



European Network of  
Transmission System Operators  
for Electricity

---

# EQUIPMENT RELIABILITY PROFILE SPECIFICATION

---

2023-05-10

---

APPROVED DOCUMENT  
VERSION 2.2

1 Copyright notice:

2 **Copyright © ENTSO-E. All Rights Reserved.**

3 This document and its whole translations may be copied and furnished to others, and derivative  
4 works that comment on or otherwise explain it or assist in its implementation may be prepared,  
5 copied, published and distributed, in whole or in part, without restriction of any kind, provided  
6 that the above copyright notice and this paragraph are included on all such copies and  
7 derivative works. However, this document itself may not be modified in any way, except for  
8 literal and whole translation into languages other than English and under all circumstances, the  
9 copyright notice or references to ENTSO-E may not be removed.

10 This document and the information contained herein is provided on an "as is" basis.

11 **ENTSO-E DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT**  
12 **LIMITED TO ANY WARRANTY THAT THE USE OF THE INFORMATION HEREIN WILL NOT**  
13 **INFRINGE ANY RIGHTS OR ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR**  
14 **FITNESS FOR A PARTICULAR PURPOSE.**

15 **This document is maintained by the ENTSO-E CIM WG. Comments or remarks are to be**  
16 **provided at [cim@entsoe.eu](mailto:cim@entsoe.eu)**

17 **NOTE CONCERNING WORDING USED IN THIS DOCUMENT**

18 The force of the following words is modified by the requirement level of the document in which  
19 they are used.

- 20 • SHALL: This word, or the terms "REQUIRED" or "MUST", means that the definition is an  
21 absolute requirement of the specification.
- 22 • SHALL NOT: This phrase, or the phrase "MUST NOT", means that the definition is an  
23 absolute prohibition of the specification.
- 24 • SHOULD: This word, or the adjective "RECOMMENDED", means that there may exist valid  
25 reasons in particular circumstances to ignore a particular item, but the full implications must  
26 be understood and carefully weighed before choosing a different course.
- 27 • SHOULD NOT: This phrase, or the phrase "NOT RECOMMENDED", means that there may  
28 exist valid reasons in particular circumstances when the particular behaviour is acceptable  
29 or even useful, but the full implications should be understood and the case carefully weighed  
30 before implementing any behaviour described with this label.
- 31 • MAY: This word, or the adjective "OPTIONAL", means that an item is truly optional.

32

## Revision History

Version	Release	Date	Paragraph	Comments
0	1	2021-10-12		For CIM EG review. This profile replaces Available Remedial Action Profile. These new profiles include also information on SIPS, GLSK, limits, area and overlapping zone.
1	0	2022-02-16		SOC approved
2	1	2022-09-21		SOC approved
2	2	2023-05-10		ICTC approved.

34

## CONTENTS

35	Copyright notice:.....	2
36	Revision History.....	3
37	CONTENTS .....	4
38	1 Introduction .....	19
39	2 Application profile specification .....	19
40	2.1 Version information .....	19
41	2.2 Constraints naming convention .....	19
42	2.3 Profile constraints .....	20
43	2.4 Metadata.....	22
44	2.4.1 Constraints .....	22
45	2.4.2 Reference metadata .....	22
46	3 Detailed Profile Specification .....	23
47	3.1 General.....	23
48	3.2 (Description) ACDCConverter .....	30
49	3.3 (abstract) ACDCTerminal root class .....	31
50	3.4 (NC) ACTieCorridor .....	31
51	3.5 (NC) ActivePowerControlFunction .....	31
52	3.6 (NC) AmbientTemperatureDependencyCurve .....	32
53	3.7 (NC) AreaDispatchableUnit root class .....	33
54	3.8 (abstract,NC) AutomationFunction .....	33
55	3.9 (NC) BaseOverloadLimitCurve .....	34
56	3.10 (NC) BiddingZone .....	34
57	3.11 (NC) BiddingZoneBorder .....	35
58	3.12 (NC) CapacityCalculationRegion .....	35
59	3.13 (NC) ChargingUnit .....	36
60	3.14 (abstract,NC) Circuit .....	37
61	3.15 (NC) CircuitShare .....	37
62	3.16 (NC) ClosedDistributionSystemOperator .....	38
63	3.17 (NC) CompensatorController .....	38
64	3.18 (abstract) ConductingEquipment .....	38
65	3.19 (abstract) ConnectivityNodeContainer .....	39
66	3.20 (Description) ControlArea.....	39
67	3.21 (abstract,NC) ControlFunctionBlock .....	40
68	3.22 (NC) CurrentControlFunction .....	41
69	3.23 (NC) CurrentDroopControlFunction .....	41
70	3.24 (NC) CurrentDroopOverride root class .....	42
71	3.25 (abstract) Curve .....	43
72	3.26 CurveData root class .....	43
73	3.27 (Description) DCBreaker .....	44
74	3.28 (Description) DCBusbar .....	44
75	3.29 (Description) DCChopper .....	45
76	3.30 (abstract) DCConductingEquipment .....	45
77	3.31 (Description) DCConverterUnit.....	46

78	3.32	(NC) DCCurrentControlFunction.....	46
79	3.33	(Description) DCDisconnecter.....	47
80	3.34	(abstract) DCEquipmentContainer.....	48
81	3.35	(Description) DCGround.....	48
82	3.36	(abstract) DCLine root class.....	49
83	3.37	(Description) DCLineSegment.....	49
84	3.38	(NC) DCPole.....	49
85	3.39	(Description) DCSeriesDevice.....	50
86	3.40	(Description) DCShunt.....	50
87	3.41	(Description) DCSwitch.....	51
88	3.42	(NC) DCTieCorridor.....	51
89	3.43	(NC) DCVoltageControlFunction.....	52
90	3.44	(NC) DirectCurrentCircuit.....	53
91	3.45	(NC) DirectCurrentController.....	53
92	3.46	(NC) DirectCurrentSystemOperator.....	54
93	3.47	(NC) DistributionSystemOperator.....	54
94	3.48	(NC) DurationOverloadLimitCurve.....	55
95	3.49	(NC) EnergyAlignmentCoordinator.....	55
96	3.50	(NC) EnergyBlockComponent.....	56
97	3.51	(NC) EnergyBlockOrder.....	56
98	3.52	(abstract,NC) EnergyComponent.....	57
99	3.53	(abstract) EnergyConnection.....	57
100	3.54	(Description) EnergyConsumer.....	58
101	3.55	(NC) EnergyCoordinationRegion.....	59
102	3.56	(NC) EnergyGroup.....	59
103	3.57	(abstract,NC) EnergyTypeReference root class.....	60
104	3.58	(Description) Equipment.....	60
105	3.59	(abstract) EquipmentContainer.....	60
106	3.60	(abstract,NC) EquipmentController.....	61
107	3.61	(Description) EquivalentInjection root class.....	61
108	3.62	(NC) ExceptionalPowerTransferCorridor.....	61
109	3.63	(NC) FacilityPlantController.....	62
110	3.64	(abstract,NC) FACTSEquipment.....	62
111	3.65	Feeder.....	63
112	3.66	(NC) FlexibleEnergyUnit.....	64
113	3.67	(Description) FossilFuel root class.....	65
114	3.68	(NC) FuelStorage.....	65
115	3.69	(abstract,NC) FunctionBlock.....	65
116	3.70	(abstract,NC) FunctionInputVariable.....	66
117	3.71	(NC) FunctionOutputVariable.....	66
118	3.72	(NC) GateInputPin.....	67
119	3.73	(Description) GeneratingUnit.....	67
120	3.74	(NC) GeothermalGeneratingUnit.....	69
121	3.75	(Description) HydroPowerPlant root class.....	70
122	3.76	(Description) HydroPump.....	70
123	3.77	(abstract) IdentifiedObject root class.....	71

124	3.78	(NC) ImpedanceControlFunction .....	71
125	3.79	(NC) InfeedLimit.....	72
126	3.80	(NC) InfeedTerminal root class .....	72
127	3.81	(NC) InjectionController .....	73
128	3.82	(abstract,NC) LimitDependencyCurve .....	73
129	3.83	(Description) Line .....	74
130	3.84	(NC) LineCircuit .....	74
131	3.85	(NC) LoadFrequencyControlArea .....	74
132	3.86	(NC) LoadFrequencyControlBlock .....	75
133	3.87	(NC) LoadFrequencyControlOperator .....	76
134	3.88	(NC) LossCurve .....	76
135	3.89	(NC) ModularStaticSynchronousSeriesCompensator .....	77
136	3.90	NuclearGeneratingUnit.....	78
137	3.91	(abstract) OperationalLimit.....	79
138	3.92	(Description) OperationalLimitSet .....	79
139	3.93	OperationalLimitType .....	80
140	3.94	(NC) OrdinaryPowerTransferCorridor .....	80
141	3.95	Organisation .....	81
142	3.96	(abstract) OrganisationRole .....	81
143	3.97	(NC) OutageCoordinationRegion.....	82
144	3.98	(NC) OutageCoordinator .....	82
145	3.99	(NC) OutagePlanningAgent.....	83
146	3.100	(NC) OverlappingZone .....	83
147	3.101	(NC) PhaseControlFunction .....	83
148	3.102	(NC) PinTerminal .....	84
149	3.103	(NC) PowerElectricalChemicalUnit .....	85
150	3.104	(NC) PowerElectronicsMarineUnit .....	85
151	3.105	(Description) PowerElectronicsUnit .....	86
152	3.106	(NC) PowerFactorControlFunction .....	87
153	3.107	(NC) PowerPlantController .....	87
154	3.108	(abstract,NC) PowerSystemOrganisationRole .....	88
155	3.109	(abstract) PowerSystemResource .....	88
156	3.110	(abstract,NC) PowerTransferCorridor .....	89
157	3.111	(NC) PowerTransformerCircuit .....	89
158	3.112	(abstract,NC) PropertyReference root class .....	89
159	3.113	(NC) ProportionalEnergyComponent .....	89
160	3.114	(NC,Description) PTCTriggeredEquipment .....	90
161	3.115	ReactiveCapabilityCurve.....	91
162	3.116	(NC) ReactivePowerControlFunction .....	91
163	3.117	(NC) RecoveryOverloadLimitCurve .....	92
164	3.118	(abstract,NC) Region .....	92
165	3.119	(abstract) RegulatingCondEq .....	93
166	3.120	Reservoir .....	93
167	3.121	(NC) RotatingMachineController .....	94
168	3.122	(NC) ScheduleResource .....	94
169	3.123	(NC) SchedulingArea .....	95

170	3.124	(NC) SecurityCoordinator .....	96
171	3.125	(NC) SolarRadiationDependencyCurve .....	96
172	3.126	(NC) SSSCController .....	97
173	3.127	(NC) SSSCSimulationSettings root class.....	97
174	3.128	(NC) StaticSynchronousCompensator .....	98
175	3.129	(NC) StaticSynchronousSeriesCompensator .....	99
176	3.130	(NC) StaticVarCompensator .....	99
177	3.131	(NC) SubSchedulingArea .....	100
178	3.132	(Description) Substation.....	101
179	3.133	(NC) SubstationController .....	101
180	3.134	(NC) SynchronousArea .....	102
181	3.135	(abstract) SynchronousMachine root class .....	102
182	3.136	(abstract,NC) SystemOperationCoordinator .....	102
183	3.137	(abstract,NC) SystemOperator .....	103
184	3.138	(Description) TapChanger root class .....	103
185	3.139	(NC) TapChangerController .....	104
186	3.140	(NC) TCSCCompensationPoint root class .....	104
187	3.141	(NC) TCSCController .....	105
188	3.142	(abstract) Terminal.....	105
189	3.143	(NC) ThyristorControlledSeriesCompensator.....	105
190	3.144	(NC) TieCorridor .....	106
191	3.145	(Description) TieFlow .....	107
192	3.146	(NC) TransmissionSystemOperator .....	107
193	3.147	(NC) UnifiedPowerFlowController.....	108
194	3.148	(NC) VoltageAngleLimit.....	108
195	3.149	(NC) VoltageControlFunction .....	109
196	3.150	(NC) VoltageInjectionControlFunction .....	110
197	3.151	VsCapabilityCurve .....	110
198	3.152	(abstract) VsConverter root class .....	111
199	3.153	Currency enumeration.....	111
200	3.154	CurveStyle enumeration.....	115
201	3.155	(NC) GeothermalUnitKind enumeration .....	115
202	3.156	(NC) LogicalOperatorsKind enumeration .....	116
203	3.157	(NC) MarineUnitKind enumeration.....	116
204	3.158	(NC) NuclearReactorKind enumeration .....	116
205	3.159	OperationalLimitDirectionKind enumeration.....	117
206	3.160	(NC) PinTerminalKind enumeration .....	117
207	3.161	(NC) PowerElectricalChemicalUnitKind enumeration .....	118
208	3.162	(NC) RampingPrincipleKind enumeration .....	118
209	3.163	UnitMultiplier enumeration .....	119
210	3.164	UnitSymbol enumeration .....	119
211	3.165	CurrentFlow datatype.....	120
212	3.166	ActivePower datatype .....	121
213	3.167	ActivePowerChangeRate datatype .....	121
214	3.168	Resistance datatype .....	121
215	3.169	Pressure datatype.....	121

216	3.170	PU datatype .....	122
217	3.171	AngleDegrees datatype .....	122
218	3.172	Voltage datatype .....	122
219	3.173	Temperature datatype .....	122
220	3.174	Frequency datatype .....	122
221	3.175	Impedance datatype .....	123
222	3.176	Money datatype .....	123
223	3.177	PerCent datatype .....	123
224	3.178	Reactance datatype .....	123
225	3.179	Seconds datatype .....	124
226	3.180	VoltagePerReactivePower datatype .....	124
227	3.181	Boolean primitive .....	124
228	3.182	Decimal primitive .....	124
229	3.183	Duration primitive .....	124
230	3.184	Float primitive .....	124
231	3.185	Integer primitive .....	124
232	3.186	String primitive .....	124
233		Annex A (informative): Sample data .....	125
234	A.1	General .....	125
235	A.2	Sample instance data .....	125
236			
237		<b>List of figures</b>	
238		Figure 1 – Class diagram EquipmentReliabilityProfile::Core .....	23
239		Figure 2 – Class diagram EquipmentReliabilityProfile::DirectCurrent .....	24
240		Figure 3 – Class diagram EquipmentReliabilityProfile::EnergyArea .....	25
241		Figure 4 – Class diagram EquipmentReliabilityProfile::ControllersAndFACTS .....	26
242		Figure 5 – Class diagram EquipmentReliabilityProfile::GLSK .....	27
243		Figure 6 – Class diagram EquipmentReliabilityProfile::PowerSystemOrganizationRole .....	28
244		Figure 7 – Class diagram EquipmentReliabilityProfile::PowerTransferCorridor .....	28
245		Figure 8 – Class diagram EquipmentReliabilityProfile::Production .....	29
246		Figure 9 – Class diagram EquipmentReliabilityProfile::ReactiveCapabilityCurve .....	29
247		Figure 10 – Class diagram EquipmentReliabilityProfile::ReliabilityLimits .....	30
248			
249		<b>List of tables</b>	
250		Table 1 – Attributes of EquipmentReliabilityProfile::ACDCCConverter .....	30
251		Table 2 – Association ends of EquipmentReliabilityProfile::ACDCCConverter with other	
252		classes .....	31
253		Table 3 – Attributes of EquipmentReliabilityProfile::ACTieCorridor .....	31
254		Table 4 – Association ends of EquipmentReliabilityProfile::ACTieCorridor with other	
255		classes .....	31
256		Table 5 – Attributes of EquipmentReliabilityProfile::ActivePowerControlFunction .....	32



257	Table 6 – Association ends of EquipmentReliabilityProfile::ActivePowerControlFunction	
258	with other classes .....	32
259	Table 7 – Attributes of	
260	EquipmentReliabilityProfile::AmbientTemperatureDependencyCurve .....	32
261	Table 8 – Attributes of EquipmentReliabilityProfile::AreaDispatchableUnit .....	33
262	Table 9 – Association ends of EquipmentReliabilityProfile::AreaDispatchableUnit with	
263	other classes .....	33
264	Table 10 – Attributes of EquipmentReliabilityProfile::AutomationFunction .....	33
265	Table 11 – Association ends of EquipmentReliabilityProfile::AutomationFunction with	
266	other classes .....	34
267	Table 12 – Attributes of EquipmentReliabilityProfile::BaseOverloadLimitCurve .....	34
268	Table 13 – Attributes of EquipmentReliabilityProfile::BiddingZone.....	34
269	Table 14 – Association ends of EquipmentReliabilityProfile::BiddingZone with other	
270	classes .....	35
271	Table 15 – Attributes of EquipmentReliabilityProfile::BiddingZoneBorder .....	35
272	Table 16 – Association ends of EquipmentReliabilityProfile::BiddingZoneBorder with	
273	other classes .....	35
274	Table 17 – Attributes of EquipmentReliabilityProfile::CapacityCalculationRegion .....	36
275	Table 18 – Association ends of EquipmentReliabilityProfile::CapacityCalculationRegion	
276	with other classes .....	36
277	Table 19 – Attributes of EquipmentReliabilityProfile::ChargingUnit.....	36
278	Table 20 – Association ends of EquipmentReliabilityProfile::ChargingUnit with other	
279	classes .....	36
280	Table 21 – Attributes of EquipmentReliabilityProfile::Circuit .....	37
281	Table 22 – Attributes of EquipmentReliabilityProfile::CircuitShare .....	37
282	Table 23 – Association ends of EquipmentReliabilityProfile::CircuitShare with other	
283	classes .....	37
284	Table 24 – Attributes of EquipmentReliabilityProfile::ClosedDistributionSystemOperator .....	38
285	Table 25 – Association ends of	
286	EquipmentReliabilityProfile::ClosedDistributionSystemOperator with other classes .....	38
287	Table 26 – Attributes of EquipmentReliabilityProfile::CompensatorController .....	38
288	Table 27 – Association ends of EquipmentReliabilityProfile::CompensatorController	
289	with other classes .....	38
290	Table 28 – Attributes of EquipmentReliabilityProfile::ConductingEquipment .....	39
291	Table 29 – Association ends of EquipmentReliabilityProfile::ConductingEquipment with	
292	other classes .....	39
293	Table 30 – Attributes of EquipmentReliabilityProfile::ConnectivityNodeContainer .....	39
294	Table 31 – Attributes of EquipmentReliabilityProfile::ControlArea .....	40
295	Table 32 – Association ends of EquipmentReliabilityProfile::ControlArea with other	
296	classes .....	40
297	Table 33 – Attributes of EquipmentReliabilityProfile::ControlFunctionBlock .....	40
298	Table 34 – Association ends of EquipmentReliabilityProfile::ControlFunctionBlock with	
299	other classes .....	41
300	Table 35 – Attributes of EquipmentReliabilityProfile::CurrentControlFunction .....	41

301	Table 36 – Association ends of EquipmentReliabilityProfile::CurrentControlFunction	
302	with other classes .....	41
303	Table 37 – Attributes of EquipmentReliabilityProfile::CurrentDroopControlFunction .....	42
304	Table 38 – Association ends of	
305	EquipmentReliabilityProfile::CurrentDroopControlFunction with other classes .....	42
306	Table 39 – Attributes of EquipmentReliabilityProfile::CurrentDroopOverride .....	42
307	Table 40 – Association ends of EquipmentReliabilityProfile::CurrentDroopOverride with	
308	other classes .....	43
309	Table 41 – Attributes of EquipmentReliabilityProfile::Curve .....	43
310	Table 42 – Attributes of EquipmentReliabilityProfile::CurveData .....	43
311	Table 43 – Association ends of EquipmentReliabilityProfile::CurveData with other	
312	classes .....	44
313	Table 44 – Attributes of EquipmentReliabilityProfile::DCBreaker .....	44
314	Table 45 – Association ends of EquipmentReliabilityProfile::DCBreaker with other	
315	classes .....	44
316	Table 46 – Attributes of EquipmentReliabilityProfile::DCBusbar .....	44
317	Table 47 – Association ends of EquipmentReliabilityProfile::DCBusbar with other	
318	classes .....	45
319	Table 48 – Attributes of EquipmentReliabilityProfile::DCChopper .....	45
320	Table 49 – Association ends of EquipmentReliabilityProfile::DCChopper with other	
321	classes .....	45
322	Table 50 – Attributes of EquipmentReliabilityProfile::DCConductingEquipment .....	45
323	Table 51 – Association ends of EquipmentReliabilityProfile::DCConductingEquipment	
324	with other classes .....	46
325	Table 52 – Attributes of EquipmentReliabilityProfile::DCConverterUnit .....	46
326	Table 53 – Association ends of EquipmentReliabilityProfile::DCConverterUnit with	
327	other classes .....	46
328	Table 54 – Attributes of EquipmentReliabilityProfile::DCCurrentControlFunction .....	47
329	Table 55 – Association ends of EquipmentReliabilityProfile::DCCurrentControlFunction	
330	with other classes .....	47
331	Table 56 – Attributes of EquipmentReliabilityProfile::DCDisconnecter .....	47
332	Table 57 – Association ends of EquipmentReliabilityProfile::DCDisconnecter with other	
333	classes .....	48
334	Table 58 – Attributes of EquipmentReliabilityProfile::DCEquipmentContainer .....	48
335	Table 59 – Attributes of EquipmentReliabilityProfile::DCGround .....	48
336	Table 60 – Association ends of EquipmentReliabilityProfile::DCGround with other	
337	classes .....	48
338	Table 61 – Attributes of EquipmentReliabilityProfile::DCLineSegment .....	49
339	Table 62 – Association ends of EquipmentReliabilityProfile::DCLineSegment with other	
340	classes .....	49
341	Table 63 – Attributes of EquipmentReliabilityProfile::DCPole .....	49
342	Table 64 – Association ends of EquipmentReliabilityProfile::DCPole with other classes .....	50
343	Table 65 – Attributes of EquipmentReliabilityProfile::DCSeriesDevice .....	50

344	Table 66 – Association ends of EquipmentReliabilityProfile::DCSeriesDevice with other	
345	classes .....	50
346	Table 67 – Attributes of EquipmentReliabilityProfile::DCShunt .....	50
347	Table 68 – Association ends of EquipmentReliabilityProfile::DCShunt with other	
348	classes .....	51
349	Table 69 – Attributes of EquipmentReliabilityProfile::DCSwitch .....	51
350	Table 70 – Association ends of EquipmentReliabilityProfile::DCSwitch with other	
351	classes .....	51
352	Table 71 – Attributes of EquipmentReliabilityProfile::DCTieCorridor .....	51
353	Table 72 – Association ends of EquipmentReliabilityProfile::DCTieCorridor with other	
354	classes .....	52
355	Table 73 – Attributes of EquipmentReliabilityProfile::DCVoltageControlFunction .....	52
356	Table 74 – Association ends of EquipmentReliabilityProfile::DCVoltageControlFunction	
357	with other classes .....	53
358	Table 75 – Attributes of EquipmentReliabilityProfile::DirectCurrentCircuit .....	53
359	Table 76 – Attributes of EquipmentReliabilityProfile::DirectCurrentController .....	53
360	Table 77 – Association ends of EquipmentReliabilityProfile::DirectCurrentController	
361	with other classes .....	53
362	Table 78 – Attributes of EquipmentReliabilityProfile::DirectCurrentSystemOperator .....	54
363	Table 79 – Association ends of	
364	EquipmentReliabilityProfile::DirectCurrentSystemOperator with other classes .....	54
365	Table 80 – Attributes of EquipmentReliabilityProfile::DistributionSystemOperator .....	54
366	Table 81 – Association ends of	
367	EquipmentReliabilityProfile::DistributionSystemOperator with other classes .....	54
368	Table 82 – Attributes of EquipmentReliabilityProfile::DurationOverloadLimitCurve .....	55
369	Table 83 – Attributes of EquipmentReliabilityProfile::EnergyAlignmentCoordinator .....	55
370	Table 84 – Association ends of	
371	EquipmentReliabilityProfile::EnergyAlignmentCoordinator with other classes .....	55
372	Table 85 – Attributes of EquipmentReliabilityProfile::EnergyBlockComponent .....	56
373	Table 86 – Association ends of EquipmentReliabilityProfile::EnergyBlockComponent	
374	with other classes .....	56
375	Table 87 – Attributes of EquipmentReliabilityProfile::EnergyBlockOrder .....	56
376	Table 88 – Association ends of EquipmentReliabilityProfile::EnergyBlockOrder with	
377	other classes .....	57
378	Table 89 – Attributes of EquipmentReliabilityProfile::EnergyComponent .....	57
379	Table 90 – Association ends of EquipmentReliabilityProfile::EnergyComponent with	
380	other classes .....	57
381	Table 91 – Attributes of EquipmentReliabilityProfile::EnergyConnection .....	57
382	Table 92 – Association ends of EquipmentReliabilityProfile::EnergyConnection with	
383	other classes .....	58
384	Table 93 – Attributes of EquipmentReliabilityProfile::EnergyConsumer .....	58
385	Table 94 – Association ends of EquipmentReliabilityProfile::EnergyConsumer with	
386	other classes .....	58
387	Table 95 – Attributes of EquipmentReliabilityProfile::EnergyCoordinationRegion .....	59

