitivityFactor</a>	(NC) The sensitivity factor associated with an observable quantity.

2901

2902 **3.19.4 (NC) SensitivityFactor root class**2903 The sensitivity factor which represents the sensitivity between observable and controllable  
2904 elements.

2905 Table 332 shows all attributes of SensitivityFactor.

2906 **Table 332 – Attributes of ExtSensitivityMatrix::SensitivityFactor**

name	mult	type	description
value	0..1	Float	(NC) The value of the sensitivity factor.

2907

2908 Table 333 shows all association ends of SensitivityFactor with other classes.

2909 **Table 333 – Association ends of ExtSensitivityMatrix::SensitivityFactor with other**  
2910 **classes**

mult from	name	mult to	type	description
0..*	ControllableQuantity	0..1	<a href="#">ControllableQuantity</a>	(NC) The controllable quantity for this sensitivity factor.
0..*	ObservableQuantity	0..1	<a href="#">ObservableQuantity</a>	(NC) The observable quantity for this sensitivity factor.
0..*	SensitivityMatrix	0..1	<a href="#">SensitivityMatrix</a>	(NC) The sensitivity matrix which contains this sensitivity factor.

2911

2912 **3.19.5 (NC) SensitivityMatrix**

2913 Inheritance path = IdentifiedObject : ExtEulIdentifiedObject

2914 The sensitivity matrix which represents the sensitivity factors between observable and  
2915 controllable elements.

2916 Table 334 shows all attributes of SensitivityMatrix.

2917 **Table 334 – Attributes of ExtSensitivityMatrix::SensitivityMatrix**

name	mult	type	description
kind	0..1	<a href="#">SensitivityMatrixKind</a>	(NC) The kind of sensitivity matrix.
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

2918

2919 Table 335 shows all association ends of SensitivityMatrix with other classes.

2920 **Table 335 – Association ends of ExtSensitivityMatrix::SensitivityMatrix with other**  
2921 **classes**

mult from	name	mult to	type	description
0..1	SensitivityFactor	0..*	<a href="#">SensitivityFactor</a>	(NC) The sensitivity factor which belongs to this sensitivity matrix.
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

2922

2923 **3.19.6 (NC) ObservableQuantityKind enumeration**

2924 Kind of observable quantity.

2925 Table 336 shows all literals of ObservableQuantityKind.

2926 **Table 336 – Literals of ExtSensitivityMatrix::ObservableQuantityKind**

literal	value	description
activePower		The observable quantity is the active power.
reactivePower		The observable quantity is the reactive power.
voltageAngle		The observable quantity is the angle of terminal voltage.
voltageMagnitude		The observable quantity is the magnitude of terminal voltage.

2927

2928 **3.19.7 (NC) SensitivityMatrixKind enumeration**

2929 Kinds of sensitivity matrix.

2930 Table 337 shows all literals of SensitivityMatrixKind.

2931

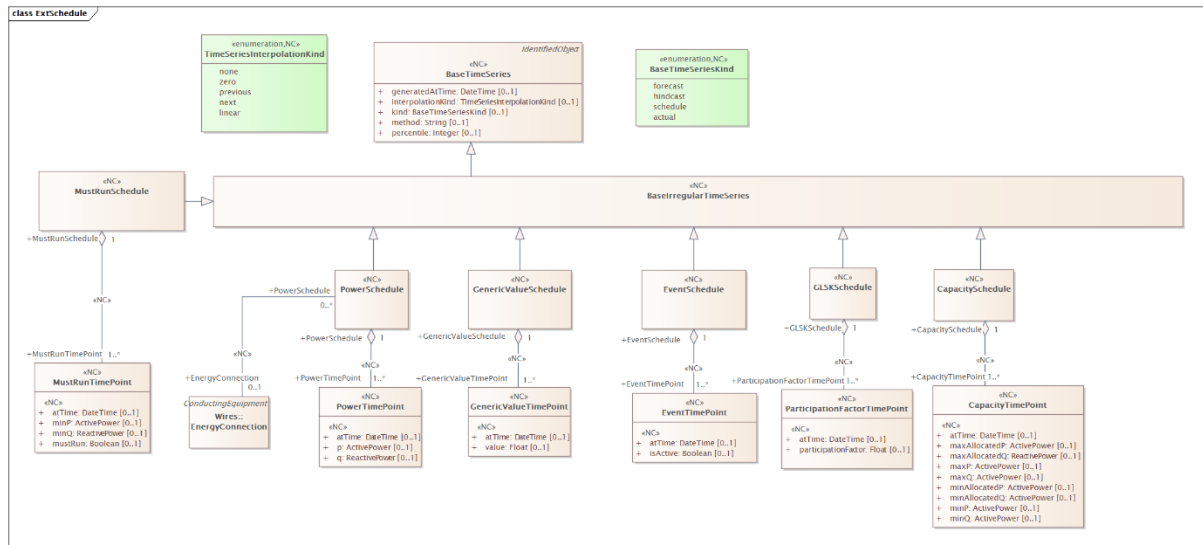
**Table 337 – Literals of ExtSensitivityMatrix::SensitivityMatrixKind**

literal	value	description
zoneToSlack		Zone to slack kind of sensitivity matrix.
other		Other kind of sensitivity matrix.

2932

**2933 3.20 Package ExtSchedule****2934 3.20.1 General**

2935 This package contains the extensions related to the schedule.



2936

**2937 Figure 32 – Class diagram ExtSchedule::ExtSchedule**

2938 Figure 32: The diagram contains classes related to schedule.

**2939 3.20.2 (NC) BaseIrregularTimeSeries**

2940 Inheritance path = [BaseTimeSeries](#) : IdentifiedObject : ExtEulIdentifiedObject

2941 Time series that has irregular points in time.

2942 Table 338 shows all attributes of BaseIrregularTimeSeries.

**2943 Table 338 – Attributes of ExtSchedule::BaseIrregularTimeSeries**

name	mult	type	description
generatedAtTime	0..1	DateTime	inherited from: <a href="#">BaseTimeSeries</a>
interpolationKind	0..1	<a href="#">TimeSeriesInterpolationKind</a>	inherited from: <a href="#">BaseTimeSeries</a>
kind	0..1	<a href="#">BaseTimeSeriesKind</a>	inherited from: <a href="#">BaseTimeSeries</a>
method	0..1	String	inherited from: <a href="#">BaseTimeSeries</a>
percentile	0..1	Integer	inherited from: <a href="#">BaseTimeSeries</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 339 shows all association ends of `BaseIrregularTimeSeries` with other classes.

**Table 339 – Association ends of `ExtSchedule::BaseIrregularTimeSeries` with other classes**

mult from	name	mult to	type	description
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.20.3 (NC) BaseTimeSeries

Inheritance path = IdentifiedObject : ExtEulIdentifiedObject

Time series of values at points in time.

Table 340 shows all attributes of `BaseTimeSeries`.

**Table 340 – Attributes of `ExtSchedule::BaseTimeSeries`**

name	mult	type	description
generatedAtTime	0..1	DateTime	The time this time series (entity) come to existents and available for use.
interpolationKind	0..1	<a href="#">TimeSeriesInterpolationKind</a>	Kind of interpolation done between time point.
kind	0..1	<a href="#">BaseTimeSeriesKind</a>	Kind of base time series.
method	0..1	String	Method used for create the value. This is used for identification in the case where there is multiple time series for the same validity period and kind.
percentile	0..1	Integer	The percentile is a number where a certain percentage of scores/ranking/values of a sample fall below that number. This is a way for expressing uncertainty in the number provided.
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 341 shows all association ends of `BaseTimeSeries` with other classes.

**Table 341 – Association ends of `ExtSchedule::BaseTimeSeries` with other classes**

mult from	name	mult to	type	description
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject

mult from	name	mult to	type	description
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

2957

2958

**3.20.4 (NC) CapacitySchedule**2959 Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : IdentifiedObject :

2960 ExtEulIdentifiedObject

2961 The schedule for the capacity

2962 Table 342 shows all attributes of CapacitySchedule.

2963

**Table 342 – Attributes of ExtSchedule::CapacitySchedule**

name	mult	type	description
generatedAtTime	0..1	DateTime	inherited from: <a href="#">BaseTimeSeries</a>
interpolationKind	0..1	<a href="#">TimeSeriesInterpolationKind</a>	inherited from: <a href="#">BaseTimeSeries</a>
kind	0..1	<a href="#">BaseTimeSeriesKind</a>	inherited from: <a href="#">BaseTimeSeries</a>
method	0..1	String	inherited from: <a href="#">BaseTimeSeries</a>
percentile	0..1	Integer	inherited from: <a href="#">BaseTimeSeries</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

2964

2965

Table 343 shows all association ends of CapacitySchedule with other classes.