388	Table 96 – Association ends of EquipmentReliabilityProfile::EnergyCoordinationRegion	
389	with other classes .....	59
390	Table 97 – Attributes of EquipmentReliabilityProfile::EnergyGroup .....	59
391	Table 98 – Association ends of EquipmentReliabilityProfile::EnergyGroup with other	
392	classes .....	60
393	Table 99 – Attributes of EquipmentReliabilityProfile::Equipment .....	60
394	Table 100 – Association ends of EquipmentReliabilityProfile::Equipment with other	
395	classes .....	60
396	Table 101 – Attributes of EquipmentReliabilityProfile::EquipmentContainer .....	60
397	Table 102 – Attributes of EquipmentReliabilityProfile::EquipmentController .....	61
398	Table 103 – Association ends of EquipmentReliabilityProfile::EquipmentController with	
399	other classes .....	61
400	Table 104 – Association ends of EquipmentReliabilityProfile::EquivalentInjection with	
401	other classes .....	61
402	Table 105 – Attributes of	
403	EquipmentReliabilityProfile::ExceptionalPowerTransferCorridor .....	61
404	Table 106 – Attributes of EquipmentReliabilityProfile::FacilityPlantController .....	62
405	Table 107 – Association ends of EquipmentReliabilityProfile::FacilityPlantController	
406	with other classes .....	62
407	Table 108 – Attributes of EquipmentReliabilityProfile::FACTSEquipment .....	62
408	Table 109 – Association ends of EquipmentReliabilityProfile::FACTSEquipment with	
409	other classes .....	63
410	Table 110 – Attributes of EquipmentReliabilityProfile::Feeder .....	63
411	Table 111 – Association ends of EquipmentReliabilityProfile::Feeder with other classes .....	63
412	Table 112 – Attributes of EquipmentReliabilityProfile::FlexibleEnergyUnit .....	64
413	Table 113 – Association ends of EquipmentReliabilityProfile::FlexibleEnergyUnit with	
414	other classes .....	64
415	Table 114 – Association ends of EquipmentReliabilityProfile::FossilFuel with other	
416	classes .....	65
417	Table 115 – Attributes of EquipmentReliabilityProfile::FuelStorage .....	65
418	Table 116 – Attributes of EquipmentReliabilityProfile::FunctionBlock .....	65
419	Table 117 – Association ends of EquipmentReliabilityProfile::FunctionBlock with other	
420	classes .....	66
421	Table 118 – Attributes of EquipmentReliabilityProfile::FunctionInputVariable .....	66
422	Table 119 – Association ends of EquipmentReliabilityProfile::FunctionInputVariable	
423	with other classes .....	66
424	Table 120 – Attributes of EquipmentReliabilityProfile::FunctionOutputVariable .....	66
425	Table 121 – Association ends of EquipmentReliabilityProfile::FunctionOutputVariable	
426	with other classes .....	67
427	Table 122 – Attributes of EquipmentReliabilityProfile::GateInputPin .....	67
428	Table 123 – Association ends of EquipmentReliabilityProfile::GateInputPin with other	
429	classes .....	67
430	Table 124 – Attributes of EquipmentReliabilityProfile::GeneratingUnit .....	68
431	Table 125 – Association ends of EquipmentReliabilityProfile::GeneratingUnit with other	
432	classes .....	69

433	Table 126 – Attributes of EquipmentReliabilityProfile::GeothermalGeneratingUnit .....	69
434	Table 127 – Association ends of	
435	EquipmentReliabilityProfile::GeothermalGeneratingUnit with other classes .....	69
436	Table 128 – Association ends of EquipmentReliabilityProfile::HydroPowerPlant with	
437	other classes .....	70
438	Table 129 – Attributes of EquipmentReliabilityProfile::HydroPump .....	70
439	Table 130 – Association ends of EquipmentReliabilityProfile::HydroPump with other	
440	classes .....	70
441	Table 131 – Attributes of EquipmentReliabilityProfile::IdentifiedObject .....	71
442	Table 132 – Attributes of EquipmentReliabilityProfile::ImpedanceControlFunction .....	71
443	Table 133 – Association ends of	
444	EquipmentReliabilityProfile::ImpedanceControlFunction with other classes .....	72
445	Table 134 – Attributes of EquipmentReliabilityProfile::InfeedLimit .....	72
446	Table 135 – Association ends of EquipmentReliabilityProfile::InfeedLimit with other	
447	classes .....	72
448	Table 136 – Attributes of EquipmentReliabilityProfile::InfeedTerminal .....	72
449	Table 137 – Association ends of EquipmentReliabilityProfile::InfeedTerminal with other	
450	classes .....	73
451	Table 138 – Attributes of EquipmentReliabilityProfile::InjectionController .....	73
452	Table 139 – Association ends of EquipmentReliabilityProfile::InjectionController with	
453	other classes .....	73
454	Table 140 – Attributes of EquipmentReliabilityProfile::LimitDependencyCurve .....	73
455	Table 141 – Attributes of EquipmentReliabilityProfile::Line .....	74
456	Table 142 – Association ends of EquipmentReliabilityProfile::Line with other classes .....	74
457	Table 143 – Attributes of EquipmentReliabilityProfile::LineCircuit .....	74
458	Table 144 – Attributes of EquipmentReliabilityProfile::LoadFrequencyControlArea .....	75
459	Table 145 – Association ends of	
460	EquipmentReliabilityProfile::LoadFrequencyControlArea with other classes .....	75
461	Table 146 – Attributes of EquipmentReliabilityProfile::LoadFrequencyControlBlock .....	75
462	Table 147 – Association ends of	
463	EquipmentReliabilityProfile::LoadFrequencyControlBlock with other classes .....	76
464	Table 148 – Attributes of EquipmentReliabilityProfile::LoadFrequencyControlOperator .....	76
465	Table 149 – Association ends of	
466	EquipmentReliabilityProfile::LoadFrequencyControlOperator with other classes .....	76
467	Table 150 – Attributes of EquipmentReliabilityProfile::LossCurve .....	76
468	Table 151 – Association ends of EquipmentReliabilityProfile::LossCurve with other	
469	classes .....	77
470	Table 152 – Attributes of	
471	EquipmentReliabilityProfile::ModularStaticSynchronousSeriesCompensator .....	77
472	Table 153 – Association ends of	
473	EquipmentReliabilityProfile::ModularStaticSynchronousSeriesCompensator with other	
474	classes .....	78
475	Table 154 – Attributes of EquipmentReliabilityProfile::NuclearGeneratingUnit .....	78
476	Table 155 – Association ends of EquipmentReliabilityProfile::NuclearGeneratingUnit	
477	with other classes .....	78

478	Table 156 – Attributes of EquipmentReliabilityProfile::OperationalLimit.....	79
479	Table 157 – Association ends of EquipmentReliabilityProfile::OperationalLimit with	
480	other classes .....	79
481	Table 158 – Attributes of EquipmentReliabilityProfile::OperationalLimitSet .....	79
482	Table 159 – Association ends of EquipmentReliabilityProfile::OperationalLimitSet with	
483	other classes .....	80
484	Table 160 – Attributes of EquipmentReliabilityProfile::OperationalLimitType .....	80
485	Table 161 – Association ends of EquipmentReliabilityProfile::OperationalLimitType	
486	with other classes .....	80
487	Table 162 – Attributes of EquipmentReliabilityProfile::OrdinaryPowerTransferCorridor .....	81
488	Table 163 – Attributes of EquipmentReliabilityProfile::Organisation .....	81
489	Table 164 – Attributes of EquipmentReliabilityProfile::OrganisationRole .....	81
490	Table 165 – Association ends of EquipmentReliabilityProfile::OrganisationRole with	
491	other classes .....	82
492	Table 166 – Attributes of EquipmentReliabilityProfile::OutageCoordinationRegion .....	82
493	Table 167 – Association ends of	
494	EquipmentReliabilityProfile::OutageCoordinationRegion with other classes .....	82
495	Table 168 – Attributes of EquipmentReliabilityProfile::OutageCoordinator.....	82
496	Table 169 – Association ends of EquipmentReliabilityProfile::OutageCoordinator with	
497	other classes .....	83
498	Table 170 – Attributes of EquipmentReliabilityProfile::OutagePlanningAgent .....	83
499	Table 171 – Association ends of EquipmentReliabilityProfile::OutagePlanningAgent	
500	with other classes .....	83
501	Table 172 – Attributes of EquipmentReliabilityProfile::OverlappingZone .....	83
502	Table 173 – Attributes of EquipmentReliabilityProfile::PhaseControlFunction .....	84
503	Table 174 – Association ends of EquipmentReliabilityProfile::PhaseControlFunction	
504	with other classes .....	84
505	Table 175 – Attributes of EquipmentReliabilityProfile::PinTerminal .....	84
506	Table 176 – Association ends of EquipmentReliabilityProfile::PinTerminal with other	
507	classes .....	85
508	Table 177 – Attributes of EquipmentReliabilityProfile::PowerElectricalChemicalUnit .....	85
509	Table 178 – Association ends of	
510	EquipmentReliabilityProfile::PowerElectricalChemicalUnit with other classes .....	85
511	Table 179 – Attributes of EquipmentReliabilityProfile::PowerElectronicsMarineUnit .....	86
512	Table 180 – Association ends of	
513	EquipmentReliabilityProfile::PowerElectronicsMarineUnit with other classes .....	86
514	Table 181 – Attributes of EquipmentReliabilityProfile::PowerElectronicsUnit .....	86
515	Table 182 – Association ends of EquipmentReliabilityProfile::PowerElectronicsUnit	
516	with other classes .....	87
517	Table 183 – Attributes of EquipmentReliabilityProfile::PowerFactorControlFunction .....	87
518	Table 184 – Association ends of	
519	EquipmentReliabilityProfile::PowerFactorControlFunction with other classes .....	87
520	Table 185 – Attributes of EquipmentReliabilityProfile::PowerPlantController .....	88



521	Table 186 – Association ends of EquipmentReliabilityProfile::PowerPlantController with	
522	other classes .....	88
523	Table 187 – Attributes of EquipmentReliabilityProfile::PowerSystemOrganisationRole .....	88
524	Table 188 – Association ends of	
525	EquipmentReliabilityProfile::PowerSystemOrganisationRole with other classes .....	88
526	Table 189 – Attributes of EquipmentReliabilityProfile::PowerSystemResource .....	89
527	Table 190 – Attributes of EquipmentReliabilityProfile::PowerTransferCorridor .....	89
528	Table 191 – Attributes of EquipmentReliabilityProfile::PowerTransformerCircuit .....	89
529	Table 192 – Attributes of EquipmentReliabilityProfile::ProportionalEnergyComponent.....	90
530	Table 193 – Association ends of	
531	EquipmentReliabilityProfile::ProportionalEnergyComponent with other classes .....	90
532	Table 194 – Attributes of EquipmentReliabilityProfile::PTCTriggeredEquipment .....	90
533	Table 195 – Association ends of EquipmentReliabilityProfile::PTCTriggeredEquipment	
534	with other classes .....	90
535	Table 196 – Attributes of EquipmentReliabilityProfile::ReactiveCapabilityCurve .....	91
536	Table 197 – Association ends of EquipmentReliabilityProfile::ReactiveCapabilityCurve	
537	with other classes .....	91
538	Table 198 – Attributes of EquipmentReliabilityProfile::ReactivePowerControlFunction .....	92
539	Table 199 – Association ends of	
540	EquipmentReliabilityProfile::ReactivePowerControlFunction with other classes .....	92
541	Table 200 – Attributes of EquipmentReliabilityProfile::RecoveryOverloadLimitCurve .....	92
542	Table 201 – Attributes of EquipmentReliabilityProfile::Region .....	93
543	Table 202 – Association ends of EquipmentReliabilityProfile::Region with other classes .....	93
544	Table 203 – Attributes of EquipmentReliabilityProfile::RegulatingCondEq .....	93
545	Table 204 – Association ends of EquipmentReliabilityProfile::RegulatingCondEq with	
546	other classes .....	93
547	Table 205 – Attributes of EquipmentReliabilityProfile::Reservoir .....	94
548	Table 206 – Attributes of EquipmentReliabilityProfile::RotatingMachineController .....	94
549	Table 207 – Association ends of	
550	EquipmentReliabilityProfile::RotatingMachineController with other classes .....	94
551	Table 208 – Attributes of EquipmentReliabilityProfile::ScheduleResource .....	94
552	Table 209 – Association ends of EquipmentReliabilityProfile::ScheduleResource with	
553	other classes .....	95
554	Table 210 – Attributes of EquipmentReliabilityProfile::SchedulingArea.....	95
555	Table 211 – Association ends of EquipmentReliabilityProfile::SchedulingArea with	
556	other classes .....	95
557	Table 212 – Attributes of EquipmentReliabilityProfile::SecurityCoordinator .....	96
558	Table 213 – Association ends of EquipmentReliabilityProfile::SecurityCoordinator with	
559	other classes .....	96
560	Table 214 – Attributes of EquipmentReliabilityProfile::SolarRadiationDependencyCurve .....	96
561	Table 215 – Attributes of EquipmentReliabilityProfile::SSSCController.....	97
562	Table 216 – Association ends of EquipmentReliabilityProfile::SSSCController with	
563	other classes .....	97
564	Table 217 – Attributes of EquipmentReliabilityProfile::SSSCSimulationSettings .....	97

565	Table 218 – Attributes of EquipmentReliabilityProfile::StaticSynchronousCompensator .....	98
566	Table 219 – Association ends of	
567	EquipmentReliabilityProfile::StaticSynchronousCompensator with other classes .....	99
568	Table 220 – Attributes of	
569	EquipmentReliabilityProfile::StaticSynchronousSeriesCompensator .....	99
570	Table 221 – Association ends of	
571	EquipmentReliabilityProfile::StaticSynchronousSeriesCompensator with other classes .....	99
572	Table 222 – Attributes of EquipmentReliabilityProfile::StaticVarCompensator .....	100
573	Table 223 – Association ends of EquipmentReliabilityProfile::StaticVarCompensator	
574	with other classes .....	100
575	Table 224 – Attributes of EquipmentReliabilityProfile::SubSchedulingArea .....	100
576	Table 225 – Association ends of EquipmentReliabilityProfile::SubSchedulingArea with	
577	other classes .....	101
578	Table 226 – Attributes of EquipmentReliabilityProfile::Substation .....	101
579	Table 227 – Association ends of EquipmentReliabilityProfile::Substation with other	
580	classes .....	101
581	Table 228 – Attributes of EquipmentReliabilityProfile::SubstationController .....	102
582	Table 229 – Association ends of EquipmentReliabilityProfile::SubstationController with	
583	other classes .....	102
584	Table 230 – Attributes of EquipmentReliabilityProfile::SynchronousArea .....	102
585	Table 231 – Attributes of EquipmentReliabilityProfile::SystemOperationCoordinator .....	102
586	Table 232 – Association ends of	
587	EquipmentReliabilityProfile::SystemOperationCoordinator with other classes .....	103
588	Table 233 – Attributes of EquipmentReliabilityProfile::SystemOperator .....	103
589	Table 234 – Association ends of EquipmentReliabilityProfile::SystemOperator with	
590	other classes .....	103
591	Table 235 – Association ends of EquipmentReliabilityProfile::TapChanger with other	
592	classes .....	103
593	Table 236 – Attributes of EquipmentReliabilityProfile::TapChangerController .....	104
594	Table 237 – Association ends of EquipmentReliabilityProfile::TapChangerController	
595	with other classes .....	104
596	Table 238 – Attributes of EquipmentReliabilityProfile::TCSCCompensationPoint .....	104
597	Table 239 – Association ends of EquipmentReliabilityProfile::TCSCCompensationPoint	
598	with other classes .....	105
599	Table 240 – Attributes of EquipmentReliabilityProfile::TCSCController .....	105
600	Table 241 – Association ends of EquipmentReliabilityProfile::TCSCController with	
601	other classes .....	105
602	Table 242 – Attributes of	
603	EquipmentReliabilityProfile::ThyristorControlledSeriesCompensator .....	106
604	Table 243 – Association ends of	
605	EquipmentReliabilityProfile::ThyristorControlledSeriesCompensator with other classes .....	106
606	Table 244 – Attributes of EquipmentReliabilityProfile::TieCorridor .....	106
607	Table 245 – Association ends of EquipmentReliabilityProfile::TieCorridor with other	
608	classes .....	107
609	Table 246 – Attributes of EquipmentReliabilityProfile::TieFlow .....	107



610	Table 247 – Association ends of EquipmentReliabilityProfile::TieFlow with other	
611	classes .....	107
612	Table 248 – Attributes of EquipmentReliabilityProfile::TransmissionSystemOperator .....	107
613	Table 249 – Association ends of	
614	EquipmentReliabilityProfile::TransmissionSystemOperator with other classes .....	108
615	Table 250 – Attributes of EquipmentReliabilityProfile::UnifiedPowerFlowController .....	108
616	Table 251 – Association ends of	
617	EquipmentReliabilityProfile::UnifiedPowerFlowController with other classes .....	108
618	Table 252 – Attributes of EquipmentReliabilityProfile::VoltageAngleLimit .....	109
619	Table 253 – Association ends of EquipmentReliabilityProfile::VoltageAngleLimit with	
620	other classes .....	109
621	Table 254 – Attributes of EquipmentReliabilityProfile::VoltageControlFunction .....	109
622	Table 255 – Association ends of EquipmentReliabilityProfile::VoltageControlFunction	
623	with other classes .....	110
624	Table 256 – Attributes of EquipmentReliabilityProfile::VoltageInjectionControlFunction .....	110
625	Table 257 – Association ends of	
626	EquipmentReliabilityProfile::VoltageInjectionControlFunction with other classes .....	110
627	Table 258 – Attributes of EquipmentReliabilityProfile::VsCapabilityCurve .....	110
628	Table 259 – Association ends of EquipmentReliabilityProfile::VsCapabilityCurve with	
629	other classes .....	111
630	Table 260 – Literals of EquipmentReliabilityProfile::Currency .....	111
631	Table 261 – Literals of EquipmentReliabilityProfile::CurveStyle .....	115
632	Table 262 – Literals of EquipmentReliabilityProfile::GeothermalUnitKind .....	116
633	Table 263 – Literals of EquipmentReliabilityProfile::LogicalOperatorsKind .....	116
634	Table 264 – Literals of EquipmentReliabilityProfile::MarineUnitKind .....	116
635	Table 265 – Literals of EquipmentReliabilityProfile::NuclearReactorKind .....	117
636	Table 266 – Literals of EquipmentReliabilityProfile::OperationalLimitDirectionKind .....	117
637	Table 267 – Literals of EquipmentReliabilityProfile::PinTerminalKind .....	117
638	Table 268 – Literals of EquipmentReliabilityProfile::PowerElectricalChemicalUnitKind .....	118
639	Table 269 – Literals of EquipmentReliabilityProfile::RampingPrincipleKind .....	118
640	Table 270 – Literals of EquipmentReliabilityProfile::UnitMultiplier .....	119
641	Table 271 – Literals of EquipmentReliabilityProfile::UnitSymbol .....	120
642	Table 272 – Attributes of EquipmentReliabilityProfile::CurrentFlow .....	120
643	Table 273 – Attributes of EquipmentReliabilityProfile::ActivePower .....	121
644	Table 274 – Attributes of EquipmentReliabilityProfile::ActivePowerChangeRate .....	121
645	Table 275 – Attributes of EquipmentReliabilityProfile::Resistance .....	121
646	Table 276 – Attributes of EquipmentReliabilityProfile::Pressure .....	121
647	Table 277 – Attributes of EquipmentReliabilityProfile::PU .....	122
648	Table 278 – Attributes of EquipmentReliabilityProfile::AngleDegrees .....	122
649	Table 279 – Attributes of EquipmentReliabilityProfile::Voltage .....	122
650	Table 280 – Attributes of EquipmentReliabilityProfile::Temperature .....	122
651	Table 281 – Attributes of EquipmentReliabilityProfile::Frequency .....	123

652	Table 282 – Attributes of EquipmentReliabilityProfile::Impedance .....	123
653	Table 283 – Attributes of EquipmentReliabilityProfile::Money .....	123
654	Table 284 – Attributes of EquipmentReliabilityProfile::PerCent .....	123
655	Table 285 – Attributes of EquipmentReliabilityProfile::Reactance.....	123
656	Table 286 – Attributes of EquipmentReliabilityProfile::Seconds .....	124
657	Table 287 – Attributes of EquipmentReliabilityProfile::VoltagePerReactivePower .....	124
658		

## 659 1 Introduction

660 The equipment reliability profile enables exchanges of additional information related to  
661 equipment as well as FACTS, limits, area and GLSK amongst others.

## 662 2 Application profile specification

### 663 2.1 Version information

664 The content is generated from UML model file CIM100\_CGMES31v01\_501-  
665 20v02\_NC22v95\_MM10v01.eap.

666 This edition is based on the IEC 61970 UML version 'IEC61970CIM17v40', dated '2020-08-24'.

- 667 - Title: Equipment Reliability Vocabulary
- 668 - Keyword: ER
- 669 - Description: This vocabulary is describing the equipment reliability profile.
- 670 - Version IRI: <http://entsoe.eu/ns/CIM/EquipmentReliability-EU/2.2>
- 671 - Version info: 2.2.0
- 672 - Prior version: <http://entsoe.eu/ns/CIM/EquipmentReliability-EU/2.1>
- 673 - Conforms to: <urn:iso:std:iec:61970-600-2:ed-1>|<urn:iso:std:iec:61970-301:ed-7:amd1>|[file:///iec61970cim17v40\\_iec61968cim13v13a\\_iec62325cim03v17a.eap](file:///iec61970cim17v40_iec61968cim13v13a_iec62325cim03v17a.eap)|<urn:iso:std:iec:61970-401:draft:ed-1>|<urn:iso:std:iec:61970-501:draft:ed-2>|[file:///CGMES-30v25\\_501-20v01.eap](file:///CGMES-30v25_501-20v01.eap)
- 677 - Identifier: <urn:uuid:5f727c5c-b49f-47be-b750-a00fefb7e806>

678

### 679 2.2 Constraints naming convention

680 The naming of the rules shall not be used for machine processing. The rule names are just a  
681 string. The naming convention of the constraints is as follows.

682 "{rule.Type}:{rule.Standard}:{rule.Profile}:{rule.Property}:{rule.Name}"

683 where

684 rule.Type: C – for constraint; R – for requirement

685 rule.Standard: the number of the standard e.g. 301 for 61970-301, 456 for 61970-456, 13 for  
686 61968-13. 61970-600 specific constraints refer to 600 although they are related to one or  
687 combination of the 61970-450 series profiles. For NC profiles, NC is used.

688 rule.Profile: the abbreviation of the profile, e.g. TP for Topology profile. If set to "ALL" the  
689 constraint is applicable to all IEC 61970-600 profiles.

690 rule.Property: for UML classes, the name of the class, for attributes and associations, the name  
691 of the class and attribute or association end, e.g. EnergyConsumer, IdentifiedObject.name, etc.  
692 If set to "NA" the property is not applicable to a specific UML element.

693 rule.Name: the name of the rule. It is unique for the same property.

694 Example: C:600:ALL:IdentifiedObject.name:stringLength

## 695 2.3 Profile constraints

696 This clause defines requirements and constraints that shall be fulfilled by applications that  
697 conform to this document.

698 This document is the master for rules and constraints tagged "NC". For the sake of self-  
699 containment, the list below also includes a copy of the relevant rules from IEC 61970-452,  
700 tagged "452".

- 701 • C:452:ALL:NA:datatypes

702 According to 61970-501, datatypes are not exchanged in the instance data. The  
703 UnitMultiplier is 1 in cases none value is specified in the profile.

- 704 • R:452:ALL:NA:exchange

705 Optional and required attributes and associations must be imported and exported if they  
706 are in the model file prior to import.

- 707 • R:452:ALL:NA:exchange1

708 If an optional attribute does not exist in the imported file, it does not have to be exported  
709 in case exactly the same data set is exported, i.e. the tool is not obliged to automatically  
710 provide this attribute. If the export is resulting from an action by the user performed after  
711 the import, e.g. data processing or model update the export can contain optional  
712 attributes.

- 713 • R:452:ALL:NA:exchange2

714 In most of the profiles the selection of optional and required attributes is made so as to  
715 ensure a minimum set of required attributes without which the exchange does not fulfil  
716 its basic purpose. Business processes governing different exchanges can require  
717 mandatory exchange of certain optional attributes or associations. Optional and required  
718 attributes and associations shall therefore be supported by applications which claim  
719 conformance with certain functionalities of the IEC 61970-452. This provides flexibility  
720 for the business processes to adapt to different business requirements and base the  
721 exchanges on IEC 61970-452 compliant applications.

- 722 • R:452:ALL:NA:exchange3

723 An exporter may, at his or her discretion, produce a serialization containing additional  
724 class data described by the CIM Schema but not required by this document provided  
725 these data adhere to the conventions established in Clause 5.

- 726 • R:452:ALL:NA:exchange4

727 From the standpoint of the model import used by a data recipient, the document  
728 describes a subset of the CIM that importing software shall be able to interpret in order  
729 to import exported models. Data providers are free to exceed the minimum requirements  
730 described herein as long as their resulting data files are compliant with the CIM Schema  
731 and the conventions established in Clause 5. The document, therefore, describes  
732 additional classes and class data that, although not required, exporters will, in all  
733 likelihood, choose to include in their data files. The additional classes and data are  
734 labelled as required (cardinality 1..1) or as optional (cardinality 0..1) to distinguish them  
735 from their required counterparts. Please note, however, that data importers could  
736 potentially receive data containing instances of any and all classes described by the  
737 CIM Schema.

- 738 • R:452:ALL:NA:cardinality

- 739 The cardinality defined in the CIM model shall be followed, unless a more restrictive  
740 cardinality is explicitly defined in this document. For instance, the cardinality on the  
741 association between VoltageLevel and BaseVoltage indicates that a VoltageLevel shall  
742 be associated with one and only one BaseVoltage, but a BaseVoltage can be associated  
743 with zero to many VoltageLevels.
- 744 • R:452:ALL:NA:associations
- 745 Associations between classes referenced in this document and classes not referenced  
746 here are not required regardless of cardinality.
- 747 • R:452:ALL:IdentifiedObject.name:rule
- 748 The attribute “name” inherited by many classes from the abstract class IdentifiedObject  
749 is not required to be unique. It must be a human readable identifier without additional  
750 embedded information that would need to be parsed. The attribute is used for purposes  
751 such as User Interface and data exchange debugging. The MRID defined in the data  
752 exchange format is the only unique and persistent identifier used for this data exchange.  
753 The attribute IdentifiedObject.name is, however, always required for CoreEquipment  
754 profile and Short Circuit profile.
- 755 • R:452:ALL:IdentifiedObject.description:rule
- 756 The attribute “description” inherited by many classes from the abstract class  
757 IdentifiedObject must contain human readable text without additional embedded  
758 information that would need to be parsed.
- 759 • R:452:ALL:NA:uniqueIdentifier
- 760 All IdentifiedObject-s shall have a persistent and globally unique identifier (Master  
761 Resource Identifier - mRID).
- 762 • R:452:ALL:NA:unitMultiplier
- 763 For exchange of attributes defined using CIM Data Types (ActivePower, Susceptance,  
764 etc.) a unit multiplier of 1 is used if the UnitMultiplier specified in this document is “none”.
- 765 • C:452:ALL:IdentifiedObject.name:stringLength
- 766 The string IdentifiedObject.name has a maximum of 128 characters.
- 767 • C:452:ALL:IdentifiedObject.description:stringLength
- 768 The string IdentifiedObject.description is maximum 256 characters.
- 769 • C:452:ALL:NA:float
- 770 An attribute that is defined as float (e.g. has a type Float or a type which is a Datatype  
771 with .value attribute of type Float) shall support ISO/IEC 60559:2020 for floating-point  
772 arithmetic using single precision floating point. A single precision float supports 7  
773 significant digits where the significant digits are described as an integer, or a decimal  
774 number with 6 decimal digits. Two float values are equal when the significant with 7  
775 digits are identical, e.g. 1234567 is equal 1.234567E6 and so are 1.2345678 and  
776 1.234567E0.
- 777 • R:NC:ER:AreaDispatchableUnit:interconnection

778 In cases where the AreaDispatchingUnit is providing dispatch support for a control area  
779 outside its location it shall refer to TieCorridor that refers to ControlArea. Otherwise, the  
780 AreaDispatchingUnit shall refer to SchedulingArea.

- 781 • C:NC:ER:AreaDispatchableUnit:associations

782 The AreaDispatchableUnit shall be associated with either GeneratingUnit,  
783 PowerElectronicsUnit, EnergyConsumer, ScheduleResource or HydroPump.

- 784 • C:NC:ER:EnergyComponent:associations

785 The EnergyComponent shall be associated with either GeneratingUnit,  
786 PowerElectronicsUnit, EnergyConsumer or HydroPump.

- 787 • R:NC:ER:VoltageAngleLimit:AngleReferenceTerminal

788 Due to the nature of the exchange and requirements it is allowed that the association  
789 VoltageAngleLimit.AngleReferenceTerminal provides a dangling reference. This occurs  
790 when the referenced Terminal is in another MAS. Validation of this association is only  
791 performed when all dangling references are completed.

## 792 2.4 Metadata

793 ENTSO-E agreed to extend the header and metadata definitions by IEC 61970-552 Ed2. This  
794 new header definitions rely on W3C recommendations which are used worldwide and are  
795 positively recognised by the European Commission. The new definitions of the header mainly  
796 use Provenance ontology (PROV-O), Time Ontology and Data Catalog Vocabulary (DCAT). The  
797 global new header applicable for this profile is included in the metadata and document header  
798 specification document.

799 The header vocabulary contains all attributes defined in IEC 61970-552. This is done only for  
800 the purpose of having one vocabulary for header and to ensure transition for data exchanges  
801 that are using IEC 61970-552:2016 header. This profile does not use IEC 61970-552:2016  
802 header attributes and relies only on the extended attributes.

### 803 2.4.1 Constraints

804 The identification of the constraints related to the metadata follows the same convention for  
805 naming of the constraints as for profile constraints.

- 806 • R:NC:ALL:wasAttributedTo:usage

807 The prov:wasAttributedTo should normally be the “X” EIC code of the actor (prov:Agent).

808

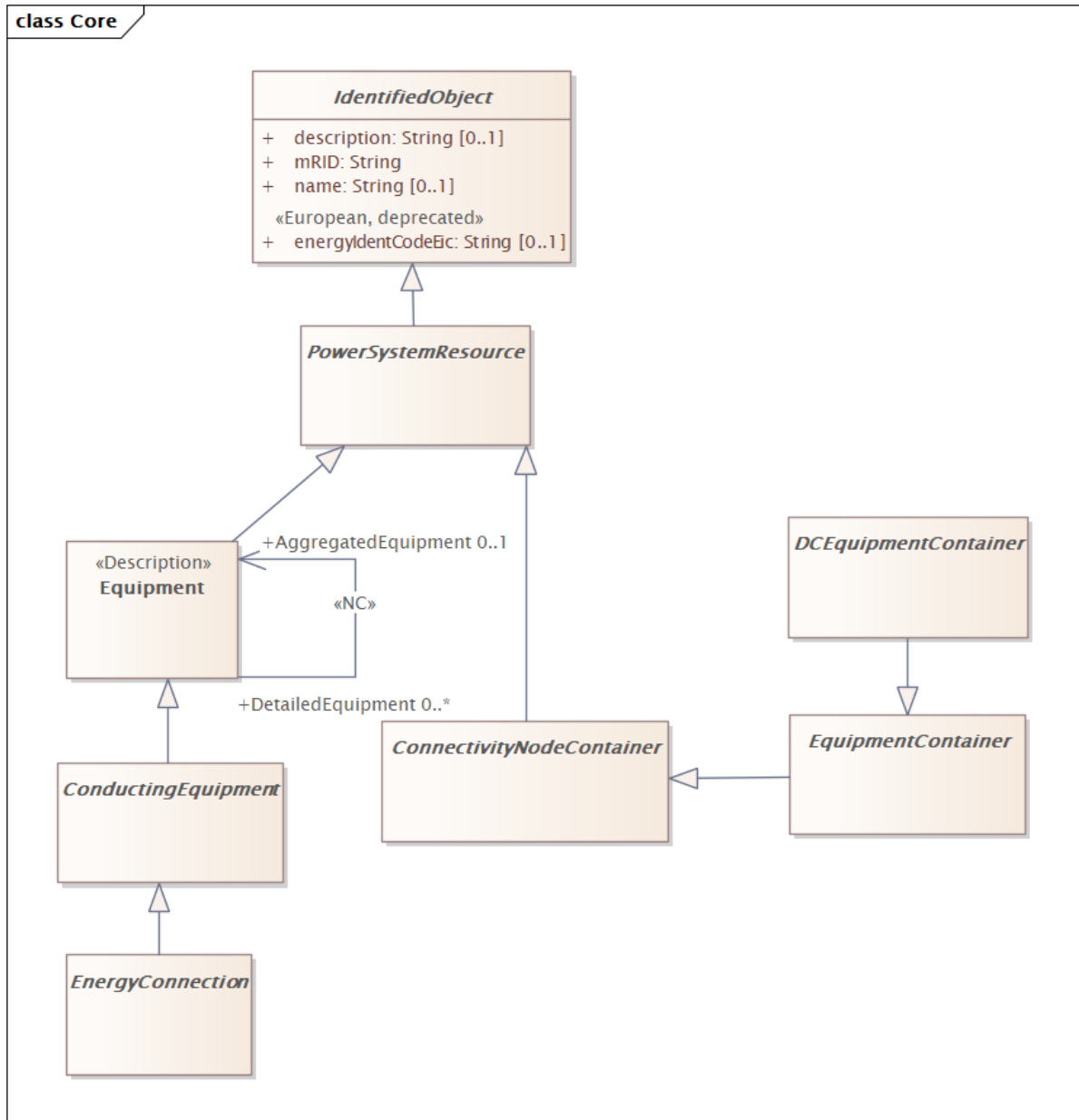
### 809 2.4.2 Reference metadata

810 The header defined for this profile requires availability of a set of reference metadata. For  
811 instance, the attribute prov:wasGeneratedBy requires a reference to an activity which produced  
812 the model or the related process. The activities are defined as reference metadata and their  
813 identifiers are referenced from the header to enable the receiving entity to retrieve the “static”  
814 (reference) information that it is not modified frequently. This approach imposes a requirement  
815 that both the sending entity and the receiving entity have access to a unique version of the  
816 reference metadata. Therefore, each business process shall define which reference metadata  
817 is used and where it is located.

818 **3 Detailed Profile Specification**

819 **3.1 General**

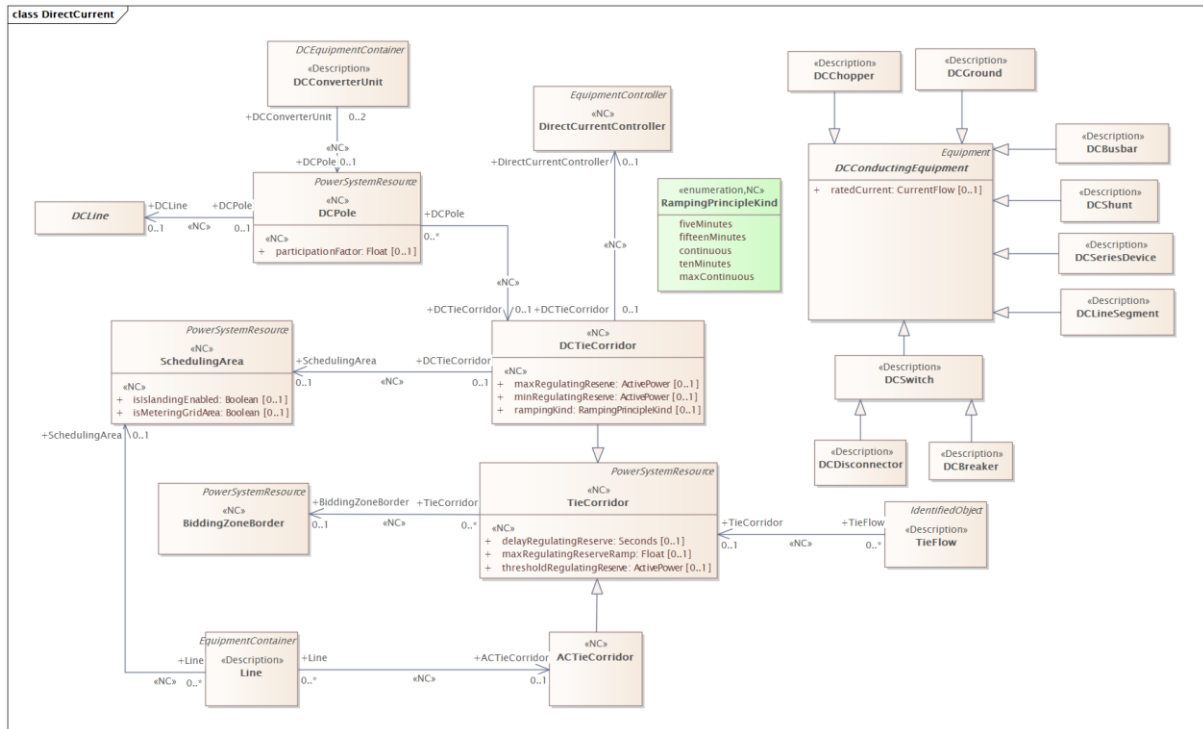
820 This package contains equipment reliability profile.



821

822 **Figure 1 – Class diagram EquipmentReliabilityProfile::Core**

823 Figure 1: The diagram shows classes from Base CIM used in the profile.



824

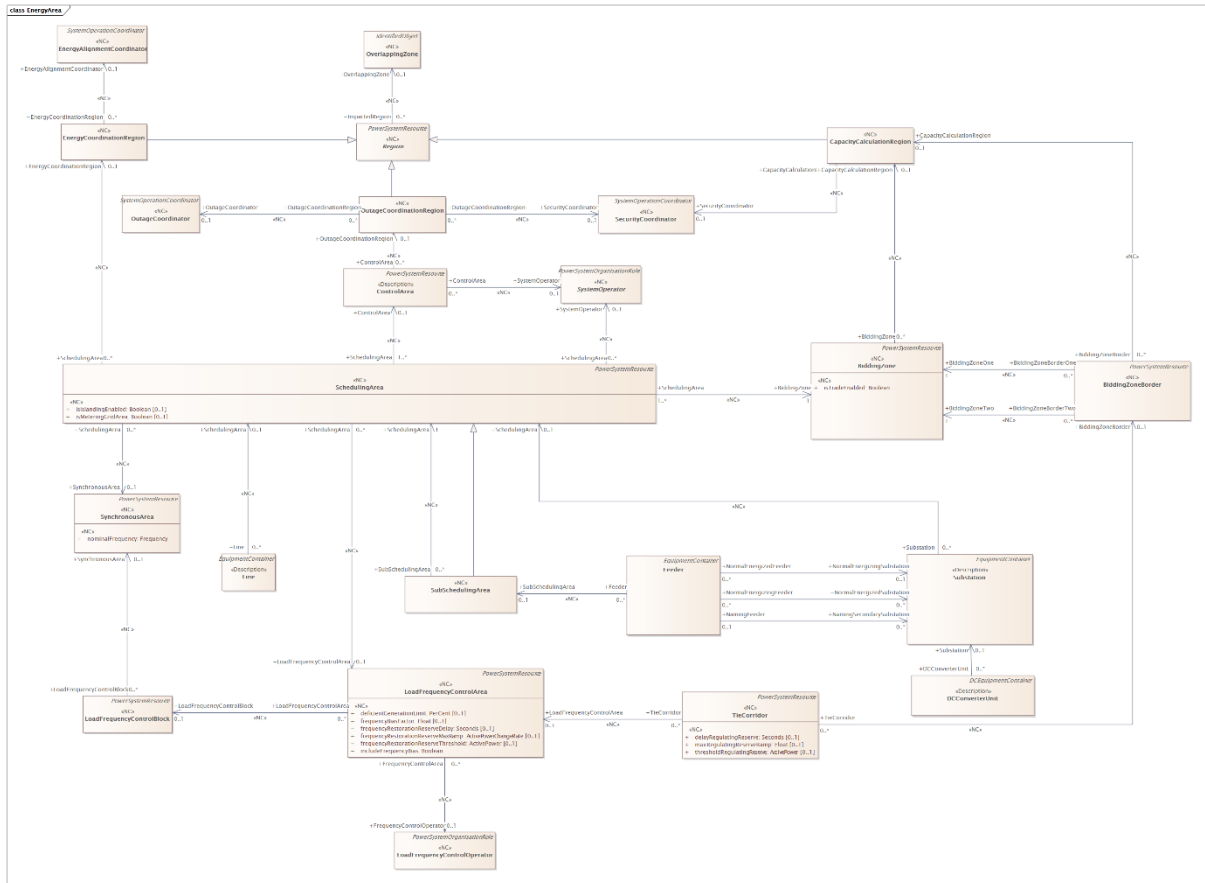
825

**Figure 2 – Class diagram EquipmentReliabilityProfile::DirectCurrent**

826

Figure 2: The diagram shows direct current related classes.



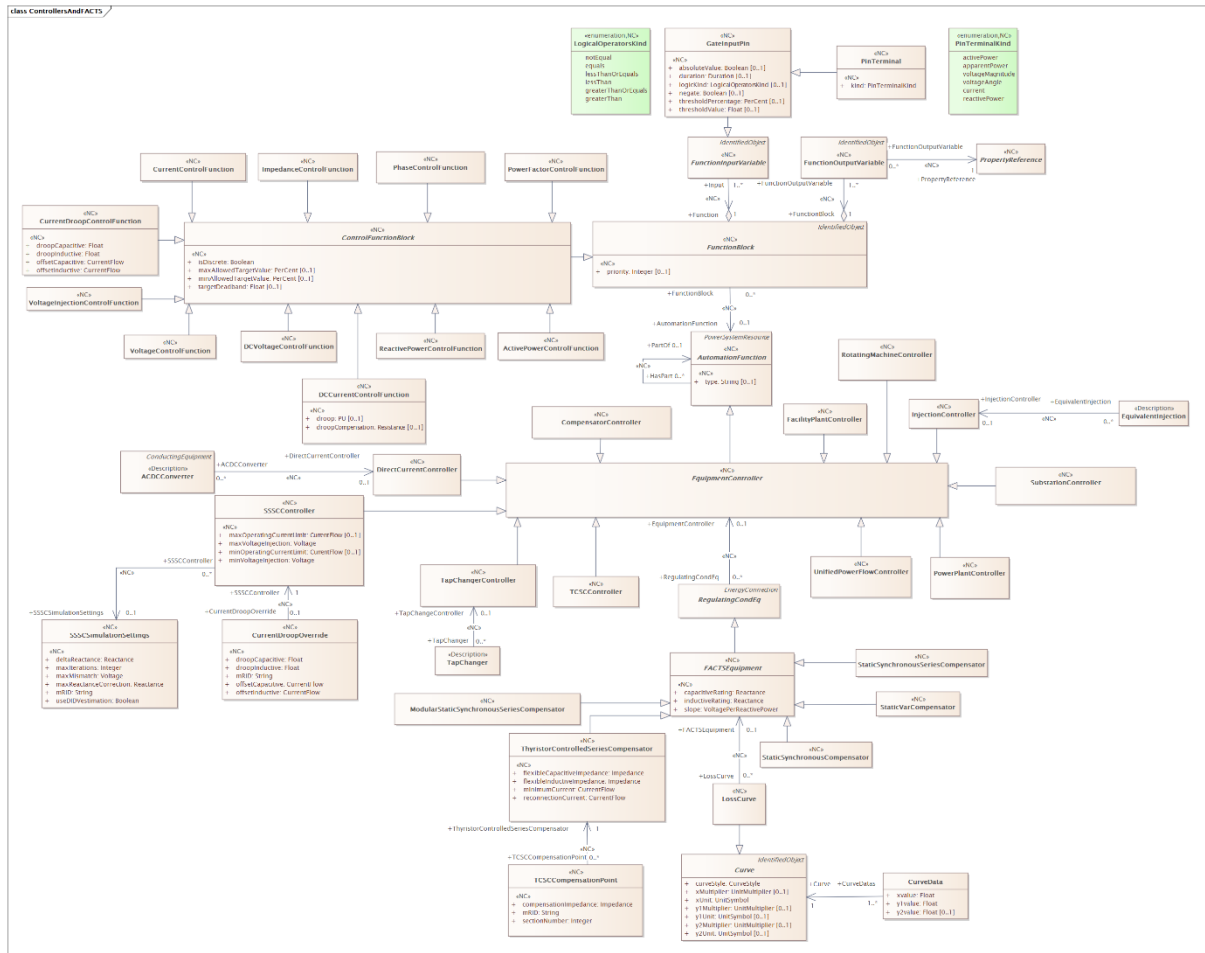


827

828

**Figure 3 – Class diagram EquipmentReliabilityProfile::EnergyArea**

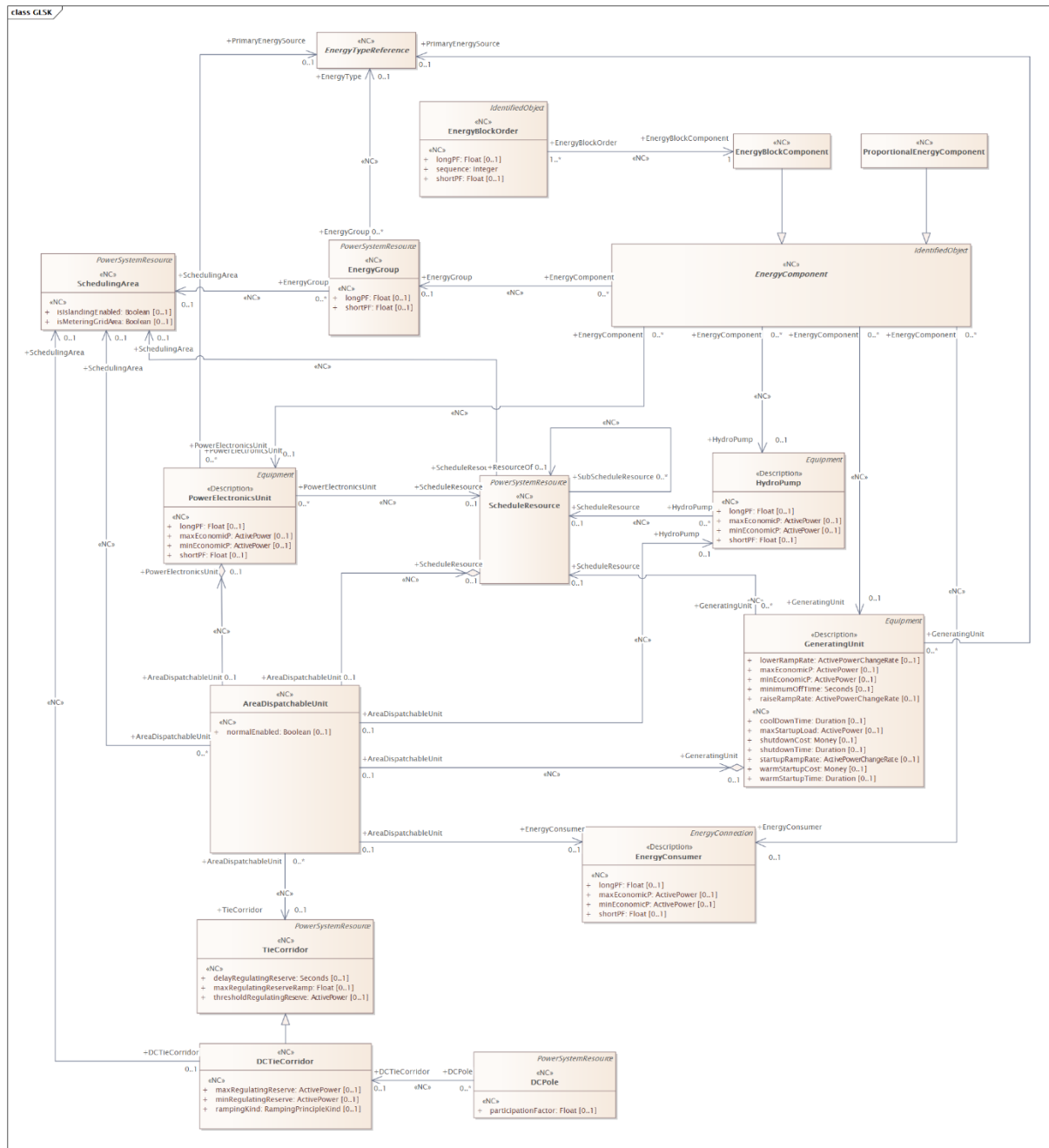
829 Figure 3:



830

831 **Figure 4 – Class diagram EquipmentReliabilityProfile::ControllersAndFACTS**

832 Figure 4: The diagram shows Controllers and FACTS related classes.



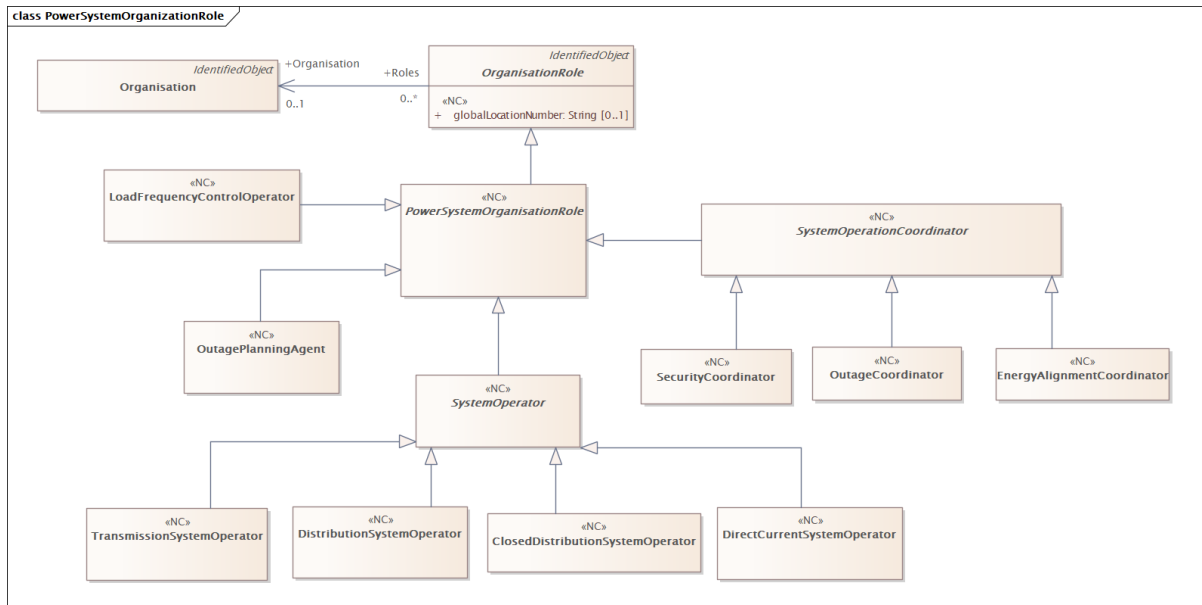
833

834

**Figure 5 – Class diagram EquipmentReliabilityProfile::GLSK**

835

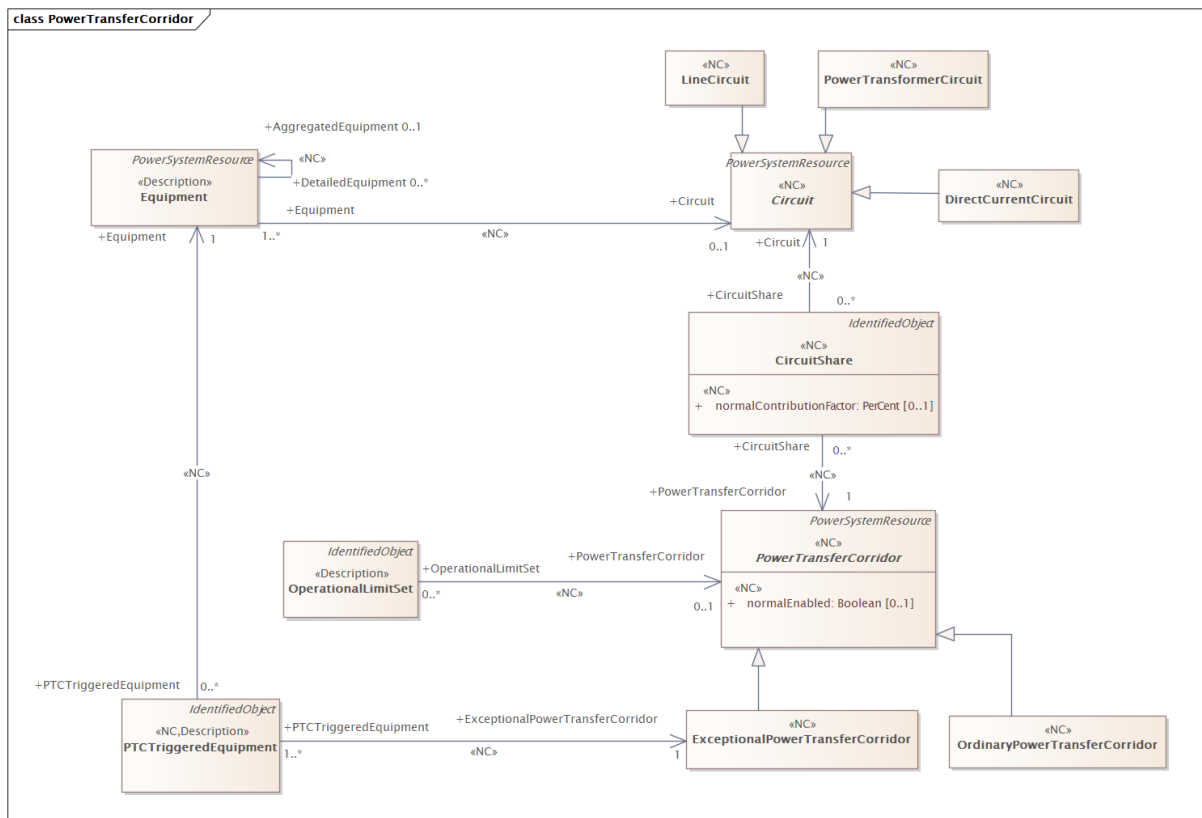
Figure 5: The diagram shows generation and load shift keys related classes.



836

837 **Figure 6 – Class diagram EquipmentReliabilityProfile::PowerSystemOrganizationRole**

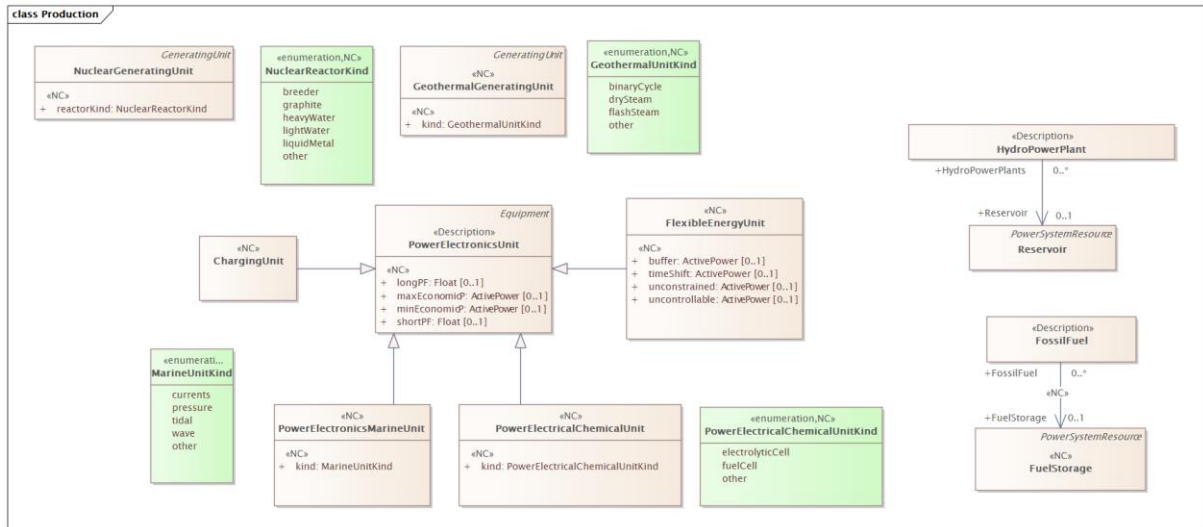
838 Figure 6: The diagram shows power system organisation role related classes.



839

840 **Figure 7 – Class diagram EquipmentReliabilityProfile::PowerTransferCorridor**

841 Figure 7: The diagram shows power transfer corridor related classes.

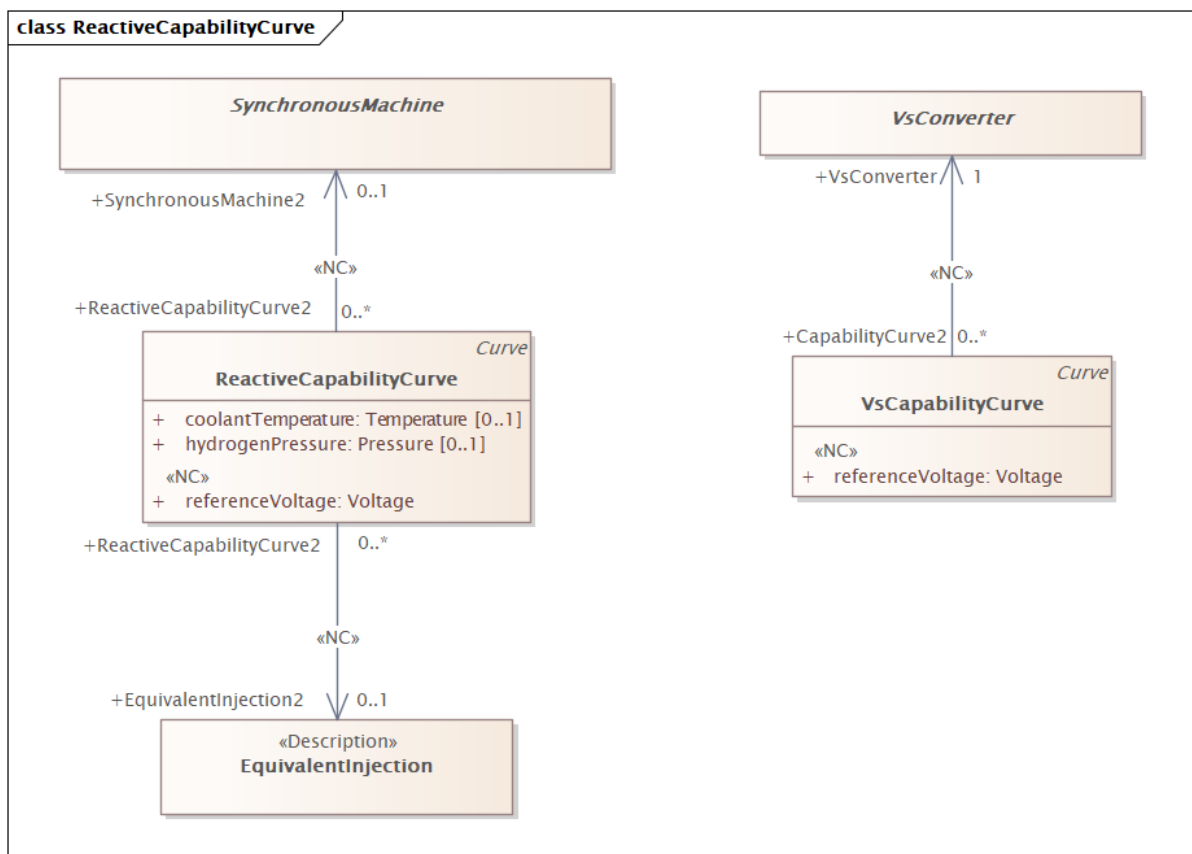


842

843

**Figure 8 – Class diagram EquipmentReliabilityProfile::Production**

844 Figure 8: The diagram shows production related classes.

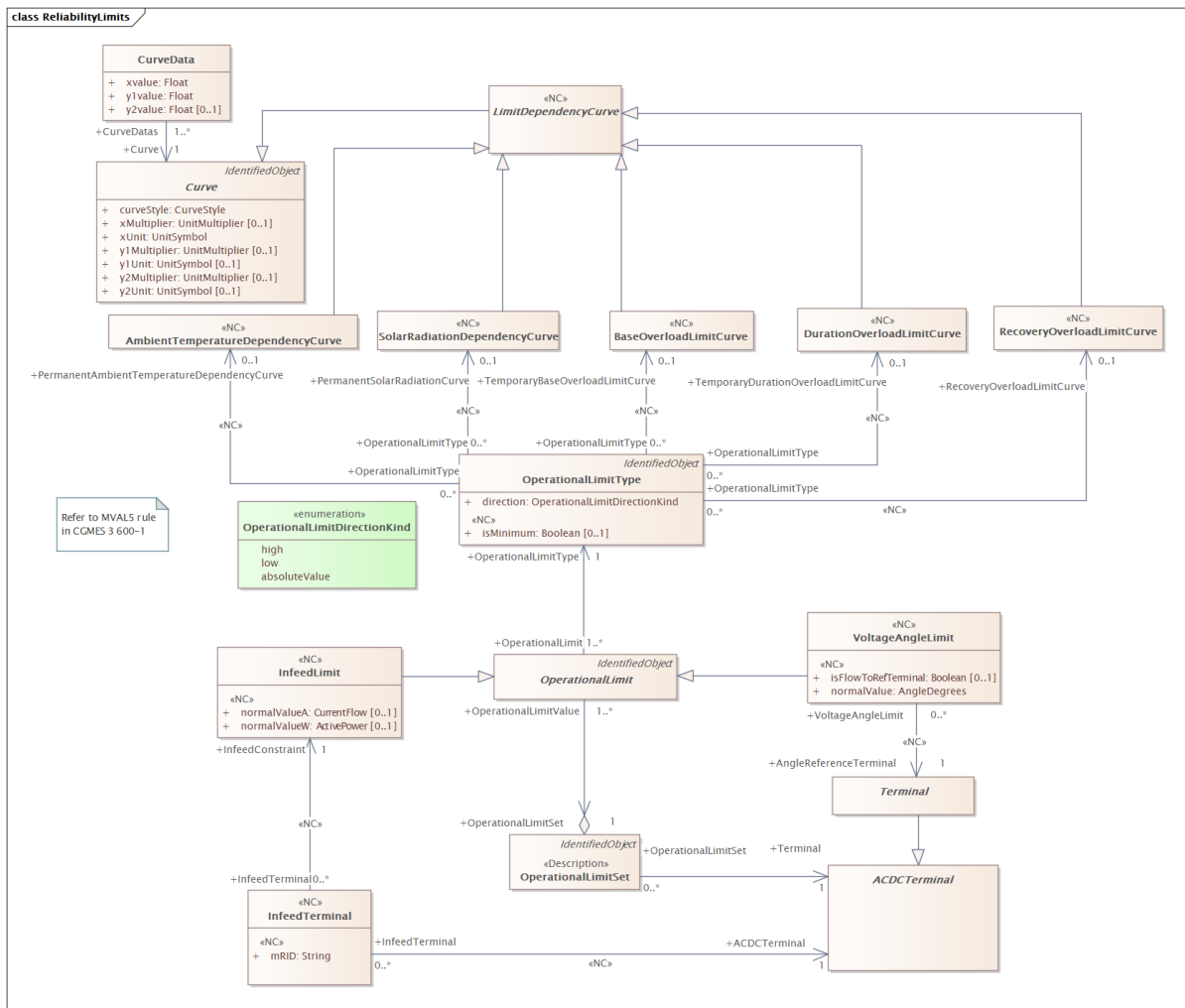


845

846

**Figure 9 – Class diagram EquipmentReliabilityProfile::ReactiveCapabilityCurve**

847 Figure 9: The diagram shows classes related to reactive capability curve.



848  
849 **Figure 10 – Class diagram EquipmentReliabilityProfile::ReliabilityLimits**

850 Figure 10: The diagram contains main classes related to the reliability limits.

851 **3.2 (Description) ACDCCConverter**

852 Inheritance path = [ConductingEquipment](#) : [Equipment](#) : [PowerSystemResource](#) :  
853 [IdentifiedObject](#)

854 A unit with valves for three phases, together with unit control equipment, essential protective  
855 and switching devices, DC storage capacitors, phase reactors and auxiliaries, if any, used for  
856 conversion.

857 Table 1 shows all attributes of ACDCCConverter.

858 **Table 1 – Attributes of EquipmentReliabilityProfile::ACDCCConverter**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

859  
860 Table 2 shows all association ends of ACDCCConverter with other classes.

861 **Table 2 – Association ends of EquipmentReliabilityProfile::ACDCConverter with other**  
862 **classes**

mult from	name	mult to	type	description
0..*	DirectCurrentController	0..1	<a href="#">DirectCurrentController</a>	(NC) Direct current controller which controls the ACDC converter.
1..*	Circuit	0..1	<a href="#">Circuit</a>	(NC) inherited from: <a href="#">Equipment</a>
0..*	AggregatedEquipment	0..1	<a href="#">Equipment</a>	(NC) inherited from: <a href="#">Equipment</a>

863

### 864 3.3 (abstract) ACDCTerminal root class

865 An electrical connection point (AC or DC) to a piece of conducting equipment. Terminals are  
866 connected at physical connection points called connectivity nodes.

### 867 3.4 (NC) ACTieCorridor

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

869 A collection of one or more AC tie lines that connect two different control areas.

870 Table 3 shows all attributes of ACTieCorridor.

871 **Table 3 – Attributes of EquipmentReliabilityProfile::ACTieCorridor**

name	mult	type	description
delayRegulatingReserve	0..1	<a href="#">Seconds</a>	(NC) inherited from: <a href="#">TieCorridor</a>
maxRegulatingReserveRamp	0..1	<a href="#">Float</a>	(NC) inherited from: <a href="#">TieCorridor</a>
thresholdRegulatingReserve	0..1	<a href="#">ActivePower</a>	(NC) inherited from: <a href="#">TieCorridor</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

872

873 Table 4 shows all association ends of ACTieCorridor with other classes.

874 **Table 4 – Association ends of EquipmentReliabilityProfile::ACTieCorridor with other**  
875 **classes**

mult from	name	mult to	type	description
0..*	LoadFrequencyControlArea	0..1	<a href="#">LoadFrequencyControlArea</a>	(NC) inherited from: <a href="#">TieCorridor</a>
0..*	BiddingZoneBorder	0..1	<a href="#">BiddingZoneBorder</a>	(NC) inherited from: <a href="#">TieCorridor</a>

876

### 877 3.5 (NC) ActivePowerControlFunction

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

879 Active power control function is a function block that calculates operating point of the controlled  
880 equipment to achieve the target active power.

881 Table 5 shows all attributes of ActivePowerControlFunction.

882 **Table 5 – Attributes of EquipmentReliabilityProfile::ActivePowerControlFunction**

name	mult	type	description
isDiscrete	1..1	<a href="#">Boolean</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
targetDeadband	0..1	<a href="#">Float</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
maxAllowedTargetValue	0..1	<a href="#">PerCent</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
minAllowedTargetValue	0..1	<a href="#">PerCent</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
priority	0..1	<a href="#">Integer</a>	(NC) inherited from: <a href="#">FunctionBlock</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

883

884 Table 6 shows all association ends of ActivePowerControlFunction with other classes.

885 **Table 6 – Association ends of EquipmentReliabilityProfile::ActivePowerControlFunction**  
886 **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>

887

888 **3.6 (NC) AmbientTemperatureDependencyCurve**889 Inheritance path = [LimitDependencyCurve](#) : [Curve](#) : [IdentifiedObject](#)

890 A curve or functional relationship between the ambient temperature independent variable (X-axis) and relative temperature dependent (Y-axis) variables.

892 Table 7 shows all attributes of AmbientTemperatureDependencyCurve.

893

894

**Table 7 – Attributes of  
EquipmentReliabilityProfile::AmbientTemperatureDependencyCurve**

name	mult	type	description
curveStyle	1..1	<a href="#">CurveStyle</a>	inherited from: <a href="#">Curve</a>
xMultiplier	0..1	<a href="#">UnitMultiplier</a>	inherited from: <a href="#">Curve</a>
xUnit	1..1	<a href="#">UnitSymbol</a>	inherited from: <a href="#">Curve</a>
y1Multiplier	0..1	<a href="#">UnitMultiplier</a>	inherited from: <a href="#">Curve</a>
y1Unit	0..1	<a href="#">UnitSymbol</a>	inherited from: <a href="#">Curve</a>
y2Multiplier	0..1	<a href="#">UnitMultiplier</a>	inherited from: <a href="#">Curve</a>
y2Unit	0..1	<a href="#">UnitSymbol</a>	inherited from: <a href="#">Curve</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

895



896 **3.7 (NC) AreaDispatchableUnit root class**

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

900 Table 8 shows all attributes of AreaDispatchableUnit.

901 **Table 8 – Attributes of EquipmentReliabilityProfile::AreaDispatchableUnit**

name	mult	type	description
normalEnabled	0..1	<a href="#">Boolean</a>	(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.

902

903 Table 9 shows all association ends of AreaDispatchableUnit with other classes.

904 **Table 9 – Association ends of EquipmentReliabilityProfile::AreaDispatchableUnit with**  
905 **other classes**

mult from	name	mult to	type	description
0..1	PowerElectronicsUnit	0..1	<a href="#">PowerElectronicsUnit</a>	(NC) The power electronics unit that belongs to this area dispatchable unit.
0..1	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..*	SchedulingArea	0..1	<a href="#">SchedulingArea</a>	(NC) The scheduling area that has this area dispatchable unit.
0..1	GeneratingUnit	0..1	<a href="#">GeneratingUnit</a>	(NC) The generating unit that belongs to area dispatchable unit.
0..1	EnergyConsumer	0..1	<a href="#">EnergyConsumer</a>	Energy consumer for this area dispatchable unit.
0..1	HydroPump	0..1	<a href="#">HydroPump</a>	(NC) Hydro Pump which is associated with the area dispatchable unit.
0..*	TieCorridor	0..1	<a href="#">TieCorridor</a>	(NC) Tie Corridor which belongs to the Area Dispatchable Unit.

906

907 **3.8 (abstract,NC) AutomationFunction**

908 Inheritance path = [PowerSystemResource](#) : [IdentifiedObject](#)

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

911 Table 10 shows all attributes of AutomationFunction.

912 **Table 10 – Attributes of EquipmentReliabilityProfile::AutomationFunction**

name	mult	type	description
type	0..1	<a href="#">String</a>	(NC) Type of automation function.
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

913  
914 Table 11 shows all association ends of AutomationFunction with other classes.