2966

**Table 343 – Association ends of ExtSchedule::CapacitySchedule with other classes**

mult from	name	mult to	type	description
1..1	CapacityTimePoint	1..*	<a href="#">CapacityTimePoint</a>	(NC) The capacity timepoint for a capacity schedule.
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

2967

2968

**3.20.5 (NC) CapacityTimePoint root class**

2969 Participation factor for a given point in time.

2970 Table 344 shows all attributes of CapacityTimePoint.

2971

**Table 344 – Attributes of ExtSchedule::CapacityTimePoint**

name	mult	type	description
atTime	0..1	DateTime	(NC) The time the data is valid for.
maxAllocatedP	0..1	ActivePower	(NC) The maximum active power that can be imported to the bidding zone. Load sign

name	mult	type	description
			convention is used, i.e. negative number means an import, positive number means an export.
minAllocatedP	0..1	ActivePower	(NC) The minimum active power that can be imported to the bidding zone. Load sign convention is used, i.e. negative number means an import, positive number means an export.
maxP	0..1	ActivePower	(NC) Maximum active power.
minP	0..1	ActivePower	(NC) Minimum active power.
maxAllocatedQ	0..1	ReactivePower	(NC) The maximum reactive power that can be imported to the bidding zone. Load sign convention is used, i.e. negative number means an import, positive number means an export.
minAllocatedQ	0..1	ActivePower	(NC) The minimum reactive power that can be imported to the bidding zone. Load sign convention is used, i.e. negative number means an import, positive number means an export.
maxQ	0..1	ActivePower	(NC) Maximum reactive power.
minQ	0..1	ActivePower	(NC) Minimum reactive power.

Table 345 shows all association ends of CapacityTimePoint with other classes.

**Table 345 – Association ends of ExtSchedule::CapacityTimePoint with other classes**

mult from	name	mult to	type	description
1..*	CapacitySchedule	1..1	<a href="#">CapacitySchedule</a>	(NC) The capacity schedule which belongs to the capacity timepoint.

### 3.20.6 (NC) EventSchedule

Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : IdentifiedObject : ExtEulIdentifiedObject

Time series represent irregular event described by event points in time.

Table 346 shows all attributes of EventSchedule.

**Table 346 – Attributes of ExtSchedule::EventSchedule**

name	mult	type	description
generatedAtTime	0..1	DateTime	inherited from: <a href="#">BaseTimeSeries</a>
interpolationKind	0..1	<a href="#">TimeSeriesInterpolationKind</a>	inherited from: <a href="#">BaseTimeSeries</a>
kind	0..1	<a href="#">BaseTimeSeriesKind</a>	inherited from: <a href="#">BaseTimeSeries</a>
method	0..1	String	inherited from: <a href="#">BaseTimeSeries</a>
percentile	0..1	Integer	inherited from: <a href="#">BaseTimeSeries</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 347 shows all association ends of EventSchedule with other classes.



2984 **Table 347 – Association ends of ExtSchedule::EventSchedule with other classes**

mult from	name	mult to	type	description
0..1	ActualAvailabilitySchedule	0..1	<a href="#">AvailabilitySchedule</a>	(NC) Actual availability schedule that has this irregular interval schedule.
0..1	PlannedAvailabilitySchedule	0..1	<a href="#">AvailabilitySchedule</a>	(NC) Planned availability schedule that has this irregular interval schedule.
0..1	RemedialActionSchedule	0..1	<a href="#">RemedialActionSchedule</a>	Remedial action schedule is the event that is validity for the given time series.
1..1	EventTimePoint	1..*	<a href="#">EventTimePoint</a>	(NC) Value for the point in time.
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

2985

2986 **3.20.7 (NC) EventTimePoint root class**

2987 Event valid for a given point in time.

2988 Table 348 shows all attributes of EventTimePoint.

2989 **Table 348 – Attributes of ExtSchedule::EventTimePoint**

name	mult	type	description
atTime	0..1	DateTime	(NC) The time the data is valid for.
isActive	0..1	Boolean	(NC) True, if the event is occurring (Active) at this time point. Otherwise false.

2990

2991 Table 349 shows all association ends of EventTimePoint with other classes.

2992 **Table 349 – Association ends of ExtSchedule::EventTimePoint with other classes**

mult from	name	mult to	type	description
1..*	EventSchedule	1..1	<a href="#">EventSchedule</a>	(NC) Time series the time point values belongs to.

2993

2994 **3.20.8 (NC) GenericValueSchedule**2995 Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : IdentifiedObject :  
2996 ExtEulIdentifiedObject2997 Time series represent irregular generic value at given points in time. The type of value is given  
2998 by the reference association.

2999 Table 350 shows all attributes of GenericValueSchedule.

3000 **Table 350 – Attributes of ExtSchedule::GenericValueSchedule**

name	mult	type	description
generatedAtTime	0..1	DateTime	inherited from: <a href="#">BaseTimeSeries</a>
interpolationKind	0..1	<a href="#">TimeSeriesInterpolationKind</a>	inherited from: <a href="#">BaseTimeSeries</a>
kind	0..1	<a href="#">BaseTimeSeriesKind</a>	inherited from: <a href="#">BaseTimeSeries</a>
method	0..1	String	inherited from: <a href="#">BaseTimeSeries</a>

name	mult	type	description
percentile	0..1	Integer	inherited from: <a href="#">BaseTimeSeries</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 351 shows all association ends of GenericValueSchedule with other classes.

**Table 351 – Association ends of ExtSchedule::GenericValueSchedule with other classes**

mult from	name	mult to	type	description
1..1	GenericValueTimePoint	1..*	<a href="#">GenericValueTimePoint</a>	(NC) Value for the point in time.
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.20.9 (NC) GenericValueTimePoint root class

Generic value for a given point in time.

Table 352 shows all attributes of GenericValueTimePoint.

**Table 352 – Attributes of ExtSchedule::GenericValueTimePoint**

name	mult	type	description
atTime	0..1	DateTime	(NC) The time the data is valid for.
value	0..1	Float	(NC) The value at the time. The meaning of the value is defined by the derived type of the associated schedule. The value can be integer, float or boolean. In case of boolean 1 equals true and 0 equals false.

Table 353 shows all association ends of GenericValueTimePoint with other classes.

**Table 353 – Association ends of ExtSchedule::GenericValueTimePoint with other classes**

mult from	name	mult to	type	description
1..*	GenericValueSchedule	1..1	<a href="#">GenericValueSchedule</a>	(NC) Time series the time point values belongs to.

### 3.20.10 (NC) MustRunSchedule

Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : IdentifiedObject : ExtEulIdentifiedObject

Time series represent irregular must-run instruction values at given points in time. This could be instruction to a reliability must-run (RMR) generation facility that is necessary to run to meet

3019 certain operating conditions in order to maintain the security of power systems in a competitive  
3020 environment.

3021 Table 354 shows all attributes of MustRunSchedule.

3022 **Table 354 – Attributes of ExtSchedule::MustRunSchedule**

name	mult	type	description
generatedAtTime	0..1	DateTime	inherited from: <a href="#">BaseTimeSeries</a>
interpolationKind	0..1	<a href="#">TimeSeriesInterpolationKind</a>	inherited from: <a href="#">BaseTimeSeries</a>
kind	0..1	<a href="#">BaseTimeSeriesKind</a>	inherited from: <a href="#">BaseTimeSeries</a>
method	0..1	String	inherited from: <a href="#">BaseTimeSeries</a>
percentile	0..1	Integer	inherited from: <a href="#">BaseTimeSeries</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

3023  
3024 Table 355 shows all association ends of MustRunSchedule with other classes.