915 **Table 11 – Association ends of EquipmentReliabilityProfile::AutomationFunction with**  
916 **other classes**

mult from	name	mult to	type	description
0..*	PartOf	0..1	<a href="#">AutomationFunction</a>	(NC) Automation function is part of this automation function.

917  
918 **3.9 (NC) BaseOverloadLimitCurve**

919 Inheritance path = [LimitDependencyCurve](#) : [Curve](#) : [IdentifiedObject](#)

920 A curve or functional relationship between

921 - the relative loading - current loading over permanent loading (PATL) independent variable (X-axis), and

922 - temporary overloading (TATL) limiting dependent (Y-axis) variables.

923 Table 12 shows all attributes of BaseOverloadLimitCurve.

925 **Table 12 – Attributes of EquipmentReliabilityProfile::BaseOverloadLimitCurve**

name	mult	type	description
curveStyle	1..1	<a href="#">CurveStyle</a>	inherited from: <a href="#">Curve</a>
xMultiplier	0..1	<a href="#">UnitMultiplier</a>	inherited from: <a href="#">Curve</a>
xUnit	1..1	<a href="#">UnitSymbol</a>	inherited from: <a href="#">Curve</a>
y1Multiplier	0..1	<a href="#">UnitMultiplier</a>	inherited from: <a href="#">Curve</a>
y1Unit	0..1	<a href="#">UnitSymbol</a>	inherited from: <a href="#">Curve</a>
y2Multiplier	0..1	<a href="#">UnitMultiplier</a>	inherited from: <a href="#">Curve</a>
y2Unit	0..1	<a href="#">UnitSymbol</a>	inherited from: <a href="#">Curve</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

926  
927 **3.10 (NC) BiddingZone**

928 Inheritance path = [PowerSystemResource](#) : [IdentifiedObject](#)

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

932 Table 13 shows all attributes of BiddingZone.

933 **Table 13 – Attributes of EquipmentReliabilityProfile::BiddingZone**

name	mult	type	description
isTradeEnabled	1..1	<a href="#">Boolean</a>	(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.

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

934

935

Table 14 shows all association ends of BiddingZone with other classes.

936

937

**Table 14 – Association ends of EquipmentReliabilityProfile::BiddingZone with other classes**

mult from	name	mult to	type	description
0..*	CapacityCalculationRegion	0..1	<a href="#">CapacityCalculationRegion</a>	(NC) The capacity calculation region related to this bidding zone.

938

939

### 3.11 (NC) BiddingZoneBorder

940

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

941

Defines the aggregated connection capacity between two Bidding Zones.

942

Table 15 shows all attributes of BiddingZoneBorder.

943

**Table 15 – Attributes of EquipmentReliabilityProfile::BiddingZoneBorder**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

944

945

Table 16 shows all association ends of BiddingZoneBorder with other classes.

946

947

**Table 16 – Association ends of EquipmentReliabilityProfile::BiddingZoneBorder with other classes**

mult from	name	mult to	type	description
0..*	BiddingZoneTwo	1..1	<a href="#">BiddingZone</a>	(NC) The bidding zone for the secondary side.
0..*	BiddingZoneOne	1..1	<a href="#">BiddingZone</a>	(NC) The bidding zone for the primary side.
0..*	CapacityCalculationRegion	0..1	<a href="#">CapacityCalculationRegion</a>	(NC) The capacity calculation region for which the capacity is derived from.

948

949

### 3.12 (NC) CapacityCalculationRegion

950

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

951

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.

952

953

Table 17 shows all attributes of CapacityCalculationRegion.

954 **Table 17 – Attributes of EquipmentReliabilityProfile::CapacityCalculationRegion**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

955  
956 Table 18 shows all association ends of CapacityCalculationRegion with other classes.

957 **Table 18 – Association ends of EquipmentReliabilityProfile::CapacityCalculationRegion**  
958 **with other classes**

mult from	name	mult to	type	description
0..*	SecurityCoordinator	0..1	<a href="#">SecurityCoordinator</a>	(NC) The security coordinator responsible for the capacity calculation region.
0..*	OverlappingZone	0..1	<a href="#">OverlappingZone</a>	(NC) inherited from: <a href="#">Region</a>

959  
960 **3.13 (NC) ChargingUnit**

961 Inheritance path = [PowerElectronicsUnit](#) : [Equipment](#) : [PowerSystemResource](#) :  
962 [IdentifiedObject](#)

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

966 Table 19 shows all attributes of ChargingUnit.

967 **Table 19 – Attributes of EquipmentReliabilityProfile::ChargingUnit**

name	mult	type	description
longPF	0..1	<a href="#">Float</a>	(NC) inherited from: <a href="#">PowerElectronicsUnit</a>
maxEconomicP	0..1	<a href="#">ActivePower</a>	(NC) inherited from: <a href="#">PowerElectronicsUnit</a>
minEconomicP	0..1	<a href="#">ActivePower</a>	(NC) inherited from: <a href="#">PowerElectronicsUnit</a>
shortPF	0..1	<a href="#">Float</a>	(NC) inherited from: <a href="#">PowerElectronicsUnit</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

968  
969 Table 20 shows all association ends of ChargingUnit with other classes.

970 **Table 20 – Association ends of EquipmentReliabilityProfile::ChargingUnit with other**  
971 **classes**

mult from	name	mult to	type	description
0..*	PrimaryEnergySource	0..1	<a href="#">EnergyTypeReference</a>	inherited from: <a href="#">PowerElectronicsUnit</a>
0..*	ScheduleResource	0..1	<a href="#">ScheduleResource</a>	(NC) inherited from: <a href="#">PowerElectronicsUnit</a>

mult from	name	mult to	type	description
1..*	Circuit	0..1	<a href="#">Circuit</a>	(NC) inherited from: <a href="#">Equipment</a>
0..*	AggregatedEquipment	0..1	<a href="#">Equipment</a>	(NC) inherited from: <a href="#">Equipment</a>

972

973 **3.14 (abstract,NC) Circuit**974 Inheritance path = [PowerSystemResource](#) : [IdentifiedObject](#)

975 A circuit is a collection of equipment in a network graph that provide common stability limits.

976 The relevant equipment is in general given by the identifying terminal. A software application

977 that can do topology processing shall calculate the equipment belonging to the circuit, if there

978 are no stability limits associated to it. In case of stability limits, the containment reflects the

979 equipments that were used in the calculation/analysis.

980 Table 21 shows all attributes of Circuit.

981

**Table 21 – Attributes of EquipmentReliabilityProfile::Circuit**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

982

983 **3.15 (NC) CircuitShare**984 Inheritance path = [IdentifiedObject](#)

985 Defines the share of the circuit which is part of an associated power transfer corridor.

986 Table 22 shows all attributes of CircuitShare.

987

**Table 22 – Attributes of EquipmentReliabilityProfile::CircuitShare**

name	mult	type	description
normalContributionFactor	0..1	<a href="#">PerCent</a>	(NC) Normal contribution factor for the circuit which is part of a power transfer corridor. The allowed value range is [0,100].
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

988

989 Table 23 shows all association ends of CircuitShare with other classes.

**Table 23 – Association ends of EquipmentReliabilityProfile::CircuitShare with other classes**

990

991

mult from	name	mult to	type	description
0..*	Circuit	1..1	<a href="#">Circuit</a>	(NC) The circuit that has a share of the power system corridor.
0..*	PowerTransferCorridor	1..1	<a href="#">PowerTransferCorridor</a>	(NC) The power transfer corridor that has this circuit share.

992

993 **3.16 (NC) ClosedDistributionSystemOperator**994 Inheritance path = [SystemOperator](#) : [PowerSystemOrganisationRole](#) : [OrganisationRole](#) :  
995 [IdentifiedObject](#)996 A system operator which distributes electricity (or gas) within a geographically confined  
997 industrial, commercial or shared services and does not supply household customers.

998 Table 24 shows all attributes of ClosedDistributionSystemOperator.

999 **Table 24 – Attributes of EquipmentReliabilityProfile::ClosedDistributionSystemOperator**

name	mult	type	description
globalLocationNumber	0..1	<a href="#">String</a>	(NC) inherited from: <a href="#">OrganisationRole</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1000

1001 Table 25 shows all association ends of ClosedDistributionSystemOperator with other classes.

1002

1003 **Table 25 – Association ends of EquipmentReliabilityProfile::ClosedDistributionSystemOperator with other classes**

mult from	name	mult to	type	description
0..*	Organisation	0..1	<a href="#">Organisation</a>	inherited from: <a href="#">OrganisationRole</a>

1004

1005 **3.17 (NC) CompensatorController**1006 Inheritance path = [EquipmentController](#) : [AutomationFunction](#) : [PowerSystemResource](#) :  
1007 [IdentifiedObject](#)

1008 Compensator controller is controlling the equipment to optimize the use of the compensators.

1009 Table 26 shows all attributes of CompensatorController.

1010 **Table 26 – Attributes of EquipmentReliabilityProfile::CompensatorController**

name	mult	type	description
type	0..1	<a href="#">String</a>	(NC) inherited from: <a href="#">AutomationFunction</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1011

1012 Table 27 shows all association ends of CompensatorController with other classes.

1013 **Table 27 – Association ends of EquipmentReliabilityProfile::CompensatorController**  
1014 **with other classes**

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

1015

1016 **3.18 (abstract) ConductingEquipment**1017 Inheritance path = [Equipment](#) : [PowerSystemResource](#) : [IdentifiedObject](#)

1018 The parts of the AC power system that are designed to carry current or that are conductively  
1019 connected through terminals.  
1020 Table 28 shows all attributes of ConductingEquipment.

1021 **Table 28 – Attributes of EquipmentReliabilityProfile::ConductingEquipment**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1022  
1023 Table 29 shows all association ends of ConductingEquipment with other classes.

1024 **Table 29 – Association ends of EquipmentReliabilityProfile::ConductingEquipment with**  
1025 **other classes**

mult from	name	mult to	type	description
1..*	Circuit	0..1	<a href="#">Circuit</a>	(NC) inherited from: <a href="#">Equipment</a>
0..*	AggregatedEquipment	0..1	<a href="#">Equipment</a>	(NC) inherited from: <a href="#">Equipment</a>

1026  
1027 **3.19 (abstract) ConnectivityNodeContainer**

1028 Inheritance path = [PowerSystemResource](#) : [IdentifiedObject](#)  
1029 A base class for all objects that may contain connectivity nodes or topological nodes.  
1030 Table 30 shows all attributes of ConnectivityNodeContainer.

1031 **Table 30 – Attributes of EquipmentReliabilityProfile::ConnectivityNodeContainer**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1032  
1033 **3.20 (Description) ControlArea**

1034 Inheritance path = [PowerSystemResource](#) : [IdentifiedObject](#)  
1035 A control area is a grouping of generating units and/or loads and a subset of tie lines (as  
1036 terminals) which may be used for a variety of purposes including automatic generation control,  
1037 power flow solution area interchange control specification, and input to load forecasting. All  
1038 generation and load within the area defined by the terminals on the border are considered in  
1039 the area interchange control. Note that any number of overlapping control area specifications  
1040 can be superimposed on the physical model. The following general principles apply to  
1041 ControlArea:  
1042 1. The control area orientation for net interchange is positive for an import, negative for an  
1043 export.  
1044 2. The control area net interchange is determined by summing flows in Terminals. The  
1045 Terminals are identified by creating a set of TieFlow objects associated with a ControlArea  
1046 object. Each TieFlow object identifies one Terminal.  
1047 3. In a single network model, a tie between two control areas must be modelled in both control  
1048 area specifications, such that the two representations of the tie flow sum to zero.



1049 4. The normal orientation of Terminal flow is positive for flow into the conducting equipment  
1050 that owns the Terminal. (i.e. flow from a bus into a device is positive.) However, the orientation  
1051 of each flow in the control area specification must align with the control area convention, i.e.  
1052 import is positive. If the orientation of the Terminal flow referenced by a TieFlow is positive into  
1053 the control area, then this is confirmed by setting TieFlow.positiveFlowIn flag TRUE. If not, the  
1054 orientation must be reversed by setting the TieFlow.positiveFlowIn flag FALSE.  
1055 Table 31 shows all attributes of ControlArea.

1056 **Table 31 – Attributes of EquipmentReliabilityProfile::ControlArea**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1057  
1058 Table 32 shows all association ends of ControlArea with other classes.

1059 **Table 32 – Association ends of EquipmentReliabilityProfile::ControlArea with other**  
1060 **classes**

mult from	name	mult to	type	description
0..*	SystemOperator	0..1	<a href="#">SystemOperator</a>	(NC) The system operator that operates this control area.
0..*	OutageCoordinationRegion	0..1	<a href="#">OutageCoordinationRegion</a>	(NC) The outage coordination region that has this control area.

1061

### 1062 3.21 (abstract,NC) ControlFunctionBlock

1063 Inheritance path = [FunctionBlock](#) : [IdentifiedObject](#)

1064 Control function block is a function block that contains an algorithm for controlling the  
1065 equipment.

1066 Table 33 shows all attributes of ControlFunctionBlock.

1067 **Table 33 – Attributes of EquipmentReliabilityProfile::ControlFunctionBlock**

name	mult	type	description
isDiscrete	1..1	<a href="#">Boolean</a>	(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	<a href="#">Float</a>	(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	<a href="#">PerCent</a>	(NC) Maximum allowed target value given by the percent of target value. The allowed value range is [0,100].
minAllowedTargetValue	0..1	<a href="#">PerCent</a>	(NC) Minimum allowed target value given by the percent of target value. The allowed value range is [0,100].



name	mult	type	description
priority	0..1	<a href="#">Integer</a>	(NC) inherited from: <a href="#">FunctionBlock</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1068  
1069  
1070  
1071

Table 34 shows all association ends of ControlFunctionBlock with other classes.

**Table 34 – Association ends of EquipmentReliabilityProfile::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>

1072  
1073  
1074  
1075  
1076  
1077  
1078

### 3.22 (NC) CurrentControlFunction

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

Current control function is a function block that calculates the operating point of the controlled equipment to achieve the target current.

Table 35 shows all attributes of CurrentControlFunction.

**Table 35 – Attributes of EquipmentReliabilityProfile::CurrentControlFunction**

name	mult	type	description
isDiscrete	1..1	<a href="#">Boolean</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
targetDeadband	0..1	<a href="#">Float</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
maxAllowedTargetValue	0..1	<a href="#">PerCent</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
minAllowedTargetValue	0..1	<a href="#">PerCent</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
priority	0..1	<a href="#">Integer</a>	(NC) inherited from: <a href="#">FunctionBlock</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1079  
1080  
1081  
1082

Table 36 shows all association ends of CurrentControlFunction with other classes.

**Table 36 – Association ends of EquipmentReliabilityProfile::CurrentControlFunction 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>

1083  
1084  
1085  
1086  
1087  
1088

### 3.23 (NC) CurrentDropControlFunction

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

Current droop control function is a function block that calculates the operating point of the controlled equipment to achieve the target current.

Table 37 shows all attributes of CurrentDropControlFunction.

1089 **Table 37 – Attributes of EquipmentReliabilityProfile::CurrentDroopControlFunction**

name	mult	type	description
offsetInductive	1..1	<a href="#">CurrentFlow</a>	(NC) Offset in capacitive region.
droopInductive	1..1	<a href="#">Float</a>	(NC) Droop in inductive region. The unit is V/A.
offsetCapacitive	1..1	<a href="#">CurrentFlow</a>	(NC) Offset in capacitive region.
droopCapacitive	1..1	<a href="#">Float</a>	(NC) Droop in capacitive region. The unit is V/A.
isDiscrete	1..1	<a href="#">Boolean</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
targetDeadband	0..1	<a href="#">Float</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
maxAllowedTargetValue	0..1	<a href="#">PerCent</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
minAllowedTargetValue	0..1	<a href="#">PerCent</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
priority	0..1	<a href="#">Integer</a>	(NC) inherited from: <a href="#">FunctionBlock</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1090

1091 Table 38 shows all association ends of CurrentDroopControlFunction with other classes.

1092

1093 **Table 38 – Association ends of EquipmentReliabilityProfile::CurrentDroopControlFunction 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>

1094

1095 **3.24 (NC) CurrentDroopOverride root class**

1096 Current droop override uses the following logic:

1097 - When the current exceeds a threshold the device executes the following transitions: 1) When  
 1098 injecting an inductive voltage or in monitoring mode the device tends to inject a voltage  
 1099 proportional to the difference between the line current and the aforementioned threshold. 2)  
 1100 When injecting a capacitive voltage the device transitions to monitoring mode.

1101 - If the aforementioned proportional voltage is lower than the initial one, the voltage injection  
 1102 remains unchanged.

1103 Current droop override is not applied when the device operates in currentDroop mode.

1104 Table 39 shows all attributes of CurrentDroopOverride.

1105 **Table 39 – Attributes of EquipmentReliabilityProfile::CurrentDroopOverride**

name	mult	type	description
droopCapacitive	1..1	<a href="#">Float</a>	(NC) Droop in capacitive region. The unit is V/A.
droopInductive	1..1	<a href="#">Float</a>	(NC) Droop in inductive region. The unit is V/A.
offsetCapacitive	1..1	<a href="#">CurrentFlow</a>	(NC) Offset in capacitive region.
offsetInductive	1..1	<a href="#">CurrentFlow</a>	(NC) Offset in capacitive region.
mRID	1..1	<a href="#">String</a>	(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.

1106

1107

Table 40 shows all association ends of CurrentDropOverride with other classes.

1108

**Table 40 – Association ends of EquipmentReliabilityProfile::CurrentDropOverride with other classes**

1109

mult from	name	mult to	type	description
0..1	SSSCController	1..1	<a href="#">SSSCController</a>	(NC) The SSSC controller to which this CurrentDropOverride applies to.

1110

### 1111 3.25 (abstract) Curve

1112 Inheritance path = [IdentifiedObject](#)

1113 A multi-purpose curve or functional relationship between an independent variable (X-axis) and  
1114 dependent (Y-axis) variables.

1115 Table 41 shows all attributes of Curve.

1116

**Table 41 – Attributes of EquipmentReliabilityProfile::Curve**

name	mult	type	description
curveStyle	1..1	<a href="#">CurveStyle</a>	The style or shape of the curve.
xMultiplier	0..1	<a href="#">UnitMultiplier</a>	Multiplier for X-axis.
xUnit	1..1	<a href="#">UnitSymbol</a>	The X-axis units of measure.
y1Multiplier	0..1	<a href="#">UnitMultiplier</a>	Multiplier for Y1-axis.
y1Unit	0..1	<a href="#">UnitSymbol</a>	The Y1-axis units of measure.
y2Multiplier	0..1	<a href="#">UnitMultiplier</a>	Multiplier for Y2-axis.
y2Unit	0..1	<a href="#">UnitSymbol</a>	The Y2-axis units of measure.
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1117

### 1118 3.26 CurveData root class

1119 Multi-purpose data points for defining a curve. The use of this generic class is discouraged if  
1120 a more specific class can be used to specify the X and Y axis values along with their specific  
1121 data types.

1122 Table 42 shows all attributes of CurveData.

1123

**Table 42 – Attributes of EquipmentReliabilityProfile::CurveData**

name	mult	type	description
xvalue	1..1	<a href="#">Float</a>	The data value of the X-axis variable, depending on the X-axis units.
y1value	1..1	<a href="#">Float</a>	The data value of the first Y-axis variable, depending on the Y-axis units.

name	mult	type	description
y2value	0..1	<a href="#">Float</a>	The data value of the second Y-axis variable (if present), depending on the Y-axis units.

1124

1125

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

1126

**Table 43 – Association ends of EquipmentReliabilityProfile::CurveData with other classes**

1127

mult from	name	mult to	type	description
1..*	Curve	1..1	<a href="#">Curve</a>	The curve of this curve data point.

1128

### 1129 3.27 (Description) DCBreaker

1130 Inheritance path = [DCSwitch](#) : [DCConductingEquipment](#) : [Equipment](#) : [PowerSystemResource](#) :  
1131 [IdentifiedObject](#)

1132 A breaker within a DC system.

1133 Table 44 shows all attributes of DCBreaker.

1134

**Table 44 – Attributes of EquipmentReliabilityProfile::DCBreaker**

name	mult	type	description
ratedCurrent	0..1	<a href="#">CurrentFlow</a>	inherited from: <a href="#">DCConductingEquipment</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1135

1136

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

1137

**Table 45 – Association ends of EquipmentReliabilityProfile::DCBreaker with other classes**

1138

mult from	name	mult to	type	description
1..*	Circuit	0..1	<a href="#">Circuit</a>	(NC) inherited from: <a href="#">Equipment</a>
0..*	AggregatedEquipment	0..1	<a href="#">Equipment</a>	(NC) inherited from: <a href="#">Equipment</a>

1139

### 1140 3.28 (Description) DCBusbar

1141 Inheritance path = [DCConductingEquipment](#) : [Equipment](#) : [PowerSystemResource](#) :  
1142 [IdentifiedObject](#)

1143 A busbar within a DC system.

1144 Table 46 shows all attributes of DCBusbar.

1145

**Table 46 – Attributes of EquipmentReliabilityProfile::DCBusbar**

name	mult	type	description
ratedCurrent	0..1	<a href="#">CurrentFlow</a>	inherited from: <a href="#">DCConductingEquipment</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

name	mult	type	description
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1146

1147

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

1148

**Table 47 – Association ends of EquipmentReliabilityProfile::DCBusbar with other classes**

1149

mult from	name	mult to	type	description
1..*	Circuit	0..1	<a href="#">Circuit</a>	(NC) inherited from: <a href="#">Equipment</a>
0..*	AggregatedEquipment	0..1	<a href="#">Equipment</a>	(NC) inherited from: <a href="#">Equipment</a>

1150

1151

### 3.29 (Description) DCChopper

1152

Inheritance path = [DCConductingEquipment](#) : [Equipment](#) : [PowerSystemResource](#) : [IdentifiedObject](#)

1153

1154

Low resistance equipment used in the internal DC circuit to balance voltages. It has typically positive and negative pole terminals and a ground.

1155

1156

Table 48 shows all attributes of DCChopper.

1157

**Table 48 – Attributes of EquipmentReliabilityProfile::DCChopper**

name	mult	type	description
ratedCurrent	0..1	<a href="#">CurrentFlow</a>	inherited from: <a href="#">DCConductingEquipment</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1158

1159

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

1160

**Table 49 – Association ends of EquipmentReliabilityProfile::DCChopper with other classes**

1161

mult from	name	mult to	type	description
1..*	Circuit	0..1	<a href="#">Circuit</a>	(NC) inherited from: <a href="#">Equipment</a>
0..*	AggregatedEquipment	0..1	<a href="#">Equipment</a>	(NC) inherited from: <a href="#">Equipment</a>

1162

1163

### 3.30 (abstract) DCConductingEquipment

1164

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

1165

The parts of the DC power system that are designed to carry current or that are conductively connected through DC terminals.

1166

1167

Table 50 shows all attributes of DCConductingEquipment.

1168

**Table 50 – Attributes of EquipmentReliabilityProfile::DCConductingEquipment**

name	mult	type	description
ratedCurrent	0..1	<a href="#">CurrentFlow</a>	The maximum continuous current carrying capacity in amps governed by the device material and construction. The attribute shall be a positive value.

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1169

1170 Table 51 shows all association ends of DCConductingEquipment with other classes.

1171 **Table 51 – Association ends of EquipmentReliabilityProfile::DCConductingEquipment**  
1172 **with other classes**

mult from	name	mult to	type	description
1..*	Circuit	0..1	<a href="#">Circuit</a>	(NC) inherited from: <a href="#">Equipment</a>
0..*	AggregatedEquipment	0..1	<a href="#">Equipment</a>	(NC) inherited from: <a href="#">Equipment</a>

1173

### 1174 3.31 (Description) DCConverterUnit

1175 Inheritance path = [DCEquipmentContainer](#) : [EquipmentContainer](#) : [ConnectivityNodeContainer](#) :  
1176 [PowerSystemResource](#) : [IdentifiedObject](#)

1177 Indivisible operative unit comprising all equipment between the point of common coupling on  
1178 the AC side and the point of common coupling – DC side, essentially one or more converters,  
1179 together with one or more converter transformers, converter control equipment, essential  
1180 protective and switching devices and auxiliaries, if any, used for conversion.

1181 Table 52 shows all attributes of DCConverterUnit.

1182 **Table 52 – Attributes of EquipmentReliabilityProfile::DCConverterUnit**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1183

1184 Table 53 shows all association ends of DCConverterUnit with other classes.

1185 **Table 53 – Association ends of EquipmentReliabilityProfile::DCConverterUnit with other**  
1186 **classes**

mult from	name	mult to	type	description
0..2	DCPole	0..1	<a href="#">DCPole</a>	(NC) The DC pole that has this DC converter unit.
0..*	Substation	0..1	<a href="#">Substation</a>	The containing substation of the DC converter unit.

1187

### 1188 3.32 (NC) DCCurrentControlFunction

1189 Inheritance path = [ControlFunctionBlock](#) : [FunctionBlock](#) : [IdentifiedObject](#)

1190 DC current control function is a function block that calculates the operating point of the  
1191 controlled equipment to achieve the target current.

1192 Table 54 shows all attributes of DCCurrentControlFunction.

1193 **Table 54 – Attributes of EquipmentReliabilityProfile::DCCurrentControlFunction**

name	mult	type	description
droop	0..1	<a href="#">PU</a>	(NC) Droop constant. The pu value is obtained as $D [kV/MW] \times S_b / U_{bdc}$ . The attribute shall be a positive value.
droopCompensation	0..1	<a href="#">Resistance</a>	(NC) Compensation constant. Used to compensate for voltage drop when controlling voltage at a distant bus. The attribute shall be a positive value.
isDiscrete	1..1	<a href="#">Boolean</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
targetDeadband	0..1	<a href="#">Float</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
maxAllowedTargetValue	0..1	<a href="#">PerCent</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
minAllowedTargetValue	0..1	<a href="#">PerCent</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
priority	0..1	<a href="#">Integer</a>	(NC) inherited from: <a href="#">FunctionBlock</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1194

1195 Table 55 shows all association ends of DCCurrentControlFunction with other classes.

1196 **Table 55 – Association ends of EquipmentReliabilityProfile::DCCurrentControlFunction**  
1197 **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>

1198

1199 **3.33 (Description) DCDisconnector**1200 Inheritance path = [DCSwitch](#) : [DCConductingEquipment](#) : [Equipment](#) : [PowerSystemResource](#) :  
1201 [IdentifiedObject](#)

1202 A disconnector within a DC system.

1203 Table 56 shows all attributes of DCDisconnector.

1204 **Table 56 – Attributes of EquipmentReliabilityProfile::DCDisconnector**

name	mult	type	description
ratedCurrent	0..1	<a href="#">CurrentFlow</a>	inherited from: <a href="#">DCConductingEquipment</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1205

1206 Table 57 shows all association ends of DCDisconnector with other classes.

1207 **Table 57 – Association ends of EquipmentReliabilityProfile::DCDisconnecter with other**  
1208 **classes**

mult from	name	mult to	type	description
1..*	Circuit	0..1	<a href="#">Circuit</a>	(NC) inherited from: <a href="#">Equipment</a>
0..*	AggregatedEquipment	0..1	<a href="#">Equipment</a>	(NC) inherited from: <a href="#">Equipment</a>

1209

### 1210 3.34 (abstract) DCEquipmentContainer

1211 Inheritance path = [EquipmentContainer](#) : [ConnectivityNodeContainer](#) : [PowerSystemResource](#) :  
1212 [IdentifiedObject](#)

1213 A modelling construct to provide a root class for containment of DC as well as AC equipment.  
1214 The class differ from the EquipmentContainer for AC in that it may also contain DCNode-s.  
1215 Hence it can contain both AC and DC equipment.

1216 Table 58 shows all attributes of DCEquipmentContainer.

1217 **Table 58 – Attributes of EquipmentReliabilityProfile::DCEquipmentContainer**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1218

### 1219 3.35 (Description) DCGround

1220 Inheritance path = [DCConductingEquipment](#) : [Equipment](#) : [PowerSystemResource](#) :  
1221 [IdentifiedObject](#)

1222 A ground within a DC system.

1223 Table 59 shows all attributes of DCGround.

1224 **Table 59 – Attributes of EquipmentReliabilityProfile::DCGround**

name	mult	type	description
ratedCurrent	0..1	<a href="#">CurrentFlow</a>	inherited from: <a href="#">DCConductingEquipment</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1225

1226 Table 60 shows all association ends of DCGround with other classes.

1227 **Table 60 – Association ends of EquipmentReliabilityProfile::DCGround with other**  
1228 **classes**

mult from	name	mult to	type	description
1..*	Circuit	0..1	<a href="#">Circuit</a>	(NC) inherited from: <a href="#">Equipment</a>
0..*	AggregatedEquipment	0..1	<a href="#">Equipment</a>	(NC) inherited from: <a href="#">Equipment</a>

1229



1230 **3.36 (abstract) DCLine root class**

1231 Overhead lines and/or cables connecting two or more HVDC substations.

1232 **3.37 (Description) DCLineSegment**1233 Inheritance path = [DCConductingEquipment](#) : [Equipment](#) : [PowerSystemResource](#) :  
1234 [IdentifiedObject](#)1235 A wire or combination of wires not insulated from one another, with consistent electrical  
1236 characteristics, used to carry direct current between points in the DC region of the power  
1237 system.

1238 Table 61 shows all attributes of DCLineSegment.

1239 **Table 61 – Attributes of EquipmentReliabilityProfile::DCLineSegment**

name	mult	type	description
ratedCurrent	0..1	<a href="#">CurrentFlow</a>	inherited from: <a href="#">DCConductingEquipment</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1240

1241 Table 62 shows all association ends of DCLineSegment with other classes.

1242 **Table 62 – Association ends of EquipmentReliabilityProfile::DCLineSegment with other**  
1243 **classes**

mult from	name	mult to	type	description
1..*	Circuit	0..1	<a href="#">Circuit</a>	(NC) inherited from: <a href="#">Equipment</a>
0..*	AggregatedEquipment	0..1	<a href="#">Equipment</a>	(NC) inherited from: <a href="#">Equipment</a>

1244

1245 **3.38 (NC) DCPole**1246 Inheritance path = [PowerSystemResource](#) : [IdentifiedObject](#)1247 The direct current (DC) pole is the circuit which includes converter units from both sides and  
1248 the relevant direct current line. This forms the smallest unit of transmission control.

1249 Table 63 shows all attributes of DCPole.

1250 **Table 63 – Attributes of EquipmentReliabilityProfile::DCPole**

name	mult	type	description
participationFactor	0..1	<a href="#">Float</a>	(NC) Participation factor describing the entity part of the active power provided by a collection of entities (e.g. an active power forecast to a collection of entities is divided to each of the member entity according to the participation factor). Must be a positive value.  In the case of a sharing strategy, the distribution is following entities value (V) equals aggregated value (T) divided by sum of participation factors (PF), i.e. $V=T/\text{sum}(PF)$ .  In the case of priority strategy, the item with the lowest number gets allocated energy first.
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

name	mult	type	description
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1251

1252

Table 64 shows all association ends of DCPole with other classes.

1253

**Table 64 – Association ends of EquipmentReliabilityProfile::DCPole with other classes**

mult from	name	mult to	type	description
0..*	DCTieCorridor	0..1	<a href="#">DCTieCorridor</a>	(NC) The DCTieCorridor that has this DC pole.
0..1	DCLine	0..1	<a href="#">DCLine</a>	(NC) The DC line that is related to this DC pole.

1254

### 3.39 (Description) DCSeriesDevice

Inheritance path = [DCConductingEquipment](#) : [Equipment](#) : [PowerSystemResource](#) : [IdentifiedObject](#)

1257

1258

A series device within the DC system, typically a reactor used for filtering or smoothing. Needed for transient and short circuit studies.

1259

1260

Table 65 shows all attributes of DCSeriesDevice.

1261

**Table 65 – Attributes of EquipmentReliabilityProfile::DCSeriesDevice**

name	mult	type	description
ratedCurrent	0..1	<a href="#">CurrentFlow</a>	inherited from: <a href="#">DCConductingEquipment</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1262

1263

Table 66 shows all association ends of DCSeriesDevice with other classes.

1264

1265

**Table 66 – Association ends of EquipmentReliabilityProfile::DCSeriesDevice with other classes**

mult from	name	mult to	type	description
1..*	Circuit	0..1	<a href="#">Circuit</a>	(NC) inherited from: <a href="#">Equipment</a>
0..*	AggregatedEquipment	0..1	<a href="#">Equipment</a>	(NC) inherited from: <a href="#">Equipment</a>

1266

### 3.40 (Description) DCShunt

Inheritance path = [DCConductingEquipment](#) : [Equipment](#) : [PowerSystemResource](#) : [IdentifiedObject](#)

1269

1270

A shunt device within the DC system, typically used for filtering. Needed for transient and short circuit studies.

1271

1272

Table 67 shows all attributes of DCShunt.

1273

**Table 67 – Attributes of EquipmentReliabilityProfile::DCShunt**

name	mult	type	description
ratedCurrent	0..1	<a href="#">CurrentFlow</a>	inherited from: <a href="#">DCConductingEquipment</a>

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1274

1275 Table 68 shows all association ends of DCShunt with other classes.

1276 **Table 68 – Association ends of EquipmentReliabilityProfile::DCShunt with other classes**

mult from	name	mult to	type	description
1..*	Circuit	0..1	<a href="#">Circuit</a>	(NC) inherited from: <a href="#">Equipment</a>
0..*	AggregatedEquipment	0..1	<a href="#">Equipment</a>	(NC) inherited from: <a href="#">Equipment</a>

1277

1278 **3.41 (Description) DCSwitch**1279 Inheritance path = [DCConductingEquipment](#) : [Equipment](#) : [PowerSystemResource](#) :  
1280 [IdentifiedObject](#)

1281 A switch within the DC system.

1282 Table 69 shows all attributes of DCSwitch.

1283 **Table 69 – Attributes of EquipmentReliabilityProfile::DCSwitch**

name	mult	type	description
ratedCurrent	0..1	<a href="#">CurrentFlow</a>	inherited from: <a href="#">DCConductingEquipment</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1284

1285 Table 70 shows all association ends of DCSwitch with other classes.

1286 **Table 70 – Association ends of EquipmentReliabilityProfile::DCSwitch with other**  
1287 **classes**

mult from	name	mult to	type	description
1..*	Circuit	0..1	<a href="#">Circuit</a>	(NC) inherited from: <a href="#">Equipment</a>
0..*	AggregatedEquipment	0..1	<a href="#">Equipment</a>	(NC) inherited from: <a href="#">Equipment</a>

1288

1289 **3.42 (NC) DCTieCorridor**1290 Inheritance path = [TieCorridor](#) : [PowerSystemResource](#) : [IdentifiedObject](#)

1291 A collection of one or more direct current poles that connect two different control areas.

1292 Table 71 shows all attributes of DCTieCorridor.

1293 **Table 71 – Attributes of EquipmentReliabilityProfile::DCTieCorridor**

name	mult	type	description
maxRegulatingReserve	0..1	<a href="#">ActivePower</a>	(NC) Maximum regulating reserve.
minRegulatingReserve	0..1	<a href="#">ActivePower</a>	(NC) Minimum regulating reserve.

name	mult	type	description
rampingKind	0..1	<a href="#">RampingPrincipleKind</a>	(NC) Ramping principle is used to define a transition from one scheduled value to next one.
delayRegulatingReserve	0..1	<a href="#">Seconds</a>	(NC) inherited from: <a href="#">TieCorridor</a>
maxRegulatingReserveRamp	0..1	<a href="#">Float</a>	(NC) inherited from: <a href="#">TieCorridor</a>
thresholdRegulatingReserve	0..1	<a href="#">ActivePower</a>	(NC) inherited from: <a href="#">TieCorridor</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1294

1295

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

1296

1297

**Table 72 – Association ends of EquipmentReliabilityProfile::DCTieCorridor with other classes**

mult from	name	mult to	type	description
0..1	SchedulingArea	0..1	<a href="#">SchedulingArea</a>	(NC) The scheduling area that has this DC tie corridor.
0..1	DirectCurrentController	0..1	<a href="#">DirectCurrentController</a>	(NC) Direct current controller for this DCTieCorridor.
0..*	LoadFrequencyControlArea	0..1	<a href="#">LoadFrequencyControlArea</a>	(NC) inherited from: <a href="#">TieCorridor</a>
0..*	BiddingZoneBorder	0..1	<a href="#">BiddingZoneBorder</a>	(NC) inherited from: <a href="#">TieCorridor</a>

1298

1299

### 3.43 (NC) DCVoltageControlFunction

1300

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

1301

DC voltage control function is a function block that calculate the operating point of the controlled equipment to achieve the target voltage.

1302

Table 73 shows all attributes of DCVoltageControlFunction.

1303

1304

**Table 73 – Attributes of EquipmentReliabilityProfile::DCVoltageControlFunction**

name	mult	type	description
isDiscrete	1..1	<a href="#">Boolean</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
targetDeadband	0..1	<a href="#">Float</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
maxAllowedTargetValue	0..1	<a href="#">PerCent</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
minAllowedTargetValue	0..1	<a href="#">PerCent</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
priority	0..1	<a href="#">Integer</a>	(NC) inherited from: <a href="#">FunctionBlock</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1305

1306

Table 74 shows all association ends of DCVoltageControlFunction with other classes.

1307 **Table 74 – Association ends of EquipmentReliabilityProfile::DCVoltageControlFunction**  
1308 **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>

1309

### 1310 3.44 (NC) DirectCurrentCircuit

1311 Inheritance path = [Circuit](#) : [PowerSystemResource](#) : [IdentifiedObject](#)

1312 A direct current circuit is a circuit consists of direct current equipment.

1313 Table 75 shows all attributes of DirectCurrentCircuit.

1314 **Table 75 – Attributes of EquipmentReliabilityProfile::DirectCurrentCircuit**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1315

### 1316 3.45 (NC) DirectCurrentController

1317 Inheritance path = [EquipmentController](#) : [AutomationFunction](#) : [PowerSystemResource](#) :  
1318 [IdentifiedObject](#)

1319 Power flow controller for direct current that can be used in high-voltage direct current grids and  
1320 for low-voltage direct current microgrids. It uses a high-frequency isolated dc-dc converter  
1321 cascaded with a controllable full-bridge inverter that creates a small bipolar voltage in series  
1322 with the line. The controller can control the power and compensate for accumulated voltage  
1323 drop in a distribution line.

1324 Table 76 shows all attributes of DirectCurrentController.

1325 **Table 76 – Attributes of EquipmentReliabilityProfile::DirectCurrentController**

name	mult	type	description
type	0..1	<a href="#">String</a>	(NC) inherited from: <a href="#">AutomationFunction</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1326

1327 Table 77 shows all association ends of DirectCurrentController with other classes.

1328 **Table 77 – Association ends of EquipmentReliabilityProfile::DirectCurrentController**  
1329 **with other classes**

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

1330

1331 **3.46 (NC) DirectCurrentSystemOperator**1332 Inheritance path = [SystemOperator](#) : [PowerSystemOrganisationRole](#) : [OrganisationRole](#) :  
1333 [IdentifiedObject](#)1334 System operator of the direct current pole. There are typically one or two system operators that  
1335 are operating either the control area at one side or the control areas at both sides of the direct  
1336 current pole. In some cases it is operated by an operator from the connected control areas.

1337 Table 78 shows all attributes of DirectCurrentSystemOperator.

1338 **Table 78 – Attributes of EquipmentReliabilityProfile::DirectCurrentSystemOperator**

name	mult	type	description
globalLocationNumber	0..1	<a href="#">String</a>	(NC) inherited from: <a href="#">OrganisationRole</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1339  
1340 Table 79 shows all association ends of DirectCurrentSystemOperator with other classes.1341 **Table 79 – Association ends of**  
1342 **EquipmentReliabilityProfile::DirectCurrentSystemOperator with other classes**

mult from	name	mult to	type	description
0..*	Organisation	0..1	<a href="#">Organisation</a>	inherited from: <a href="#">OrganisationRole</a>

1343

1344 **3.47 (NC) DistributionSystemOperator**1345 Inheritance path = [SystemOperator](#) : [PowerSystemOrganisationRole](#) : [OrganisationRole](#) :  
1346 [IdentifiedObject](#)1347 A system operator that is responsible for operating of energy distribution network from  
1348 transmission level down to low voltage levels including the connection to household.

1349 Table 80 shows all attributes of DistributionSystemOperator.

1350 **Table 80 – Attributes of EquipmentReliabilityProfile::DistributionSystemOperator**

name	mult	type	description
globalLocationNumber	0..1	<a href="#">String</a>	(NC) inherited from: <a href="#">OrganisationRole</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1351  
1352 Table 81 shows all association ends of DistributionSystemOperator with other classes.1353 **Table 81 – Association ends of**  
1354 **EquipmentReliabilityProfile::DistributionSystemOperator with other classes**

mult from	name	mult to	type	description
0..*	Organisation	0..1	<a href="#">Organisation</a>	inherited from: <a href="#">OrganisationRole</a>

1355

1356 **3.48 (NC) DurationOverloadLimitCurve**1357 Inheritance path = [LimitDependencyCurve](#) : [Curve](#) : [IdentifiedObject](#)

1358 A curve or functional relationship between

1359 - the overload duration independent variable (X-axis), and

1360 - temporary overloading (TATL) limiting dependent (Y-axis) variables.

1361 Table 82 shows all attributes of DurationOverloadLimitCurve.

1362 **Table 82 – Attributes of EquipmentReliabilityProfile::DurationOverloadLimitCurve**

name	mult	type	description
curveStyle	1..1	<a href="#">CurveStyle</a>	inherited from: <a href="#">Curve</a>
xMultiplier	0..1	<a href="#">UnitMultiplier</a>	inherited from: <a href="#">Curve</a>
xUnit	1..1	<a href="#">UnitSymbol</a>	inherited from: <a href="#">Curve</a>
y1Multiplier	0..1	<a href="#">UnitMultiplier</a>	inherited from: <a href="#">Curve</a>
y1Unit	0..1	<a href="#">UnitSymbol</a>	inherited from: <a href="#">Curve</a>
y2Multiplier	0..1	<a href="#">UnitMultiplier</a>	inherited from: <a href="#">Curve</a>
y2Unit	0..1	<a href="#">UnitSymbol</a>	inherited from: <a href="#">Curve</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1363

1364 **3.49 (NC) EnergyAlignmentCoordinator**1365 Inheritance path = [SystemOperationCoordinator](#) : [PowerSystemOrganisationRole](#) :  
1366 [OrganisationRole](#) : [IdentifiedObject](#)1367 A role that is responsible for alignment of forecast and schedule energy to a given energy  
1368 coordination region.

1369 Table 83 shows all attributes of EnergyAlignmentCoordinator.

1370 **Table 83 – Attributes of EquipmentReliabilityProfile::EnergyAlignmentCoordinator**

name	mult	type	description
globalLocationNumber	0..1	<a href="#">String</a>	(NC) inherited from: <a href="#">OrganisationRole</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1371

1372 Table 84 shows all association ends of EnergyAlignmentCoordinator with other classes.

1373 **Table 84 – Association ends of**  
1374 **EquipmentReliabilityProfile::EnergyAlignmentCoordinator with other classes**

mult from	name	mult to	type	description
0..*	Organisation	0..1	<a href="#">Organisation</a>	inherited from: <a href="#">OrganisationRole</a>

1375

1376 **3.50 (NC) EnergyBlockComponent**1377 Inheritance path = [EnergyComponent](#) : [IdentifiedObject](#)

1378 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.

1379 Table 85 shows all attributes of EnergyBlockComponent.

1381 **Table 85 – Attributes of EquipmentReliabilityProfile::EnergyBlockComponent**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1382

1383 Table 86 shows all association ends of EnergyBlockComponent with other classes.

1384 **Table 86 – Association ends of EquipmentReliabilityProfile::EnergyBlockComponent with other classes**

1385

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

1386

1387 **3.51 (NC) EnergyBlockOrder**1388 Inheritance path = [IdentifiedObject](#)

1389 The energy block order is a block (an amount) of active power that forms the sequence of active power orders that are going to be distributed to an energy block component.

1390 Table 87 shows all attributes of EnergyBlockOrder.

1392 **Table 87 – Attributes of EquipmentReliabilityProfile::EnergyBlockOrder**

name	mult	type	description
sequence	1..1	<a href="#">Integer</a>	(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	<a href="#">Float</a>	(NC) Block order long term economic participation factor.
shortPF	0..1	<a href="#">Float</a>	(NC) Block order short term economic participation factor.
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1393

1394 Table 88 shows all association ends of EnergyBlockOrder with other classes.



1395 **Table 88 – Association ends of EquipmentReliabilityProfile::EnergyBlockOrder with**  
1396 **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.

1397

### 1398 3.52 (abstract,NC) EnergyComponent

1399 Inheritance path = [IdentifiedObject](#)

1400 The energy component is an active power component for an energy producer or a consumer  
1401 that has the same energy characteristic, e.g. fuel type and technology.

1402 Table 89 shows all attributes of EnergyComponent.

1403 **Table 89 – Attributes of EquipmentReliabilityProfile::EnergyComponent**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1404

1405 Table 90 shows all association ends of EnergyComponent with other classes.

1406 **Table 90 – Association ends of EquipmentReliabilityProfile::EnergyComponent with**  
1407 **other classes**

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

1408

### 1409 3.53 (abstract) EnergyConnection

1410 Inheritance path = [ConductingEquipment](#) : [Equipment](#) : [PowerSystemResource](#) :  
1411 [IdentifiedObject](#)

1412 A connection of energy generation or consumption on the power system model.

1413 Table 91 shows all attributes of EnergyConnection.

1414 **Table 91 – Attributes of EquipmentReliabilityProfile::EnergyConnection**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

name	mult	type	description
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1415

1416

Table 92 shows all association ends of EnergyConnection with other classes.

1417

**Table 92 – Association ends of EquipmentReliabilityProfile::EnergyConnection with other classes**

1418

mult from	name	mult to	type	description
1..*	Circuit	0..1	<a href="#">Circuit</a>	(NC) inherited from: <a href="#">Equipment</a>
0..*	AggregatedEquipment	0..1	<a href="#">Equipment</a>	(NC) inherited from: <a href="#">Equipment</a>

1419

1420

### 3.54 (Description) EnergyConsumer

1421

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

1422

1423

Generic user of energy - a point of consumption on the power system model.

1424

EnergyConsumer.pfixed, .qfixed, .pfixedPct and .qfixedPct have meaning only if there is no

1425

LoadResponseCharacteristic associated with EnergyConsumer or if

1426

LoadResponseCharacteristic.exponentModel is set to False.

1427

Table 93 shows all attributes of EnergyConsumer.

1428

**Table 93 – Attributes of EquipmentReliabilityProfile::EnergyConsumer**

name	mult	type	description
longPF	0..1	<a href="#">Float</a>	(NC) Energy consumer long term economic participation factor.
maxEconomicP	0..1	<a href="#">ActivePower</a>	(NC) Maximum high economic active power limit, that should not exceed the maximum operating active power limit.
minEconomicP	0..1	<a href="#">ActivePower</a>	(NC) Low economic active power limit that shall be greater than or equal to the minimum operating active power limit.
shortPF	0..1	<a href="#">Float</a>	(NC) Energy consumer short term economic participation factor.
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1429

1430

Table 94 shows all association ends of EnergyConsumer with other classes.

1431

**Table 94 – Association ends of EquipmentReliabilityProfile::EnergyConsumer with other classes**

1432

mult from	name	mult to	type	description
1..*	Circuit	0..1	<a href="#">Circuit</a>	(NC) inherited from: <a href="#">Equipment</a>
0..*	AggregatedEquipment	0..1	<a href="#">Equipment</a>	(NC) inherited from: <a href="#">Equipment</a>

1433

1434 **3.55 (NC) EnergyCoordinationRegion**1435 Inheritance path = [Region](#) : [PowerSystemResource](#) : [IdentifiedObject](#)1436 A region that has a common organisation or a service that is responsible for alignment of  
1437 forecast and scheduling of energy.