3025 **Table 355 – Association ends of ExtSchedule::MustRunSchedule with other classes**

mult from	name	mult to	type	description
1..1	MustRunTimePoint	1..*	<a href="#">MustRunTimePoint</a>	(NC) Value for the point in time.
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

3026  
3027 **3.20.11 (NC) MustRunTimePoint root class**

3028 Must-run instruction value at a given point in time.

3029 Table 356 shows all attributes of MustRunTimePoint.

3030 **Table 356 – Attributes of ExtSchedule::MustRunTimePoint**

name	mult	type	description
atTime	0..1	DateTime	(NC) The time the data is valid for.
minP	0..1	ActivePower	(NC) Minimum active power injection that is needed to meet must-run requirement. This value can be higher or equal to minimum operational limit. Load sign convention is used, i.e. positive sign means flow out from a node.
minQ	0..1	ReactivePower	(NC) Minimum reactive power injection that is needed to meet must-run requirement. This value can be higher or equal to minimum operational limit. Load sign convention is used, i.e. positive sign means flow out from a node.

name	mult	type	description
mustRun	0..1	Boolean	(NC) True, if the must-run instruction is active this time point. Otherwise false.

Table 357 shows all association ends of MustRunTimePoint with other classes.

**Table 357 – Association ends of ExtSchedule::MustRunTimePoint with other classes**

mult from	name	mult to	type	description
1..*	MustRunSchedule	1..1	<a href="#">MustRunSchedule</a>	(NC) Time series the time point values belongs to.

### 3.20.12 (NC) ParticipationFactorTimePoint root class

Participation factor for a given point in time.

Table 358 shows all attributes of ParticipationFactorTimePoint.

**Table 358 – Attributes of ExtSchedule::ParticipationFactorTimePoint**

name	mult	type	description
atTime	0..1	DateTime	(NC) The time the data is valid for.
participationFactor	0..1	Float	(NC) Situation economic participation factor.

Table 359 shows all association ends of ParticipationFactorTimePoint with other classes.

**Table 359 – Association ends of ExtSchedule::ParticipationFactorTimePoint with other classes**

mult from	name	mult to	type	description
1..*	GLSKSchedule	1..1	<a href="#">GLSKSchedule</a>	(NC) The GLSK schedule which belongs to the participation factor timepoint.

### 3.20.13 (NC) PowerSchedule

Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : IdentifiedObject : ExtEulIdentifiedObject

Time series represent irregular power, active and reactive, values at given points in time.

Table 360 shows all attributes of PowerSchedule.

**Table 360 – Attributes of ExtSchedule::PowerSchedule**

name	mult	type	description
generatedAtTime	0..1	DateTime	inherited from: <a href="#">BaseTimeSeries</a>
interpolationKind	0..1	<a href="#">TimeSeriesInterpolationKind</a>	inherited from: <a href="#">BaseTimeSeries</a>
kind	0..1	<a href="#">BaseTimeSeriesKind</a>	inherited from: <a href="#">BaseTimeSeries</a>
method	0..1	String	inherited from: <a href="#">BaseTimeSeries</a>
percentile	0..1	Integer	inherited from: <a href="#">BaseTimeSeries</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject

name	mult	type	description
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 361 shows all association ends of PowerSchedule with other classes.

**Table 361 – Association ends of ExtSchedule::PowerSchedule with other classes**

mult from	name	mult to	type	description
0..*	EnergyConnection	0..1	EnergyConnection	(NC) The energy connection that has a power schedule.
1..1	PowerTimePoint	1..*	<a href="#">PowerTimePoint</a>	(NC) Value for the point in time.
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.20.14 (NC) PowerTimePoint root class

Power, active and reactive, value at a given point in time.

Table 362 shows all attributes of PowerTimePoint.

**Table 362 – Attributes of ExtSchedule::PowerTimePoint**

name	mult	type	description
atTime	0..1	DateTime	(NC) The time the data is valid for.
p	0..1	ActivePower	(NC) Active power injection. Load sign convention is used, i.e. positive sign means flow out from a node.
q	0..1	ReactivePower	(NC) Reactive power injection. Load sign convention is used, i.e. positive sign means flow out from a node.

Table 363 shows all association ends of PowerTimePoint with other classes.

**Table 363 – Association ends of ExtSchedule::PowerTimePoint with other classes**

mult from	name	mult to	type	description
1..*	PowerSchedule	1..1	<a href="#">PowerSchedule</a>	(NC) Time series the time point values belongs to.

### 3.20.15 (NC) BaseTimeSeriesKind enumeration

Kind of time series.

Table 364 shows all literals of BaseTimeSeriesKind.

**Table 364 – Literals of ExtSchedule::BaseTimeSeriesKind**

literal	value	description
forecast		Time series is forecast data. The values represent the result of scientific predictions based on historical time stamped data.

literal	value	description
hindcast		Time series is hindcast data. The value represent probable past (historic) condition given by calculation done using actual values. For instance, determine the among of wind based on the energy produced by wind. However, hindcast is typical the result of a simulated forecasts for historical periods.
schedule		Time series is schedule data. The values represent the result of a committed and plan forecast data that has been through a quality control and could incur penalty when not followed.
actual		Time series is actual data. The values represent measured or calculated values that represent the actual behaviour.

3066

3067 **3.20.16 (NC) TimeSeriesInterpolationKind enumeration**

3068 Kinds of interpolation of values between two time point.

3069 Table 365 shows all literals of TimeSeriesInterpolationKind.

3070 **Table 365 – Literals of ExtSchedule::TimeSeriesInterpolationKind**

literal	value	description
none		No interpolation is applied. The value is considered NULL.
zero		The value between two time points is set to zero.
previous		The value between two time points is set to previous value.
next		The value between two time points is set to next value.
linear		Linear interpolation is applied for values between two time points.

3071

3072 **3.20.17 (NC) GLSKSchedule**3073 Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : IdentifiedObject :  
3074 ExtEulIdentifiedObject

3075 The schedule for Generation and Load Shift Keys (GLSK).

3076 Table 366 shows all attributes of GLSKSchedule.

3077 **Table 366 – Attributes of ExtSchedule::GLSKSchedule**

name	mult	type	description
generatedAtTime	0..1	DateTime	inherited from: <a href="#">BaseTimeSeries</a>
interpolationKind	0..1	<a href="#">TimeSeriesInterpolationKind</a>	inherited from: <a href="#">BaseTimeSeries</a>
kind	0..1	<a href="#">BaseTimeSeriesKind</a>	inherited from: <a href="#">BaseTimeSeries</a>
method	0..1	String	inherited from: <a href="#">BaseTimeSeries</a>
percentile	0..1	Integer	inherited from: <a href="#">BaseTimeSeries</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject

name	mult	type	description
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 367 shows all association ends of GLSKSchedule with other classes.

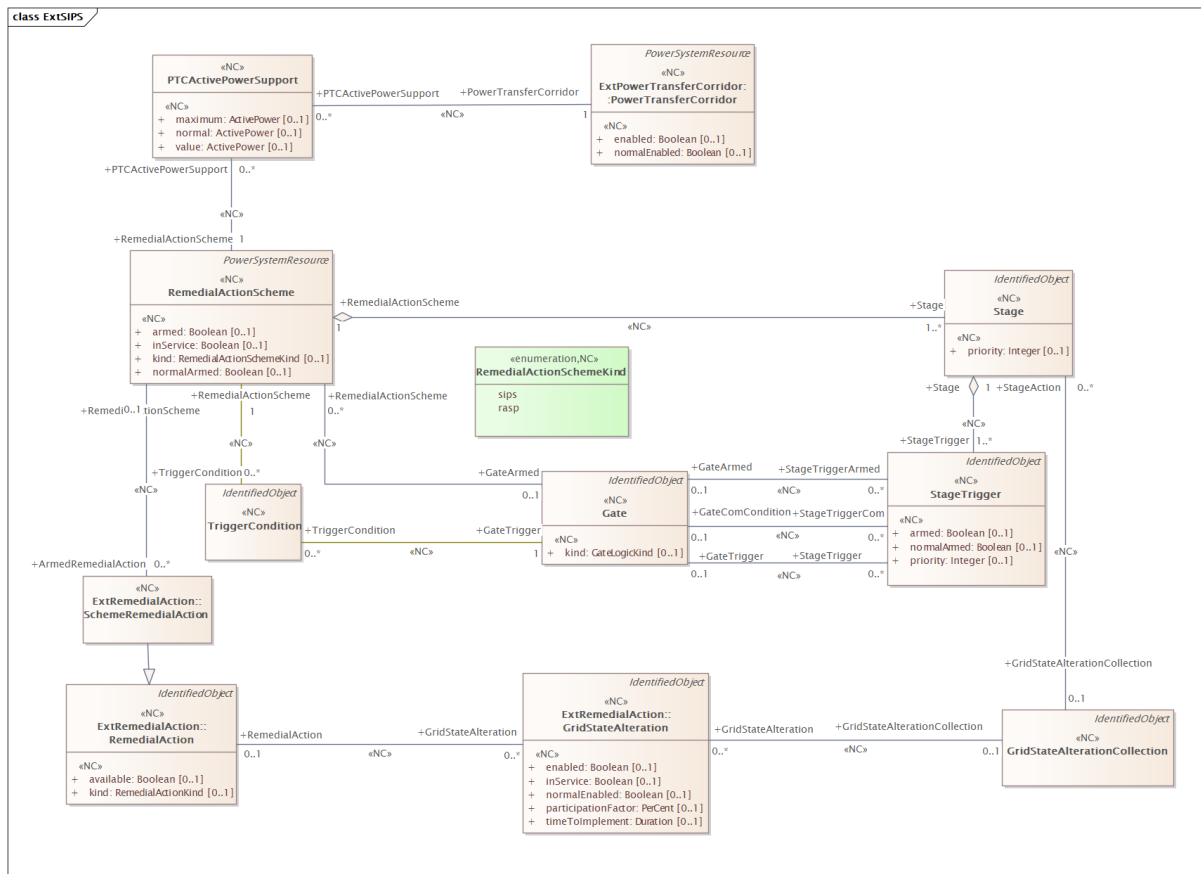
**Table 367 – Association ends of ExtSchedule::GLSKSchedule with other classes**