1438 Table 95 shows all attributes of EnergyCoordinationRegion.

1439 **Table 95 – Attributes of EquipmentReliabilityProfile::EnergyCoordinationRegion**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1440

1441 Table 96 shows all association ends of EnergyCoordinationRegion with other classes.

1442 **Table 96 – Association ends of EquipmentReliabilityProfile::EnergyCoordinationRegion**  
1443 **with other classes**

mult from	name	mult to	type	description
0..*	EnergyAlignmentCoordinator	0..1	<a href="#">EnergyAlignmentCoordinator</a>	(NC) The energy alignment coordinator that operates this energy coordination region.
0..*	OverlappingZone	0..1	<a href="#">OverlappingZone</a>	(NC) inherited from: <a href="#">Region</a>

1444

1445 **3.56 (NC) EnergyGroup**1446 Inheritance path = [PowerSystemResource](#) : [IdentifiedObject](#)1447 An energy group is an aggregation of energy components which have the same energy  
1448 characteristic, e.g. fuel type and technology. It can be used to allocate energy.

1449 Table 97 shows all attributes of EnergyGroup.

1450 **Table 97 – Attributes of EquipmentReliabilityProfile::EnergyGroup**

name	mult	type	description
longPF	0..1	<a href="#">Float</a>	(NC) Energy group long term economic participation factor.
shortPF	0..1	<a href="#">Float</a>	(NC) Energy group short term economic participation factor.
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1451

1452 Table 98 shows all association ends of EnergyGroup with other classes.

1453 **Table 98 – Association ends of EquipmentReliabilityProfile::EnergyGroup with other**  
1454 **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.

1455

### 1456 3.57 (abstract,NC) EnergyTypeReference root class

1457 An energy type reference refers to an energy characteristic that is needed for reporting, e.g.  
1458 European Energy Certificate System (EECS). The kind of energy should be possible to be linked  
1459 with different type of energy forecast, e.g. wind production for a given area based on wind  
1460 forecast.

### 1461 3.58 (Description) Equipment

1462 Inheritance path = [PowerSystemResource](#) : [IdentifiedObject](#)  
1463 The parts of a power system that are physical devices, electronic or mechanical.  
1464 Table 99 shows all attributes of Equipment.

1465 **Table 99 – Attributes of EquipmentReliabilityProfile::Equipment**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1466

1467 Table 100 shows all association ends of Equipment with other classes.

1468 **Table 100 – Association ends of EquipmentReliabilityProfile::Equipment with other**  
1469 **classes**

mult from	name	mult to	type	description
1..*	Circuit	0..1	<a href="#">Circuit</a>	(NC) The circuit that contains its member equipment.
0..*	AggregatedEquipment	0..1	<a href="#">Equipment</a>	(NC) An aggregated representation of the detailed equipment.

1470

### 1471 3.59 (abstract) EquipmentContainer

1472 Inheritance path = [ConnectivityNodeContainer](#) : [PowerSystemResource](#) : [IdentifiedObject](#)  
1473 A modelling construct to provide a root class for containing equipment.  
1474 Table 101 shows all attributes of EquipmentContainer.

1475 **Table 101 – Attributes of EquipmentReliabilityProfile::EquipmentContainer**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

name	mult	type	description
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1476

### 1477 3.60 (abstract,NC) EquipmentController

1478 Inheritance path = [AutomationFunction](#) : [PowerSystemResource](#) : [IdentifiedObject](#)

1479 Equipment controller is an automation function that can control one or multiple equipment function to achieve all the targets inside the given tolerance.

1480 Table 102 shows all attributes of EquipmentController.

1482

**Table 102 – Attributes of EquipmentReliabilityProfile::EquipmentController**

name	mult	type	description
type	0..1	<a href="#">String</a>	(NC) inherited from: <a href="#">AutomationFunction</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1483

1484 Table 103 shows all association ends of EquipmentController with other classes.

**Table 103 – Association ends of EquipmentReliabilityProfile::EquipmentController with other classes**

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

1487

### 1488 3.61 (Description) EquivalentInjection root class

1489 This class represents equivalent injections (generation or load). Voltage regulation is allowed only at the point of connection.

1491 Table 104 shows all association ends of EquivalentInjection with other classes.

**Table 104 – Association ends of EquipmentReliabilityProfile::EquivalentInjection with other classes**

mult from	name	mult to	type	description
0..*	InjectionController	0..1	<a href="#">InjectionController</a>	(NC) Injection controller which controls the equivalent injection.

1494

### 1495 3.62 (NC) ExceptionalPowerTransferCorridor

1496 Inheritance path = [PowerTransferCorridor](#) : [PowerSystemResource](#) : [IdentifiedObject](#)

1497 Potential power transfer corridor that can be triggered by equipment which changes its in service status or it is operating in an island.

1499 Table 105 shows all attributes of ExceptionalPowerTransferCorridor.

1500

**Table 105 – Attributes of EquipmentReliabilityProfile::ExceptionalPowerTransferCorridor**

name	mult	type	description
normalEnabled	0..1	<a href="#">Boolean</a>	(NC) inherited from: <a href="#">PowerTransferCorridor</a>

1501

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1502

1503 **3.63 (NC) FacilityPlantController**1504 Inheritance path = [EquipmentController](#) : [AutomationFunction](#) : [PowerSystemResource](#) :  
1505 [IdentifiedObject](#)

1506 Facility plant controller is controlling the equipment to optimize the facility plant.

1507 Table 106 shows all attributes of FacilityPlantController.

1508 **Table 106 – Attributes of EquipmentReliabilityProfile::FacilityPlantController**

name	mult	type	description
type	0..1	<a href="#">String</a>	(NC) inherited from: <a href="#">AutomationFunction</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1509

1510 Table 107 shows all association ends of FacilityPlantController with other classes.

1511 **Table 107 – Association ends of EquipmentReliabilityProfile::FacilityPlantController**  
1512 **with other classes**

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

1513

1514 **3.64 (abstract,NC) FACTSEquipment**1515 Inheritance path = [RegulatingCondEq](#) : [EnergyConnection](#) : [ConductingEquipment](#) :  
1516 [Equipment](#) : [PowerSystemResource](#) : [IdentifiedObject](#)

1517 Flexible Alternating Current Transmission System regulating equipment.

1518 Table 108 shows all attributes of FACTSEquipment.

1519 **Table 108 – Attributes of EquipmentReliabilityProfile::FACTSEquipment**

name	mult	type	description
capacitiveRating	1..1	<a href="#">Reactance</a>	(NC) Capacitive reactance at maximum reactive power. Shall always be positive.
inductiveRating	1..1	<a href="#">Reactance</a>	(NC) Inductive rating at maximum inductive reactive power. Shall always be negative.
slope	1..1	<a href="#">VoltagePerReactivePower</a>	(NC) The characteristics slope which 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.
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>

name	mult	type	description
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1520

1521 Table 109 shows all association ends of FACTSEquipment with other classes.

1522 **Table 109 – Association ends of EquipmentReliabilityProfile::FACTSEquipment with**  
1523 **other classes**

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

1524

1525 **3.65 Feeder**1526 Inheritance path = [EquipmentContainer](#) : [ConnectivityNodeContainer](#) : [PowerSystemResource](#) :  
1527 [IdentifiedObject](#)

1528 A collection of equipment for organizational purposes, used for grouping distribution resources.

1529 The organization a feeder does not necessarily reflect connectivity or current operation state.

1530 Table 110 shows all attributes of Feeder.

1531 **Table 110 – Attributes of EquipmentReliabilityProfile::Feeder**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1532

1533 Table 111 shows all association ends of Feeder with other classes.

1534 **Table 111 – Association ends of EquipmentReliabilityProfile::Feeder with other classes**

mult from	name	mult to	type	description
0..*	NormalEnergizingSubstation	0..1	<a href="#">Substation</a>	The substation that nominally energizes the feeder. Also used for naming purposes.
0..1	NamingSecondarySubstation	0..*	<a href="#">Substation</a>	The secondary substations that are normally energized from the feeder. Used for naming purposes. Should be consistent with the other associations for energizing terminal specification and the feeder energization specification.
0..*	SubSchedulingArea	0..1	<a href="#">SubSchedulingArea</a>	(NC) The subscheduling area that has this feeder.
0..*	NormalEnergizedSubstation	0..*	<a href="#">Substation</a>	The substations that are normally energized by the feeder.

1535

1536 **3.66 (NC) FlexibleEnergyUnit**1537 Inheritance path = [PowerElectronicsUnit](#) : [Equipment](#) : [PowerSystemResource](#) :  
1538 [IdentifiedObject](#)

1539 Flexible consumer or embedded producer of energy. The unit cannot be a net producer.

1540 Table 112 shows all attributes of FlexibleEnergyUnit.

1541 **Table 112 – Attributes of EquipmentReliabilityProfile::FlexibleEnergyUnit**

name	mult	type	description
uncontrollable	0..1	<a href="#">ActivePower</a>	(NC) The 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	<a href="#">ActivePower</a>	(NC) The 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	<a href="#">ActivePower</a>	(NC) The 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	<a href="#">ActivePower</a>	(NC) The 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.
longPF	0..1	<a href="#">Float</a>	(NC) inherited from: <a href="#">PowerElectronicsUnit</a>
maxEconomicP	0..1	<a href="#">ActivePower</a>	(NC) inherited from: <a href="#">PowerElectronicsUnit</a>
minEconomicP	0..1	<a href="#">ActivePower</a>	(NC) inherited from: <a href="#">PowerElectronicsUnit</a>
shortPF	0..1	<a href="#">Float</a>	(NC) inherited from: <a href="#">PowerElectronicsUnit</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1542

1543 Table 113 shows all association ends of FlexibleEnergyUnit with other classes.

1544 **Table 113 – Association ends of EquipmentReliabilityProfile::FlexibleEnergyUnit with**  
1545 **other classes**

mult from	name	mult to	type	description
0..*	PrimaryEnergySource	0..1	<a href="#">EnergyTypeReference</a>	inherited from: <a href="#">PowerElectronicsUnit</a>
0..*	ScheduleResource	0..1	<a href="#">ScheduleResource</a>	(NC) inherited from: <a href="#">PowerElectronicsUnit</a>
1..*	Circuit	0..1	<a href="#">Circuit</a>	(NC) inherited from: <a href="#">Equipment</a>
0..*	AggregatedEquipment	0..1	<a href="#">Equipment</a>	(NC) inherited from: <a href="#">Equipment</a>



1546

1547 **3.67 (Description) FossilFuel root class**1548 The fossil fuel consumed by the non-nuclear thermal generating unit. For example, coal, oil,  
1549 gas, etc. These are the specific fuels that the generating unit can consume.

1550 Table 114 shows all association ends of FossilFuel with other classes.

1551 **Table 114 – Association ends of EquipmentReliabilityProfile::FossilFuel with other**  
1552 **classes**

mult from	name	mult to	type	description
0..*	FuelStorage	0..1	<a href="#">FuelStorage</a>	(NC) Fuel storage that store fossil fuels.

1553

1554 **3.68 (NC) FuelStorage**1555 Inheritance path = [PowerSystemResource](#) : [IdentifiedObject](#)

1556 Fuel storage. e.g. pile of coal that can be shared between multiple thermal generating units.

1557 Table 115 shows all attributes of FuelStorage.

1558 **Table 115 – Attributes of EquipmentReliabilityProfile::FuelStorage**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1559

1560 **3.69 (abstract,NC) FunctionBlock**1561 Inheritance path = [IdentifiedObject](#)1562 Function block is a function described as a set of elementary blocks. The blocks describe the  
1563 function between input variables and output variables.

1564 Table 116 shows all attributes of FunctionBlock.

1565 **Table 116 – Attributes of EquipmentReliabilityProfile::FunctionBlock**

name	mult	type	description
priority	0..1	<a href="#">Integer</a>	(NC) Value 0 means ignore priority. 1 means the highest priority, 2 is the second highest priority.
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1566

1567 Table 117 shows all association ends of FunctionBlock with other classes.

1568 **Table 117 – Association ends of EquipmentReliabilityProfile::FunctionBlock with other**  
1569 **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.

1570

### 1571 3.70 (abstract,NC) FunctionInputVariable

1572 Inheritance path = [IdentifiedObject](#)

1573 Functional input variable defines the domain of the function.

1574 Table 118 shows all attributes of FunctionInputVariable.

1575 **Table 118 – Attributes of EquipmentReliabilityProfile::FunctionInputVariable**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1576

1577 Table 119 shows all association ends of FunctionInputVariable with other classes.

1578 **Table 119 – Association ends of EquipmentReliabilityProfile::FunctionInputVariable**  
1579 **with other classes**

mult from	name	mult to	type	description
1..*	Function	1..1	<a href="#">FunctionBlock</a>	(NC) Function block describe the function that function input variable provides the domain for.

1580

### 1581 3.71 (NC) FunctionOutputVariable

1582 Inheritance path = [IdentifiedObject](#)

1583 Functional output variable defines the codomain of the function.

1584 Table 120 shows all attributes of FunctionOutputVariable.

1585 **Table 120 – Attributes of EquipmentReliabilityProfile::FunctionOutputVariable**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1586

1587 Table 121 shows all association ends of FunctionOutputVariable with other classes.

1588 **Table 121 – Association ends of EquipmentReliabilityProfile::FunctionOutputVariable**  
1589 **with other classes**

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

1590

### 1591 3.72 (NC) GateInputPin

1592 Inheritance path = [FunctionInputVariable](#) : [IdentifiedObject](#)

1593 Input pin for a logical gate. The condition described in the input pin gives a logical true or false.

1594 The result from measurement and calculation are converted to a true or false.

1595 Table 122 shows all attributes of GateInputPin.

1596 **Table 122 – Attributes of EquipmentReliabilityProfile::GateInputPin**

name	mult	type	description
absoluteValue	0..1	<a href="#">Boolean</a>	(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	<a href="#">Duration</a>	(NC) The time duration for which the condition is satisfied before acting. Default is 0 seconds.
negate	0..1	<a href="#">Boolean</a>	(NC) Invert/negate the result of the comparison.
thresholdPercentage	0..1	<a href="#">PerCent</a>	(NC) The threshold percentage that should be used for compare with the percentage change between input value and threshold value. The allowed value range is [0,100].
thresholdValue	0..1	<a href="#">Float</a>	(NC) The threshold value that should be used for compare with the input value.
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1597

1598 Table 123 shows all association ends of GateInputPin with other classes.

1599 **Table 123 – Association ends of EquipmentReliabilityProfile::GateInputPin with other**  
1600 **classes**

mult from	name	mult to	type	description
1..*	Function	1..1	<a href="#">FunctionBlock</a>	(NC) inherited from: <a href="#">FunctionInputVariable</a>

1601

### 1602 3.73 (Description) GeneratingUnit

1603 Inheritance path = [Equipment](#) : [PowerSystemResource](#) : [IdentifiedObject](#)

1604 A single or set of synchronous machines for converting mechanical power into alternating-  
1605 current power. For example, individual machines within a set may be defined for scheduling  
1606 purposes while a single control signal is derived for the set. In this case there would be a  
1607 GeneratingUnit for each member of the set and an additional GeneratingUnit corresponding to  
1608 the set.

1609 Table 124 shows all attributes of GeneratingUnit.

1610 **Table 124 – Attributes of EquipmentReliabilityProfile::GeneratingUnit**

name	mult	type	description
maxEconomicP	0..1	<a href="#">ActivePower</a>	Maximum high economic active power limit, that should not exceed the maximum operating active power limit.
maxStartupLoad	0..1	<a href="#">ActivePower</a>	(NC) Maximum consumption by the generating unit as part of the startup process.
minEconomicP	0..1	<a href="#">ActivePower</a>	Low economic active power limit that shall be greater than or equal to the minimum operating active power limit.
shutdownCost	0..1	<a href="#">Money</a>	(NC) The shutdown cost incurred for each shutdown of the GeneratingUnit.
shutdownTime	0..1	<a href="#">Duration</a>	(NC) Time it takes to shutdown the unit.
lowerRampRate	0..1	<a href="#">ActivePowerChangeRate</a>	The normal maximum rate the generating unit active power output can be lowered by control actions.
raiseRampRate	0..1	<a href="#">ActivePowerChangeRate</a>	The normal maximum rate the generating unit active power output can be raised by control actions.
minimumOffTime	0..1	<a href="#">Seconds</a>	Minimum time interval between unit shutdown and startup.
warmStartupTime	0..1	<a href="#">Duration</a>	(NC) Time it takes to startup the unit when it is warm.
coolDownTime	0..1	<a href="#">Duration</a>	(NC) Time it takes from a unit shutdown until it is considered cold.
warmStartupCost	0..1	<a href="#">Money</a>	(NC) The warm startup cost incurred for each start of the GeneratingUnit.
startupRampRate	0..1	<a href="#">ActivePowerChangeRate</a>	(NC) The startup ramp rate of the generating unit which describes the speed of change of active power from zero to the minimum active power. When the ramp is not provided, the optimisation process shall consider the change as an instant change of active power from zero to minimum active power.
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1611

1612 Table 125 shows all association ends of GeneratingUnit with other classes.

1613 **Table 125 – Association ends of EquipmentReliabilityProfile::GeneratingUnit with other**  
1614 **classes**

mult from	name	mult to	type	description
0..*	PrimaryEnergySource	0..1	<a href="#">EnergyTypeReference</a>	Primary energy reference type for this generating unit.
0..*	ScheduleResource	0..1	<a href="#">ScheduleResource</a>	(NC) The schedule resource that has this generating unit.
1..*	Circuit	0..1	<a href="#">Circuit</a>	(NC) inherited from: <a href="#">Equipment</a>
0..*	AggregatedEquipment	0..1	<a href="#">Equipment</a>	(NC) inherited from: <a href="#">Equipment</a>

1615

### 1616 3.74 (NC) GeothermalGeneratingUnit

1617 Inheritance path = [GeneratingUnit](#) : [Equipment](#) : [PowerSystemResource](#) : [IdentifiedObject](#)

1618 Generating unit that is generating electrical power from geothermal energy.

1619 Table 126 shows all attributes of GeothermalGeneratingUnit.

1620 **Table 126 – Attributes of EquipmentReliabilityProfile::GeothermalGeneratingUnit**

name	mult	type	description
kind	1..1	<a href="#">GeothermalUnitKind</a>	(NC) Kind of geothermal generating unit.
maxEconomicP	0..1	<a href="#">ActivePower</a>	inherited from: <a href="#">GeneratingUnit</a>
maxStartupLoad	0..1	<a href="#">ActivePower</a>	(NC) inherited from: <a href="#">GeneratingUnit</a>
minEconomicP	0..1	<a href="#">ActivePower</a>	inherited from: <a href="#">GeneratingUnit</a>
shutdownCost	0..1	<a href="#">Money</a>	(NC) inherited from: <a href="#">GeneratingUnit</a>
shutdownTime	0..1	<a href="#">Duration</a>	(NC) inherited from: <a href="#">GeneratingUnit</a>
lowerRampRate	0..1	<a href="#">ActivePowerChangeRate</a>	inherited from: <a href="#">GeneratingUnit</a>
raiseRampRate	0..1	<a href="#">ActivePowerChangeRate</a>	inherited from: <a href="#">GeneratingUnit</a>
minimumOffTime	0..1	<a href="#">Seconds</a>	inherited from: <a href="#">GeneratingUnit</a>
warmStartupTime	0..1	<a href="#">Duration</a>	(NC) inherited from: <a href="#">GeneratingUnit</a>
coolDownTime	0..1	<a href="#">Duration</a>	(NC) inherited from: <a href="#">GeneratingUnit</a>
warmStartupCost	0..1	<a href="#">Money</a>	(NC) inherited from: <a href="#">GeneratingUnit</a>
startupRampRate	0..1	<a href="#">ActivePowerChangeRate</a>	(NC) inherited from: <a href="#">GeneratingUnit</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1621

1622 Table 127 shows all association ends of GeothermalGeneratingUnit with other classes.

1623 **Table 127 – Association ends of EquipmentReliabilityProfile::GeothermalGeneratingUnit**  
1624 **with other classes**

mult from	name	mult to	type	description
0..*	PrimaryEnergySource	0..1	<a href="#">EnergyTypeReference</a>	inherited from: <a href="#">GeneratingUnit</a>
0..*	ScheduleResource	0..1	<a href="#">ScheduleResource</a>	(NC) inherited from: <a href="#">GeneratingUnit</a>
1..*	Circuit	0..1	<a href="#">Circuit</a>	(NC) inherited from: <a href="#">Equipment</a>

mult from	name	mult to	type	description
0..*	AggregatedEquipment	0..1	<a href="#">Equipment</a>	(NC) inherited from: <a href="#">Equipment</a>

1625

### 1626 3.75 (Description) HydroPowerPlant root class

1627 A hydro power station which can generate or pump. When generating, the generator turbines  
1628 receive water from an upper reservoir. When pumping, the pumps receive their water from a  
1629 lower reservoir.

1630 Table 128 shows all association ends of HydroPowerPlant with other classes.

**Table 128 – Association ends of EquipmentReliabilityProfile::HydroPowerPlant with other classes**

mult from	name	mult to	type	description
0..*	Reservoir	0..1	<a href="#">Reservoir</a>	Generators discharge water to or pumps are supplied water from a downstream reservoir.

1633

### 1634 3.76 (Description) HydroPump

1635 Inheritance path = [Equipment](#) : [PowerSystemResource](#) : [IdentifiedObject](#)

1636 A synchronous motor-driven pump, typically associated with a pumped storage plant.

1637 Table 129 shows all attributes of HydroPump.

**Table 129 – Attributes of EquipmentReliabilityProfile::HydroPump**

name	mult	type	description
longPF	0..1	<a href="#">Float</a>	(NC) Hydro pump long term economic participation factor.
maxEconomicP	0..1	<a href="#">ActivePower</a>	(NC) Maximum high economic active power limit, that should not exceed the maximum operating active power limit.
minEconomicP	0..1	<a href="#">ActivePower</a>	(NC) Low economic active power limit that shall be greater than or equal to the minimum operating active power limit.
shortPF	0..1	<a href="#">Float</a>	(NC) Hydro pump short term economic participation factor.
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1639

1640 Table 130 shows all association ends of HydroPump with other classes.

**Table 130 – Association ends of EquipmentReliabilityProfile::HydroPump with other classes**

mult from	name	mult to	type	description
0..*	ScheduleResource	0..1	<a href="#">ScheduleResource</a>	(NC) The schedule resource that has this hydro pump.
1..*	Circuit	0..1	<a href="#">Circuit</a>	(NC) inherited from: <a href="#">Equipment</a>
0..*	AggregatedEquipment	0..1	<a href="#">Equipment</a>	(NC) inherited from: <a href="#">Equipment</a>

1639

1640

1641

1642

1643

1644 **3.77 (abstract) IdentifiedObject root class**1645 This is a root class to provide common identification for all classes needing identification and  
1646 naming attributes.

1647 Table 131 shows all attributes of IdentifiedObject.

1648 **Table 131 – Attributes of EquipmentReliabilityProfile::IdentifiedObject**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) The attribute is used for an exchange of the EIC code (Energy identification Code). The length of the string is 16 characters as defined by the EIC code. For details on EIC scheme please refer to ENTSO-E web site.
description	0..1	<a href="#">String</a>	The description is a free human readable text describing or naming the object. It may be non unique and may not correlate to a naming hierarchy.
mRID	1..1	<a href="#">String</a>	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.
name	0..1	<a href="#">String</a>	The name is any free human readable and possibly non unique text naming the object.

1649

1650 **3.78 (NC) ImpedanceControlFunction**1651 Inheritance path = [ControlFunctionBlock](#) : [FunctionBlock](#) : [IdentifiedObject](#)1652 Impedance control function is a function block that calculates the operating point of the  
1653 controlled equipment to achieve the target impedance.