mult from	name	mult to	type	description
0..*	ScheduleResource	0..1	<a href="#">ScheduleResource</a>	(NC) The Schedule Resource that has a GLSK schedule.
0..*	EnergyBlockOrder	0..1	<a href="#">EnergyBlockOrder</a>	(NC) A EnergyBlockOrder which has a GLSK Schedule.
0..*	EnergyGroup	0..1	<a href="#">EnergyGroup</a>	(NC) The EnergyGroup which has a GLSK Schedule.
0..*	EnergyConsumer	0..1	EnergyConsumer	(NC) The EnergyConsumer that has a GLSK schedule.
0..*	PowerElectronicsUnit	0..1	PowerElectronicsUnit	(NC) The Power Electronics Unit which has a GLSK schedule.
0..*	HydroPump	0..1	HydroPump	(NC) The Hydro Pump which has a GLSK schedule.
0..*	GeneratingUnit	0..1	GeneratingUnit	(NC) The Generating Unit which a GLSK Schedule.
1..1	ParticipationFactorTime Point	1..*	<a href="#">ParticipationFactorTime Point</a>	(NC) The participation factor timepoint for a GLSK schedule.
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.21 SIPS extensions

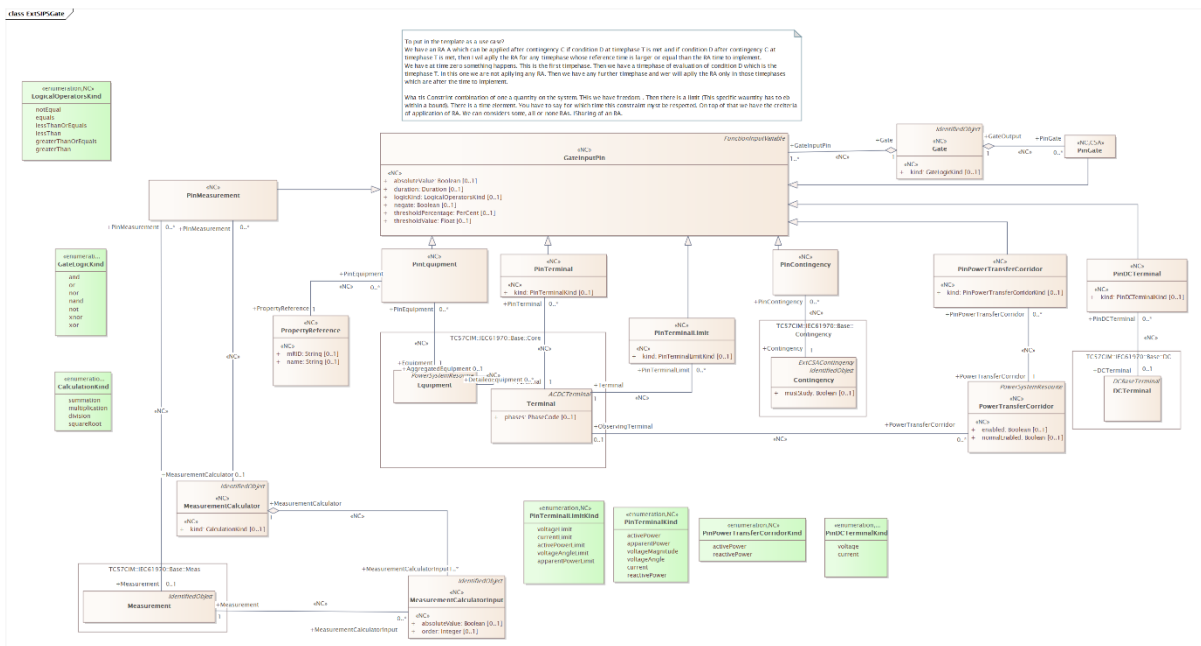
#### 3.21.1 General

This package contains the extensions related to the SIPS which is a kind of remedial action scheme. A remedial action scheme can have different stages. Each stage represents the change of values of one element in the grid model compared to the base case is described by the grid state alteration. Each stage can have multiple triggers that have a priority and one or many conditions. When the condition (gate) is reached, the grid state alteration is activated. A remedial action scheme is a kind of a remedial action. In this way, the remedial action scheme participates in the optimization of the remedial actions.



**Figure 33 – Class diagram ExtSIPS::ExtSIPS**

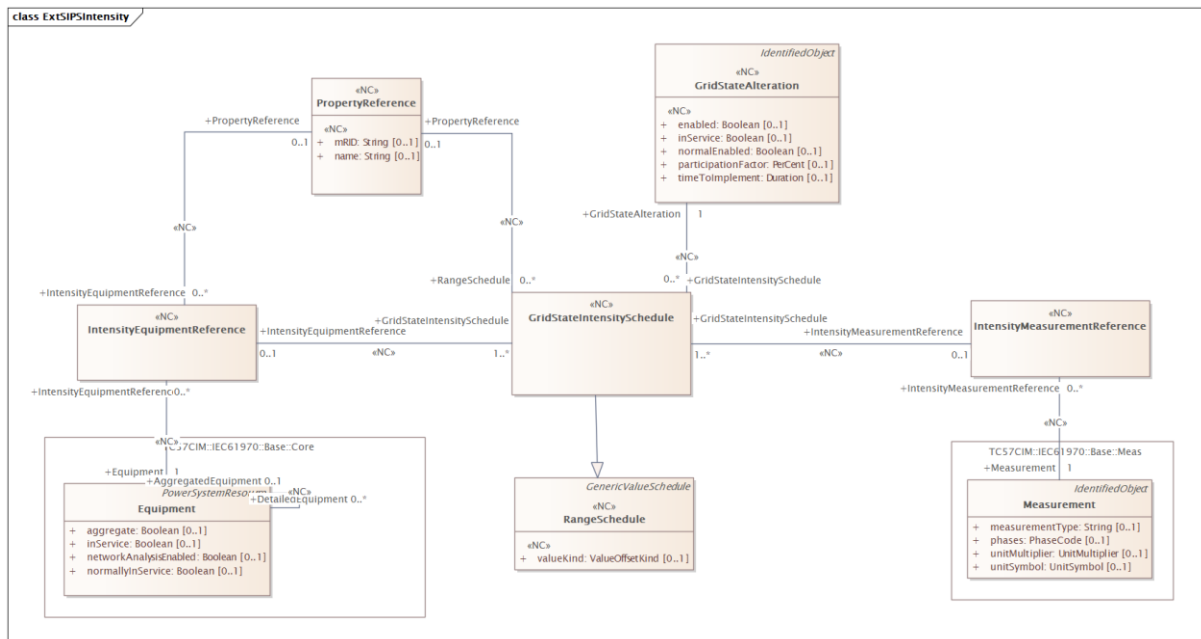
Figure 33: The diagram contains classes related to SIPS.



**Figure 34 – Class diagram ExtSIPS::ExtSIPSGate**



3096 Figure 34: The diagram contains classes related to SIPS gate.



3097

3098

**Figure 35 – Class diagram ExtSIPS::ExtSIPSIntensity**

3099 Figure 35: The diagram contains classes related to SIPS intensity.

### 3100 3.21.2 (NC) Gate

3101 Inheritance path = IdentifiedObject : ExtEulIdentifiedObject

3102 Logical gate that supports a logical operation based on the input.

3103 Table 368 shows all attributes of Gate.

3104

**Table 368 – Attributes of ExtSIPS::Gate**

name	mult	type	description
kind	0..1	<a href="#">GateLogicKind</a>	(NC) The logical operation of the gate.
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

3105

3106 Table 369 shows all association ends of Gate with other classes.

3107

**Table 369 – Association ends of ExtSIPS::Gate with other classes**

mult from	name	mult to	type	description
0..1	RemedialActionScheme	0..*	<a href="#">RemedialActionScheme</a>	(NC) The remedial action scheme which has an armed gate.
1..1	PinGate	0..*	<a href="#">PinGate</a>	(NC) The pin for this gate output.
1..1	GateInputPin	1..*	<a href="#">GateInputPin</a>	(NC) This is the input to the gate.

mult from	name	mult to	type	description
0..1	StageTriggerArmed	0..*	<a href="#">StageTrigger</a>	(NC) The stage trigger associated with the armed gate.
0..1	StageTrigger	0..*	<a href="#">StageTrigger</a>	(NC) The stage trigger associated with the gate trigger.
0..1	StageTriggerCom	0..*	<a href="#">StageTrigger</a>	(NC) The stage trigger associated with the communication gate.
1..1	TriggerCondition	0..*	<a href="#">TriggerCondition</a>	(NC) The trigger condition that has a gate trigger.
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

3108

3109 **3.21.3 (NC) GateInputPin**3110 Inheritance path = [FunctionInputVariable](#) : IdentifiedObject : ExtEulIdentifiedObject

3111 Input pin for a logical gate. The condition described in the input pin gives a logical true or false.

3112 The result from measurement and calculation are converted to a true or false.

3113 Table 370 shows all attributes of GateInputPin.

3114

**Table 370 – Attributes of ExtSIPS::GateInputPin**

name	mult	type	description
absoluteValue	0..1	Boolean	(NC) Indicates if the absolute value is used for comparison. If true, use the absolute value. If false, use the complex value (vector).
logicKind	0..1	<a href="#">LogicalOperatorsKind</a>	(NC) The logical operator kind used for comparison.
duration	0..1	Duration	(NC) The time duration for which the condition is satisfied before acting. Default is 0 seconds.
negate	0..1	Boolean	(NC) Invert/negate the result of the comparison.
thresholdPercentage	0..1	PerCent	(NC) The threshold percentage that should be used for compare with the percentage change between input value and threshold value.
thresholdValue	0..1	Float	(NC) The threshold value that should be used for compare with the input value.
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

3115

3116 Table 371 shows all association ends of GateInputPin with other classes.

3117 **Table 371 – Association ends of ExtSIPS::GateInputPin with other classes**

mult from	name	mult to	type	description
1..*	Gate	1..1	<a href="#">Gate</a>	(NC) The Gate that has this input.
1..*	Function	0..1	<a href="#">FunctionBlock</a>	(NC) inherited from: <a href="#">FunctionInputVariable</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

3118

3119 **3.21.4 (NC) GridStateAlterationCollection**

3120 Inheritance path = IdentifiedObject : ExtEulIdentifiedObject

3121 A collection of grid state alterations.

3122 Table 372 shows all attributes of GridStateAlterationCollection.

3123 **Table 372 – Attributes of ExtSIPS::GridStateAlterationCollection**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

3124

3125 Table 373 shows all association ends of GridStateAlterationCollection with other classes.

3126 **Table 373 – Association ends of ExtSIPS::GridStateAlterationCollection with other classes**

3127

mult from	name	mult to	type	description
0..1	AvailabilitySchedule	0..*	<a href="#">AvailabilitySchedule</a>	(NC) Availability schedule that require the a collection of grid state alteration to provide a valid power flow solution. For instante a set of switching plans.
0..1	GridStateAlteration	0..*	<a href="#">GridStateAlteration</a>	(NC) The GridStateAlteration that belongs to the collection.
0..1	StageAction	0..*	<a href="#">Stage</a>	(NC) The stage action related to this GridStateAlterationCollection.
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

3128

**3.21.5 (NC) IntensityEquipmentReference root class**

The intensity for a equipment reference.

Table 374 shows all association ends of IntensityEquipmentReference with other classes.

**Table 374 – Association ends of ExtSIPS::IntensityEquipmentReference with other classes**

mult from	name	mult to	type	description
0..1	GridStateIntensitySchedule	1..*	<a href="#">GridStateIntensitySchedule</a>	(NC) The grid state intensity schedule that has this intensity equipment reference.
0..*	Equipment	1..1	Equipment	(NC) The equipment that has this intensity equipment reference.
0..*	PropertyReference	0..1	<a href="#">PropertyReference</a>	(NC)

**3.21.6 (NC) IntensityMeasurementReference root class**

The value of the MeasurementValue is taken.

Table 375 shows all association ends of IntensityMeasurementReference with other classes.

**Table 375 – Association ends of ExtSIPS::IntensityMeasurementReference with other classes**

mult from	name	mult to	type	description
0..1	GridStateIntensitySchedule	1..*	<a href="#">GridStateIntensitySchedule</a>	(NC) The grid state intensity schedule that has this intensity measurement reference.
0..*	Measurement	1..1	Measurement	(NC) The measurement that has this intensity measurement reference.

**3.21.7 (NC) MeasurementCalculator**

Inheritance path = IdentifiedObject : ExtEulIdentifiedObject

Result of a calculation of one or more measurement.

Table 376 shows all attributes of MeasurementCalculator.

**Table 376 – Attributes of ExtSIPS::MeasurementCalculator**

name	mult	type	description
kind	0..1	<a href="#">CalculationKind</a>	(NC) Calculation operation executed on the operands.
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 377 shows all association ends of MeasurementCalculator with other classes.

3148 **Table 377 – Association ends of ExtSIPS::MeasurementCalculator with other classes**

mult from	name	mult to	type	description
0..1	PinMeasurement	0..*	<a href="#">PinMeasurement</a>	(NC) The pin that uses this input.
1..1	MeasurementCalculatorInput	1..*	<a href="#">MeasurementCalculatorInput</a>	(NC) The input used for the calculator.
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

3149

3150 **3.21.8 (NC) MeasurementCalculatorInput**

3151 Inheritance path = IdentifiedObject : ExtEulIdentifiedObject

3152 Input to measurement calculation. It supports Analog, Discrete and Accumulator  
3153 measurements.

3154 Table 378 shows all attributes of MeasurementCalculatorInput.

3155 **Table 378 – Attributes of ExtSIPS::MeasurementCalculatorInput**

name	mult	type	description
absoluteValue	0..1	Boolean	(NC) Indicates if the absolute value is used for comparison. If true, use the absolute value. If false, use the complex value (vector).
order	0..1	Integer	(NC) Positive number that defines the order of the operand in the calculation. 0 means default in which case the order is not relevant.
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

3156

3157 Table 379 shows all association ends of MeasurementCalculatorInput with other classes.

3158 **Table 379 – Association ends of ExtSIPS::MeasurementCalculatorInput with other**  
3159 **classes**

mult from	name	mult to	type	description
1..*	MeasurementCalculator	1..1	<a href="#">MeasurementCalculator</a>	(NC) The measurement calculator using this calculator input.
0..*	Measurement	1..1	Measurement	(NC) Measurement used as input to a calculation.
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

3160

3161 **3.21.9 (NC) PinContingency**

3162 Inheritance path = [GateInputPin](#) : [FunctionInputVariable](#) : IdentifiedObject :  
 3163 ExtEulidentifiedObject

3164 Input pin associated with a Contingency. It is used for comparison.

3165 Table 380 shows all attributes of PinContingency.

3166

**Table 380 – Attributes of ExtSIPS::PinContingency**

name	mult	type	description
absoluteValue	0..1	Boolean	(NC) inherited from: <a href="#">GateInputPin</a>
logicKind	0..1	<a href="#">LogicalOperatorsKind</a>	(NC) inherited from: <a href="#">GateInputPin</a>
duration	0..1	Duration	(NC) inherited from: <a href="#">GateInputPin</a>
negate	0..1	Boolean	(NC) inherited from: <a href="#">GateInputPin</a>
thresholdPercentage	0..1	PerCent	(NC) inherited from: <a href="#">GateInputPin</a>
thresholdValue	0..1	Float	(NC) inherited from: <a href="#">GateInputPin</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulidentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulidentifiedObject

3167

3168 Table 381 shows all association ends of PinContingency with other classes.

3169

**Table 381 – Association ends of ExtSIPS::PinContingency with other classes**

mult from	name	mult to	type	description
0..*	Contingency	1..1	Contingency	(NC) The Contingency that is used in the input pin.
1..*	Gate	1..1	<a href="#">Gate</a>	(NC) inherited from: <a href="#">GateInputPin</a>
1..*	Function	0..1	<a href="#">FunctionBlock</a>	(NC) inherited from: <a href="#">FunctionInputVariable</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

3170

3171 **3.21.10 (NC) PinEquipment**

3172 Inheritance path = [GateInputPin](#) : [FunctionInputVariable](#) : IdentifiedObject :  
 3173 ExtEulidentifiedObject

3174 Input pin associated with an Equipment. It is used for the comparison.

3175 Table 382 shows all attributes of PinEquipment.

3176

**Table 382 – Attributes of ExtSIPS::PinEquipment**

name	mult	type	description
absoluteValue	0..1	Boolean	(NC) inherited from: <a href="#">GateInputPin</a>
logicKind	0..1	<a href="#">LogicalOperatorsKind</a>	(NC) inherited from: <a href="#">GateInputPin</a>
duration	0..1	Duration	(NC) inherited from: <a href="#">GateInputPin</a>
negate	0..1	Boolean	(NC) inherited from: <a href="#">GateInputPin</a>
thresholdPercentage	0..1	PerCent	(NC) inherited from: <a href="#">GateInputPin</a>
thresholdValue	0..1	Float	(NC) inherited from: <a href="#">GateInputPin</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

3177

3178

Table 383 shows all association ends of PinEquipment with other classes.

3179

**Table 383 – Association ends of ExtSIPS::PinEquipment with other classes**

mult from	name	mult to	type	description
0..*	Equipment	1..1	Equipment	(NC) The Equipment that is used in the input pin.
0..*	PropertyReference	1..1	<a href="#">PropertyReference</a>	(NC)
1..*	Gate	1..1	<a href="#">Gate</a>	(NC) inherited from: <a href="#">GateInputPin</a>
1..*	Function	0..1	<a href="#">FunctionBlock</a>	(NC) inherited from: <a href="#">FunctionInputVariable</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

3180

3181

**3.21.11 (NC) PinDCTerminal**

3182

Inheritance path = [GateInputPin](#) : [FunctionInputVariable](#) : IdentifiedObject : ExtEulIdentifiedObject

3183

3184

Input pin associated with a DCTerminal. It is used for comparison.

3185

Table 384 shows all attributes of PinDCTerminal.

3186

**Table 384 – Attributes of ExtSIPS::PinDCTerminal**

name	mult	type	description
kind	0..1	<a href="#">PinDCTerminalKind</a>	(NC) The kind of quantity which is used as an input value.
absoluteValue	0..1	Boolean	(NC) inherited from: <a href="#">GateInputPin</a>
logicKind	0..1	<a href="#">LogicalOperatorsKind</a>	(NC) inherited from: <a href="#">GateInputPin</a>
duration	0..1	Duration	(NC) inherited from: <a href="#">GateInputPin</a>

name	mult	type	description
negate	0..1	Boolean	(NC) inherited from: <a href="#">GateInputPin</a>
thresholdPercentage	0..1	PerCent	(NC) inherited from: <a href="#">GateInputPin</a>
thresholdValue	0..1	Float	(NC) inherited from: <a href="#">GateInputPin</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 385 shows all association ends of PinDCTerminal with other classes.

**Table 385 – Association ends of ExtSIPS::PinDCTerminal with other classes**

mult from	name	mult to	type	description
0..*	DCTerminal	0..1	DCTerminal	(NC) The DC terminal that has this pin DC terminal.
1..*	Gate	1..1	<a href="#">Gate</a>	(NC) inherited from: <a href="#">GateInputPin</a>
1..*	Function	0..1	<a href="#">FunctionBlock</a>	(NC) inherited from: <a href="#">FunctionInputVariable</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.21.12 (NC,CSA) PinGate

Inheritance path = [GateInputPin](#) : [FunctionInputVariable](#) : IdentifiedObject : ExtEulIdentifiedObject

An output from one gate represents an input to another gate.

Table 386 shows all attributes of PinGate.

**Table 386 – Attributes of ExtSIPS::PinGate**

name	mult	type	description
absoluteValue	0..1	Boolean	(NC) inherited from: <a href="#">GateInputPin</a>
logicKind	0..1	<a href="#">LogicalOperatorsKind</a>	(NC) inherited from: <a href="#">GateInputPin</a>
duration	0..1	Duration	(NC) inherited from: <a href="#">GateInputPin</a>
negate	0..1	Boolean	(NC) inherited from: <a href="#">GateInputPin</a>
thresholdPercentage	0..1	PerCent	(NC) inherited from: <a href="#">GateInputPin</a>
thresholdValue	0..1	Float	(NC) inherited from: <a href="#">GateInputPin</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject



name	mult	type	description
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 387 shows all association ends of PinGate with other classes.

**Table 387 – Association ends of ExtSIPS::PinGate with other classes**

mult from	name	mult to	type	description
0..*	GateOutput	1..1	<a href="#">Gate</a>	(NC) The output of the gate.
1..*	Gate	1..1	<a href="#">Gate</a>	(NC) inherited from: <a href="#">GateInputPin</a>
1..*	Function	0..1	<a href="#">FunctionBlock</a>	(NC) inherited from: <a href="#">FunctionInputVariable</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.21.13 (NC) PinMeasurement

Inheritance path = [GateInputPin](#) : [FunctionInputVariable](#) : IdentifiedObject : ExtEulIdentifiedObject

Input pin associated with a Measurement. It is used for comparison.

Table 388 shows all attributes of PinMeasurement.

**Table 388 – Attributes of ExtSIPS::PinMeasurement**

name	mult	type	description
absoluteValue	0..1	Boolean	(NC) inherited from: <a href="#">GateInputPin</a>
logicKind	0..1	<a href="#">LogicalOperatorsKind</a>	(NC) inherited from: <a href="#">GateInputPin</a>
duration	0..1	Duration	(NC) inherited from: <a href="#">GateInputPin</a>
negate	0..1	Boolean	(NC) inherited from: <a href="#">GateInputPin</a>
thresholdPercentage	0..1	PerCent	(NC) inherited from: <a href="#">GateInputPin</a>
thresholdValue	0..1	Float	(NC) inherited from: <a href="#">GateInputPin</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 389 shows all association ends of PinMeasurement with other classes.

3209 **Table 389 – Association ends of ExtSIPS::PinMeasurement with other classes**

mult from	name	mult to	type	description
0..*	Measurement	0..1	Measurement	(NC) The Measurement that is used in the input pin.
0..*	MeasurementCalculator	0..1	<a href="#">MeasurementCalculator</a>	(NC) The result of the calculation used as input to a gate.
1..*	Gate	1..1	<a href="#">Gate</a>	(NC) inherited from: <a href="#">GateInputPin</a>
1..*	Function	0..1	<a href="#">FunctionBlock</a>	(NC) inherited from: <a href="#">FunctionInputVariable</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

3210

3211 **3.21.14 (NC) PinPowerTransferCorridor**

3212 Inheritance path = [GateInputPin](#) : [FunctionInputVariable](#) : IdentifiedObject :  
 3213 ExtEulIdentifiedObject

3214 Input pin associated with a PowerTransferCorridor. It is used for comparison.

3215 Table 390 shows all attributes of PinPowerTransferCorridor.

3216 **Table 390 – Attributes of ExtSIPS::PinPowerTransferCorridor**

name	mult	type	description
kind	0..1	<a href="#">PinPowerTransferCorridorKind</a>	(NC) The kind of quantity which is used as an input value.
absoluteValue	0..1	Boolean	(NC) inherited from: <a href="#">GateInputPin</a>
logicKind	0..1	<a href="#">LogicalOperatorsKind</a>	(NC) inherited from: <a href="#">GateInputPin</a>
duration	0..1	Duration	(NC) inherited from: <a href="#">GateInputPin</a>
negate	0..1	Boolean	(NC) inherited from: <a href="#">GateInputPin</a>
thresholdPercentage	0..1	PerCent	(NC) inherited from: <a href="#">GateInputPin</a>
thresholdValue	0..1	Float	(NC) inherited from: <a href="#">GateInputPin</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

3217

3218 Table 391 shows all association ends of PinPowerTransferCorridor with other classes.

3219 **Table 391 – Association ends of ExtSIPS::PinPowerTransferCorridor with other classes**

mult from	name	mult to	type	description
0..*	PowerTransferCorridor	1..1	<a href="#">PowerTransferCorridor</a>	(NC) The PowerTransferCorridor that is used in the input pin.

mult from	name	mult to	type	description
1..*	Gate	1..1	<a href="#">Gate</a>	(NC) inherited from: <a href="#">GateInputPin</a>
1..*	Function	0..1	<a href="#">FunctionBlock</a>	(NC) inherited from: <a href="#">FunctionInputVariable</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

3220

3221 **3.21.15 (NC) PinTerminal**3222 Inheritance path = [GateInputPin](#) : [FunctionInputVariable](#) : IdentifiedObject :

3223 ExtEulIdentifiedObject

3224 Input pin associated with a Terminal. It is used for comparison.

3225 Table 392 shows all attributes of PinTerminal.

3226

**Table 392 – Attributes of ExtSIPS::PinTerminal**

name	mult	type	description
kind	0..1	<a href="#">PinTerminalKind</a>	(NC) The kind of quantity which is used as an input value.
absoluteValue	0..1	Boolean	(NC) inherited from: <a href="#">GateInputPin</a>
logicKind	0..1	<a href="#">LogicalOperatorsKind</a>	(NC) inherited from: <a href="#">GateInputPin</a>
duration	0..1	Duration	(NC) inherited from: <a href="#">GateInputPin</a>
negate	0..1	Boolean	(NC) inherited from: <a href="#">GateInputPin</a>
thresholdPercentage	0..1	PerCent	(NC) inherited from: <a href="#">GateInputPin</a>
thresholdValue	0..1	Float	(NC) inherited from: <a href="#">GateInputPin</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

3227

3228 Table 393 shows all association ends of PinTerminal with other classes.

3229

**Table 393 – Association ends of ExtSIPS::PinTerminal with other classes**

mult from	name	mult to	type	description
0..*	Terminal	1..1	Terminal	(NC) The Terminal that is used in the input pin.
1..*	Gate	1..1	<a href="#">Gate</a>	(NC) inherited from: <a href="#">GateInputPin</a>
1..*	Function	0..1	<a href="#">FunctionBlock</a>	(NC) inherited from: <a href="#">FunctionInputVariable</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject

mult from	name	mult to	type	description
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

3230

3231 **3.21.16 (NC) PinTerminalLimit**

3232 Inheritance path = [GateInputPin](#) : [FunctionInputVariable](#) : IdentifiedObject :  
 3233 ExtEulIdentifiedObject

3234 Input pin associated with the limits of a Terminal. It is used for comparison.

3235 Table 394 shows all attributes of PinTerminalLimit.

3236 **Table 394 – Attributes of ExtSIPS::PinTerminalLimit**

name	mult	type	description
kind	0..1	<a href="#">PinTerminalLimitKind</a>	(NC) The kind of limit which is used as an input value.
absoluteValue	0..1	Boolean	(NC) inherited from: <a href="#">GateInputPin</a>
logicKind	0..1	<a href="#">LogicalOperatorsKind</a>	(NC) inherited from: <a href="#">GateInputPin</a>
duration	0..1	Duration	(NC) inherited from: <a href="#">GateInputPin</a>
negate	0..1	Boolean	(NC) inherited from: <a href="#">GateInputPin</a>
thresholdPercentage	0..1	PerCent	(NC) inherited from: <a href="#">GateInputPin</a>
thresholdValue	0..1	Float	(NC) inherited from: <a href="#">GateInputPin</a>
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

3237

3238 Table 395 shows all association ends of PinTerminalLimit with other classes.

3239 **Table 395 – Association ends of ExtSIPS::PinTerminalLimit with other classes**

mult from	name	mult to	type	description
0..*	Terminal	1..1	Terminal	(NC) The Terminal that is used in the input pin.
1..*	Gate	1..1	<a href="#">Gate</a>	(NC) inherited from: <a href="#">GateInputPin</a>
1..*	Function	0..1	<a href="#">FunctionBlock</a>	(NC) inherited from: <a href="#">FunctionInputVariable</a>
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

3240

3241 **3.21.17 (NC) PTCActivePowerSupport root class**

3242 Defines the active power capability (support) of the scheme in relation to a  
3243 PowerTransferCorridor.

3244 Table 396 shows all attributes of PTCActivePowerSupport.

3245 **Table 396 – Attributes of ExtSIPS::PTCActivePowerSupport**

name	mult	type	description
maximum	0..1	ActivePower	(NC) Maximum support that a System Integrity Protection Scheme (SIPS) can provide to a Power Transfer Corridor (PTC). This is normally limited by the maximum power system disconnect allowed.
normal	0..1	ActivePower	(NC) Normal support that a System Integrity Protection Scheme (SIPS) is expected to provide when enabled to a Power Transfer Corridor (PTC).
value	0..1	ActivePower	(NC) The support that a System Integrity Protection Scheme (SIPS) gives to a Power Transfer Corridor (PTC).

3246  
3247 Table 397 shows all association ends of PTCActivePowerSupport with other classes.

3248 **Table 397 – Association ends of ExtSIPS::PTCActivePowerSupport with other classes**

mult from	name	mult to	type	description
0..*	PowerTransferCorridor	1..1	<a href="#">PowerTransferCorridor</a>	(NC) The PowerTransferCorridor that has a specific active power support.
0..*	RemedialActionScheme	1..1	<a href="#">RemedialActionScheme</a>	(NC) The RemedialActionScheme which has active power support from the PowerTransferCorridor.

3249

3250 **3.21.18 (NC) RemedialActionScheme**

3251 Inheritance path = PowerSystemResource : IdentifiedObject : ExtEulIdentifiedObject  
3252 Remedial Action Scheme (RAS), Special Protection Schemes (SPS), System Protection  
3253 Schemes (SPS) or System Integrity Protection Schemes (SIPS).

3254 A Remedial Action Scheme consists of one or more stages that can trigger and execute a  
3255 protection action.

3256 Table 398 shows all attributes of RemedialActionScheme.

3257 **Table 398 – Attributes of ExtSIPS::RemedialActionScheme**

name	mult	type	description
armed	0..1	Boolean	(NC) Defines the arming status of the remedial action scheme. It is set by operation or by signal.
kind	0..1	<a href="#">RemedialActionScheme Kind</a>	(NC) Kind of Remedial Action Scheme.
normalArmed	0..1	Boolean	(NC) Defines the normal arming status of the remedial action scheme.
inService	0..1	Boolean	(NC) Specifies the availability of the Remedial Action Scheme (RAS). If true, the RAS is available for contingency processing. If false, the RAS is treated by contingency processing as if it is not in the model.
aliasName	0..1	String	inherited from: IdentifiedObject

name	mult	type	description
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 399 shows all association ends of RemedialActionScheme with other classes.

**Table 399 – Association ends of ExtSIPS::RemedialActionScheme with other classes**

mult from	name	mult to	type	description
0..1	ArmedRemedialAction	0..*	<a href="#">SchemeRemedialAction</a>	(NC) Armed remedial action for a remedial action scheme.
0..1	AvailabilityRemedialActionScheme	0..*	<a href="#">AvailabilityRemedialActionScheme</a>	(NC) Availability remedial action scheme describe the availability that affect this remedial action scheme.
0..*	GateArmed	0..1	<a href="#">Gate</a>	(NC) Gate that through a gate logic and input pin defines arming of a Remedial Action Scheme.
1..1	PTCActivePowerSupport	0..*	<a href="#">PTCActivePowerSupport</a>	(NC) The active power support of the PowerTransferCorridor related to this RemedialActionScheme.
1..1	TriggerCondition	0..*	<a href="#">TriggerCondition</a>	(NC) The triggering condition of this Remedial Action Scheme.
1..1	Stage	1..*	<a href="#">Stage</a>	(NC) The stage for this remedial action scheme.
0..*	PSRType	0..1	PSRType	inherited from: PowerSystemResource
0..1	Controls	0..*	Control	inherited from: PowerSystemResource
0..1	Measurements	0..*	Measurement	inherited from: PowerSystemResource
1..1	OperatingShare	0..*	OperatingShare	inherited from: PowerSystemResource
0..*	ReportingGroup	0..*	ReportingGroup	inherited from: PowerSystemResource
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.21.19 (NC) Stage

Inheritance path = IdentifiedObject : ExtEulIdentifiedObject

Stage of a remedial action scheme.

Table 400 shows all attributes of Stage.

**Table 400 – Attributes of ExtSIPS::Stage**

name	mult	type	description
priority	0..1	Integer	(NC) The priority of the stage. 0 = do not care (default) 1 = highest priority. 2 is less than 1 and so on. A stage with higher priority needs be activated before a lower stage can be activated.

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 401 shows all association ends of Stage with other classes.

**Table 401 – Association ends of ExtSIPS::Stage with other classes**

mult from	name	mult to	type	description
1..*	RemedialActionScheme	1..1	<a href="#">RemedialActionScheme</a>	(NC) The remedial action scheme that has a stage.
0..*	GridStateAlterationCollection	0..1	<a href="#">GridStateAlterationCollection</a>	(NC) The GridStateAlterationCollection which belongs to the Stage.
1..1	StageTrigger	1..*	<a href="#">StageTrigger</a>	(NC) The state trigger that is part of this stage.
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

### 3.21.20 (NC) StageTrigger

Inheritance path = IdentifiedObject : ExtEulIdentifiedObject

Stage that is triggered either by TriggerCondition or by gate condition within a stage.

Table 402 shows all attributes of StageTrigger.

**Table 402 – Attributes of ExtSIPS::StageTrigger**

name	mult	type	description
armed	0..1	Boolean	(NC) The status of the class set by operation or by signal. Optional field that will override other status fields.
normalArmed	0..1	Boolean	(NC) The default/normal value used when other active signal/values are missing.
priority	0..1	Integer	(NC) Priority of trigger. 0 = don't care (default) 1 = highest priority. 2 is less than 1 and so on. A trigger with the highest priority will trigger first.
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

Table 403 shows all association ends of StageTrigger with other classes.

3278 **Table 403 – Association ends of ExtSIPS::StageTrigger with other classes**

mult from	name	mult to	type	description
0..*	GateArmed	0..1	<a href="#">Gate</a>	(NC) The gate that is the input pin which defines arming of the StageTrigger.
0..*	GateTrigger	0..1	<a href="#">Gate</a>	(NC) The gate that is the input pin which triggers the protective reactions.
0..*	GateComCondition	0..1	<a href="#">Gate</a>	(NC) The gate that is the input pin which defines a communication condition.
1..*	Stage	1..1	<a href="#">Stage</a>	(NC) The stage that has this stage trigger.
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

3279

3280 **3.21.21 (NC) TriggerCondition**

3281 Inheritance path = IdentifiedObject : ExtEulIdentifiedObject

3282 The condition that triggers a remedial action scheme.

3283 Table 404 shows all attributes of TriggerCondition.

3284 **Table 404 – Attributes of ExtSIPS::TriggerCondition**

name	mult	type	description
aliasName	0..1	String	inherited from: IdentifiedObject
description	0..1	String	inherited from: IdentifiedObject
mRID	0..1	String	inherited from: IdentifiedObject
name	0..1	String	inherited from: IdentifiedObject
energyIdentCodeEic	0..1	String	(European) inherited from: ExtEulIdentifiedObject
shortName	0..1	String	(European) inherited from: ExtEulIdentifiedObject

3285

3286 Table 405 shows all association ends of TriggerCondition with other classes.

3287 **Table 405 – Association ends of ExtSIPS::TriggerCondition with other classes**

mult from	name	mult to	type	description
0..*	GateTrigger	1..1	<a href="#">Gate</a>	(NC) The gate that is the condition for the trigger.
0..*	RemedialActionScheme	1..1	<a href="#">RemedialActionScheme</a>	(NC) The remedial action scheme that has the trigger condition.
0..1	DiagramObjects	0..*	DiagramObject	inherited from: IdentifiedObject
1..1	Names	0..*	Name	inherited from: IdentifiedObject
0..1	ParameterEvent	0..*	ParameterEvent	inherited from: IdentifiedObject
0..1	Name	0..*	Name	(NC) inherited from: IdentifiedObject
0..1	AlternativeIdentifier	0..*	Name	(NC) inherited from: IdentifiedObject

3288



3289 **3.21.22 (NC) CalculationKind enumeration**

3290 Kind of calculation operation that can be done to Measurement.

3291 Table 406 shows all literals of CalculationKind.

3292 **Table 406 – Literals of ExtSIPS::CalculationKind**

literal	value	description
summation		Summation operation on the input values (operands).
multiplication		Multiplication operation on the input values (operands).
division		Division operation on the input values (operands).
squareRoot		Square root operator - only one input value (operands).

3293

3294 **3.21.23 (NC) GateLogicKind enumeration**

3295 Define the different logical operations.

3296 Table 407 shows all literals of GateLogicKind.

3297 **Table 407 – Literals of ExtSIPS::GateLogicKind**

literal	value	description
and		A logical AND operation. True when all inputs are true.
or		A logical OR operation. True when one or more inputs are true.
nor		A logical NOR operation. False when one or more inputs are true.
nand		A logical NAND operation. False when all inputs are true.
not		A logical NOT operation. Only one input and true input will give false out and false in will give true out. An inverter.
xnor		A logical XNOR operation. The function is the inverse of the exclusive OR (XOR) gate. All input false or true will give true. Otherwise false.
xor		A logical XOR operation. All input false or true will give false. Otherwise true.

3298

3299 **3.21.24 (NC) LogicalOperatorsKind enumeration**

3300 Kinds of logical operators for comparison.

3301 Table 408 shows all literals of LogicalOperatorsKind.

3302 **Table 408 – Literals of ExtSIPS::LogicalOperatorsKind**

literal	value	description
notEqual		Not equal (unlike) comparison operation.
equals		Equals (like) comparison operation.
lessThanOrEquals		Less than or equals comparison operation.
lessThan		Less than comparison operation.
greaterThanOrEquals		Greater than or equals comparison operation.

literal	value	description
greaterThan		Greater than comparison operation.

3303

3304 **3.21.25 (NC) PinDCTerminalKind enumeration**

3305 The kind of quantities that can serve as an input value for the DCTerminal pin.

3306 Table 409 shows all literals of PinDCTerminalKind.

3307 **Table 409 – Literals of ExtSIPS::PinDCTerminalKind**

literal	value	description
voltage		Direct current voltage in the DCTerminal.
current		Direct current in the DCTerminal.

3308

3309 **3.21.26 (NC) PinPowerTransferCorridorKind enumeration**

3310 The kind of quantities that can serve as an input value for the PowerTransferCorridor pin.

3311 Table 410 shows all literals of PinPowerTransferCorridorKind.

3312 **Table 410 – Literals of ExtSIPS::PinPowerTransferCorridorKind**

literal	value	description
activePower		Active power in the branch group.
reactivePower		Reactive power in the branch group.

3313

3314 **3.21.27 (NC) PinTerminalKind enumeration**

3315 The kind of quantities that can serve as an input value for the pin.

3316 Table 411 shows all literals of PinTerminalKind.

3317 **Table 411 – Literals of ExtSIPS::PinTerminalKind**

literal	value	description
activePower		Active power on the Terminal.
apparentPower		Apparent power on the Terminal.
voltageMagnitude		Voltage magnitude on the Terminal.
voltageAngle		Voltage angle on the Terminal.
current		Current on the Terminal.
reactivePower		Reactive power on the Terminal.

3318

3319 **3.21.28 (NC) PinTerminalLimitKind enumeration**

3320 The kind of limits that can serve as an input value for the pin.

3321 Table 412 shows all literals of PinTerminalLimitKind.

3322 **Table 412 – Literals of ExtSIPS::PinTerminalLimitKind**

literal	value	description
voltageLimit		The voltage limit is an input value.
currentLimit		The current limit is an input value.
activePowerLimit		The active power limit is an input value.
voltageAngleLimit		The voltage angle limit is an input value.
apparentPowerLimit		The apparent power limit is an input value.

3323

3324 **3.21.29 (NC) RemedialActionSchemeKind enumeration**

3325 Classification of Remedial Action Scheme.

3326 Table 413 shows all literals of RemedialActionSchemeKind.

3327 **Table 413 – Literals of ExtSIPS::RemedialActionSchemeKind**

literal	value	description
sips		System Integrity Protection Scheme (SIPS). The triggering conditions are met through field measurements.
rasp		Remedial Action Schema Plan (RASP). The triggering conditions are met through calculation.

3328