1654 Table 132 shows all attributes of ImpedanceControlFunction.

1655 **Table 132 – Attributes of EquipmentReliabilityProfile::ImpedanceControlFunction**

name	mult	type	description
isDiscrete	1..1	<a href="#">Boolean</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
targetDeadband	0..1	<a href="#">Float</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
maxAllowedTargetValue	0..1	<a href="#">PerCent</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
minAllowedTargetValue	0..1	<a href="#">PerCent</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
priority	0..1	<a href="#">Integer</a>	(NC) inherited from: <a href="#">FunctionBlock</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1656

1657 Table 133 shows all association ends of ImpedanceControlFunction with other classes.

1658  
1659**Table 133 – Association ends of  
EquipmentReliabilityProfile::ImpedanceControlFunction 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>

1660

**3.79 (NC) InfeedLimit**1662 Inheritance path = [OperationalLimit](#) : [IdentifiedObject](#)

1663 Infeed limit set constraints fed in to the network by two or more terminals.

1664 Table 134 shows all attributes of InfeedLimit.

1665

**Table 134 – Attributes of EquipmentReliabilityProfile::InfeedLimit**

name	mult	type	description
normalValueW	0..1	ActivePower	(NC) The normal value of active power limit. The attribute shall be a positive value or zero.
normalValueA	0..1	CurrentFlow	(NC) The normal current limit. The attribute shall be a positive value or zero.
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1666

1667 Table 135 shows all association ends of InfeedLimit with other classes.

**Table 135 – Association ends of EquipmentReliabilityProfile::InfeedLimit with other classes**

mult from	name	mult to	type	description
1..*	OperationalLimitType	1..1	<a href="#">OperationalLimitType</a>	inherited from: <a href="#">OperationalLimit</a>
1..*	OperationalLimitSet	1..1	<a href="#">OperationalLimitSet</a>	inherited from: <a href="#">OperationalLimit</a>

1670

**3.80 (NC) InfeedTerminal root class**

1672 Infeed terminal defines the terminals that are linked to an infeed limit.

1673 Table 136 shows all attributes of InfeedTerminal.

1674

**Table 136 – Attributes of EquipmentReliabilityProfile::InfeedTerminal**

name	mult	type	description
mRID	1..1	<a href="#">String</a>	(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.

1675

1676 Table 137 shows all association ends of InfeedTerminal with other classes.



1677 **Table 137 – Association ends of EquipmentReliabilityProfile::InfeedTerminal with other**  
1678 **classes**

mult from	name	mult to	type	description
0..*	ACDCTerminal	1..1	<a href="#">ACDCTerminal</a>	(NC) ACDCTerminal which is connected to an infeed terminal.
0..*	InfeedConstraint	1..1	<a href="#">InfeedLimit</a>	(NC) Infeed constraint which belongs to an infeed terminal.

1679

### 1680 3.81 (NC) InjectionController

1681 Inheritance path = [EquipmentController](#) : [AutomationFunction](#) : [PowerSystemResource](#) :  
1682 [IdentifiedObject](#)

1683 Injection controller is controlling the equipment which represents an injection or an external  
1684 network.

1685 Table 138 shows all attributes of InjectionController.

1686 **Table 138 – Attributes of EquipmentReliabilityProfile::InjectionController**

name	mult	type	description
type	0..1	<a href="#">String</a>	(NC) inherited from: <a href="#">AutomationFunction</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1687

1688 Table 139 shows all association ends of InjectionController with other classes.

1689 **Table 139 – Association ends of EquipmentReliabilityProfile::InjectionController with**  
1690 **other classes**

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

1691

### 1692 3.82 (abstract,NC) LimitDependencyCurve

1693 Inheritance path = [Curve](#) : [IdentifiedObject](#)

1694 A curve or functional relationship between an independent variable (X-axis) and limiting  
1695 dependent (Y-axis) variables.

1696 Table 140 shows all attributes of LimitDependencyCurve.

1697 **Table 140 – Attributes of EquipmentReliabilityProfile::LimitDependencyCurve**

name	mult	type	description
curveStyle	1..1	<a href="#">CurveStyle</a>	inherited from: <a href="#">Curve</a>
xMultiplier	0..1	<a href="#">UnitMultiplier</a>	inherited from: <a href="#">Curve</a>
xUnit	1..1	<a href="#">UnitSymbol</a>	inherited from: <a href="#">Curve</a>
y1Multiplier	0..1	<a href="#">UnitMultiplier</a>	inherited from: <a href="#">Curve</a>
y1Unit	0..1	<a href="#">UnitSymbol</a>	inherited from: <a href="#">Curve</a>
y2Multiplier	0..1	<a href="#">UnitMultiplier</a>	inherited from: <a href="#">Curve</a>
y2Unit	0..1	<a href="#">UnitSymbol</a>	inherited from: <a href="#">Curve</a>

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1698

### 1699 3.83 (Description) Line

1700 Inheritance path = [EquipmentContainer](#) : [ConnectivityNodeContainer](#) : [PowerSystemResource](#) :  
1701 [IdentifiedObject](#)

1702 Contains equipment beyond a substation belonging to a power transmission line.

1703 Table 141 shows all attributes of Line.

1704

**Table 141 – Attributes of EquipmentReliabilityProfile::Line**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1705

1706 Table 142 shows all association ends of Line with other classes.

1707

**Table 142 – Association ends of EquipmentReliabilityProfile::Line with other classes**

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

1708

### 1709 3.84 (NC) LineCircuit

1710 Inheritance path = [Circuit](#) : [PowerSystemResource](#) : [IdentifiedObject](#)

1711 A line circuit is a circuit that has at least one ACLineSegment and may or may not include  
1712 related switching and/or auxiliary equipment.

1713 Table 143 shows all attributes of LineCircuit.

1714

**Table 143 – Attributes of EquipmentReliabilityProfile::LineCircuit**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1715

### 1716 3.85 (NC) LoadFrequencyControlArea

1717 Inheritance path = [PowerSystemResource](#) : [IdentifiedObject](#)

1718 A part of a synchronous area or an entire synchronous area, physically demarcated by points  
 1719 of measurement at interconnectors to other load frequency control (LFC) areas, operated by  
 1720 one or more TSOs fulfilling the obligations of load-frequency control.  
 1721 Table 144 shows all attributes of LoadFrequencyControlArea.

1722 **Table 144 – Attributes of EquipmentReliabilityProfile::LoadFrequencyControlArea**

name	mult	type	description
deficientGenerationLimit	0..1	<a href="#">PerCent</a>	(NC) Percentage of average dispatch target plus average regulation used to calculate Deficient Generation Limit. The value shall be a positive value between 0 and 100.
frequencyBiasFactor	0..1	<a href="#">Float</a>	(NC) Frequency bias in MW/Hz.
includeFrequencyBias	1..1	<a href="#">Boolean</a>	(NC) True means the frequency bias that is taken into consideration in the frequency bias computation.
frequencyRestorationReserveDelay	0..1	<a href="#">Seconds</a>	(NC) FRR delay expressed in seconds. Must be a positive multiple of AGC's cycle duration.
frequencyRestorationReserveMaxRamp	0..1	<a href="#">ActivePowerChangeRate</a>	(NC) Maximum authorized ramp for both FRR dispatching and ramp to zero.
frequencyRestorationReserveThreshold	0..1	<a href="#">ActivePower</a>	(NC) Authorized threshold for both FRR dispatching and ramp to zero.
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1723  
 1724 Table 145 shows all association ends of LoadFrequencyControlArea with other classes.

1725 **Table 145 – Association ends of**  
 1726 **EquipmentReliabilityProfile::LoadFrequencyControlArea with other classes**

mult from	name	mult to	type	description
0..*	FrequencyControlOperator	0..1	<a href="#">LoadFrequencyControlOperator</a>	(NC) The frequency control operator that operates this frequency control area.
0..*	LoadFrequencyControlBlock	0..1	<a href="#">LoadFrequencyControlBlock</a>	(NC) The load frequency control block that has this load frequency control area.

1727  
 1728 **3.86 (NC) LoadFrequencyControlBlock**

1729 Inheritance path = [PowerSystemResource](#) : [IdentifiedObject](#)  
 1730 A part of a synchronous area or an entire synchronous area, physically demarcated by points  
 1731 of measurement at interconnectors to other load frequency control (LFC) blocks, consisting of  
 1732 one or more LFC areas, operated by one or more TSOs fulfilling the obligations of load-  
 1733 frequency control.  
 1734 Table 146 shows all attributes of LoadFrequencyControlBlock.

1735 **Table 146 – Attributes of EquipmentReliabilityProfile::LoadFrequencyControlBlock**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

name	mult	type	description
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1736  
1737 Table 147 shows all association ends of LoadFrequencyControlBlock with other classes.

1738  
1739 **Table 147 – Association ends of EquipmentReliabilityProfile::LoadFrequencyControlBlock 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 load frequency control block.

1740

### 1741 3.87 (NC) LoadFrequencyControlOperator

1742 Inheritance path = [PowerSystemOrganisationRole](#) : [OrganisationRole](#) : [IdentifiedObject](#)

1743 A role that is responsible for operational security by operating the load frequency control (LFC) mechanism.

1744 Table 148 shows all attributes of LoadFrequencyControlOperator.

1746 **Table 148 – Attributes of EquipmentReliabilityProfile::LoadFrequencyControlOperator**

name	mult	type	description
globalLocationNumber	0..1	<a href="#">String</a>	(NC) inherited from: <a href="#">OrganisationRole</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1747

1748 Table 149 shows all association ends of LoadFrequencyControlOperator with other classes.

1749  
1750 **Table 149 – Association ends of EquipmentReliabilityProfile::LoadFrequencyControlOperator with other classes**

mult from	name	mult to	type	description
0..*	Organisation	0..1	<a href="#">Organisation</a>	inherited from: <a href="#">OrganisationRole</a>

1751

### 1752 3.88 (NC) LossCurve

1753 Inheritance path = [Curve](#) : [IdentifiedObject](#)

1754 Represents the losses in the equipment due to operation position.

1755 Table 150 shows all attributes of LossCurve.

1756 **Table 150 – Attributes of EquipmentReliabilityProfile::LossCurve**

name	mult	type	description
curveStyle	1..1	<a href="#">CurveStyle</a>	inherited from: <a href="#">Curve</a>
xMultiplier	0..1	<a href="#">UnitMultiplier</a>	inherited from: <a href="#">Curve</a>
xUnit	1..1	<a href="#">UnitSymbol</a>	inherited from: <a href="#">Curve</a>
y1Multiplier	0..1	<a href="#">UnitMultiplier</a>	inherited from: <a href="#">Curve</a>
y1Unit	0..1	<a href="#">UnitSymbol</a>	inherited from: <a href="#">Curve</a>

name	mult	type	description
y2Multiplier	0..1	<a href="#">UnitMultiplier</a>	inherited from: <a href="#">Curve</a>
y2Unit	0..1	<a href="#">UnitSymbol</a>	inherited from: <a href="#">Curve</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1757

1758

Table 151 shows all association ends of LossCurve with other classes.

1759

**Table 151 – Association ends of EquipmentReliabilityProfile::LossCurve with other classes**

1760

mult from	name	mult to	type	description
0..*	FACTSEquipment	0..1	<a href="#">FACTSEquipment</a>	(NC) The FACTS equipment which has a loss curve.

1761

1762

### 3.89 (NC) ModularStaticSynchronousSeriesCompensator

1763

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

1764

1765

1766

1767

1768

1769

1770

1771

1772

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 152 shows all attributes of ModularStaticSynchronousSeriesCompensator.

1773

**Table 152 – Attributes of EquipmentReliabilityProfile::ModularStaticSynchronousSeriesCompensator**

1774

name	mult	type	description
capacitiveRating	1..1	<a href="#">Reactance</a>	(NC) inherited from: <a href="#">FACTSEquipment</a>
inductiveRating	1..1	<a href="#">Reactance</a>	(NC) inherited from: <a href="#">FACTSEquipment</a>
slope	1..1	<a href="#">VoltagePerReactivePower</a>	(NC) inherited from: <a href="#">FACTSEquipment</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1775

1776

1777

Table 153 shows all association ends of ModularStaticSynchronousSeriesCompensator with other classes.

1778  
1779  
1780**Table 153 – Association ends of EquipmentReliabilityProfile::ModularStaticSynchronousSeriesCompensator with other classes**

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

1781

**3.90 NuclearGeneratingUnit**1783 Inheritance path = [GeneratingUnit](#) : [Equipment](#) : [PowerSystemResource](#) : [IdentifiedObject](#)

1784 A nuclear generating unit.

1785 Table 154 shows all attributes of NuclearGeneratingUnit.

1786

**Table 154 – Attributes of EquipmentReliabilityProfile::NuclearGeneratingUnit**

name	mult	type	description
reactorKind	1..1	<a href="#">NuclearReactorKind</a>	(NC) Kind of nuclear reactor.
maxEconomicP	0..1	<a href="#">ActivePower</a>	inherited from: <a href="#">GeneratingUnit</a>
maxStartupLoad	0..1	<a href="#">ActivePower</a>	(NC) inherited from: <a href="#">GeneratingUnit</a>
minEconomicP	0..1	<a href="#">ActivePower</a>	inherited from: <a href="#">GeneratingUnit</a>
shutdownCost	0..1	<a href="#">Money</a>	(NC) inherited from: <a href="#">GeneratingUnit</a>
shutdownTime	0..1	<a href="#">Duration</a>	(NC) inherited from: <a href="#">GeneratingUnit</a>
lowerRampRate	0..1	<a href="#">ActivePowerChangeRate</a>	inherited from: <a href="#">GeneratingUnit</a>
raiseRampRate	0..1	<a href="#">ActivePowerChangeRate</a>	inherited from: <a href="#">GeneratingUnit</a>
minimumOffTime	0..1	<a href="#">Seconds</a>	inherited from: <a href="#">GeneratingUnit</a>
warmStartupTime	0..1	<a href="#">Duration</a>	(NC) inherited from: <a href="#">GeneratingUnit</a>
coolDownTime	0..1	<a href="#">Duration</a>	(NC) inherited from: <a href="#">GeneratingUnit</a>
warmStartupCost	0..1	<a href="#">Money</a>	(NC) inherited from: <a href="#">GeneratingUnit</a>
startupRampRate	0..1	<a href="#">ActivePowerChangeRate</a>	(NC) inherited from: <a href="#">GeneratingUnit</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1787

1788 Table 155 shows all association ends of NuclearGeneratingUnit with other classes.

**Table 155 – Association ends of EquipmentReliabilityProfile::NuclearGeneratingUnit with other classes**1789  
1790

mult from	name	mult to	type	description
0..*	PrimaryEnergySource	0..1	<a href="#">EnergyTypeReference</a>	inherited from: <a href="#">GeneratingUnit</a>
0..*	ScheduleResource	0..1	<a href="#">ScheduleResource</a>	(NC) inherited from: <a href="#">GeneratingUnit</a>
1..*	Circuit	0..1	<a href="#">Circuit</a>	(NC) inherited from: <a href="#">Equipment</a>
0..*	AggregatedEquipment	0..1	<a href="#">Equipment</a>	(NC) inherited from: <a href="#">Equipment</a>

1791

1792 **3.91 (abstract) OperationalLimit**1793 Inheritance path = [IdentifiedObject](#)

1794 A value and normal value associated with a specific kind of limit.

1795 The sub class value and normalValue attributes vary inversely to the associated  
1796 OperationalLimitType.acceptableDuration (acceptableDuration for short).1797 If a particular piece of equipment has multiple operational limits of the same kind (apparent  
1798 power, current, etc.), the limit with the greatest acceptableDuration shall have the smallest limit  
1799 value and the limit with the smallest acceptableDuration shall have the largest limit value. Note:  
1800 A large current can only be allowed to flow through a piece of equipment for a short duration  
1801 without causing damage, but a lesser current can be allowed to flow for a longer duration.

1802 Table 156 shows all attributes of OperationalLimit.

1803 **Table 156 – Attributes of EquipmentReliabilityProfile::OperationalLimit**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1804

1805 Table 157 shows all association ends of OperationalLimit with other classes.

1806 **Table 157 – Association ends of EquipmentReliabilityProfile::OperationalLimit with  
1807 other classes**

mult from	name	mult to	type	description
1..*	OperationalLimitType	1..1	<a href="#">OperationalLimitType</a>	The limit type associated with this limit.
1..*	OperationalLimitSet	1..1	<a href="#">OperationalLimitSet</a>	The limit set to which the limit values belong.

1808

1809 **3.92 (Description) OperationalLimitSet**1810 Inheritance path = [IdentifiedObject](#)1811 A set of limits associated with equipment. Sets of limits might apply to a specific temperature,  
1812 or season for example. A set of limits may contain different severities of limit levels that would  
1813 apply to the same equipment. The set may contain limits of different types such as apparent  
1814 power and current limits or high and low voltage limits that are logically applied together as a  
1815 set.

1816 Table 158 shows all attributes of OperationalLimitSet.

1817 **Table 158 – Attributes of EquipmentReliabilityProfile::OperationalLimitSet**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1818

1819 Table 159 shows all association ends of OperationalLimitSet with other classes.

1820 **Table 159 – Association ends of EquipmentReliabilityProfile::OperationalLimitSet with**  
1821 **other classes**

mult from	name	mult to	type	description
0..*	Terminal	1..1	<a href="#">ACDCTerminal</a>	The terminal where the operational limit set apply.
0..*	PowerTransferCorridor	0..1	<a href="#">PowerTransferCorridor</a>	(NC) The power transfer corridor that has this operational limit set.

1822

### 1823 3.93 OperationalLimitType

1824 Inheritance path = [IdentifiedObject](#)

1825 The operational meaning of a category of limits.

1826 Table 160 shows all attributes of OperationalLimitType.

1827 **Table 160 – Attributes of EquipmentReliabilityProfile::OperationalLimitType**

name	mult	type	description
direction	1..1	<a href="#">OperationalLimitDirectionKind</a>	The direction of the limit.
isMinimum	0..1	<a href="#">Boolean</a>	(NC) Defines if the operational limit type is minimum. If true, the value is a minimum value of the same kind. This applies to stability and PATL. If false, the limit has the normal behaviour. OperationalLimitType.direction attribute shall be absoluteValue.
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1828

1829 Table 161 shows all association ends of OperationalLimitType with other classes.

1830 **Table 161 – Association ends of EquipmentReliabilityProfile::OperationalLimitType with**  
1831 **other classes**

mult from	name	mult to	type	description
0..*	PermanentAmbientTemperatureDependencyCurve	0..1	<a href="#">AmbientTemperatureDependencyCurve</a>	(NC) The permanent ambient temperature dependency curve for this operational limit type.
0..*	TemporaryBaseOverloadLimitCurve	0..1	<a href="#">BaseOverloadLimitCurve</a>	(NC) The temporary base overload limit curve for this operational limit type.
0..*	TemporaryDurationOverloadLimitCurve	0..1	<a href="#">DurationOverloadLimitCurve</a>	(NC) The temporary duration overload limit curve for this operational limit type.
0..*	PermanentSolarRadiationCurve	0..1	<a href="#">SolarRadiationDependencyCurve</a>	(NC) The permanent solar radiation curve for this operational limit type.
0..*	RecoveryOverloadLimitCurve	0..1	<a href="#">RecoveryOverloadLimitCurve</a>	(NC) This is the curve which provides the recovery time information for this limit type.

1832

### 1833 3.94 (NC) OrdinaryPowerTransferCorridor

1834 Inheritance path = [PowerTransferCorridor](#) : [PowerSystemResource](#) : [IdentifiedObject](#)

1835 Power transfer corridor defined for normal operating network.



1836 Table 162 shows all attributes of OrdinaryPowerTransferCorridor.

1837 **Table 162 – Attributes of EquipmentReliabilityProfile::OrdinaryPowerTransferCorridor**

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

1838

### 1839 3.95 Organisation

1840 Inheritance path = [IdentifiedObject](#)

1841 Organisation that might have roles as utility, contractor, supplier, manufacturer, customer, etc.

1842 Table 163 shows all attributes of Organisation.

1843 **Table 163 – Attributes of EquipmentReliabilityProfile::Organisation**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1844

### 1845 3.96 (abstract) OrganisationRole

1846 Inheritance path = [IdentifiedObject](#)

1847 Identifies a way in which an organisation may participate in the utility enterprise (e.g., customer, manufacturer, etc).

1849 Table 164 shows all attributes of OrganisationRole.

1850 **Table 164 – Attributes of EquipmentReliabilityProfile::OrganisationRole**

name	mult	type	description
globalLocationNumber	0..1	<a href="#">String</a>	(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.
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1851

1852 Table 165 shows all association ends of OrganisationRole with other classes.

1853 **Table 165 – Association ends of EquipmentReliabilityProfile::OrganisationRole with**  
1854 **other classes**

mult from	name	mult to	type	description
0..*	Organisation	0..1	<a href="#">Organisation</a>	Organisation having this role.

1855

### 1856 3.97 (NC) OutageCoordinationRegion

1857 Inheritance path = [Region](#) : [PowerSystemResource](#) : [IdentifiedObject](#)

1858 A region that has a common organisation or service responsible for outage planning and  
1859 coordination and its impact on grid operation.

1860 Table 166 shows all attributes of OutageCoordinationRegion.

1861 **Table 166 – Attributes of EquipmentReliabilityProfile::OutageCoordinationRegion**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1862

1863 Table 167 shows all association ends of OutageCoordinationRegion with other classes.

1864 **Table 167 – Association ends of**  
1865 **EquipmentReliabilityProfile::OutageCoordinationRegion with other classes**

mult from	name	mult to	type	description
0..*	OutageCoordinator	0..1	<a href="#">OutageCoordinator</a>	(NC) The outage coordinator responsible for 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..*	OverlappingZone	0..1	<a href="#">OverlappingZone</a>	(NC) inherited from: <a href="#">Region</a>

1866

### 1867 3.98 (NC) OutageCoordinator

1868 Inheritance path = [SystemOperationCoordinator](#) : [PowerSystemOrganisationRole](#) :  
1869 [OrganisationRole](#) : [IdentifiedObject](#)

1870 A role that coordinates the planned availability status of relevant power system equipment to  
1871 meet the need by the asset owner or operator and the security of the power system.

1872 Table 168 shows all attributes of OutageCoordinator.

1873 **Table 168 – Attributes of EquipmentReliabilityProfile::OutageCoordinator**

name	mult	type	description
globalLocationNumber	0..1	<a href="#">String</a>	(NC) inherited from: <a href="#">OrganisationRole</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1874

1875 Table 169 shows all association ends of OutageCoordinator with other classes.

1876 **Table 169 – Association ends of EquipmentReliabilityProfile::OutageCoordinator with**  
1877 **other classes**

mult from	name	mult to	type	description
0..*	Organisation	0..1	<a href="#">Organisation</a>	inherited from: <a href="#">OrganisationRole</a>

1878

### 1879 3.99 (NC) OutagePlanningAgent

1880 Inheritance path = [PowerSystemOrganisationRole](#) : [OrganisationRole](#) : [IdentifiedObject](#)

1881 An entity with the task of planning the availability status of a relevant power generating module,  
1882 a relevant demand facility or a relevant grid element.

1883 Table 170 shows all attributes of OutagePlanningAgent.

1884 **Table 170 – Attributes of EquipmentReliabilityProfile::OutagePlanningAgent**

name	mult	type	description
globalLocationNumber	0..1	<a href="#">String</a>	(NC) inherited from: <a href="#">OrganisationRole</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1885

1886 Table 171 shows all association ends of OutagePlanningAgent with other classes.

1887 **Table 171 – Association ends of EquipmentReliabilityProfile::OutagePlanningAgent with**  
1888 **other classes**

mult from	name	mult to	type	description
0..*	Organisation	0..1	<a href="#">Organisation</a>	inherited from: <a href="#">OrganisationRole</a>

1889

### 1890 3.100 (NC) OverlappingZone

1891 Inheritance path = [IdentifiedObject](#)

1892 A collection of all the overlapping cross border assessed elements which have the same sets  
1893 of impacted and impacting regions.

1894 Table 172 shows all attributes of OverlappingZone.

1895 **Table 172 – Attributes of EquipmentReliabilityProfile::OverlappingZone**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1896

### 1897 3.101 (NC) PhaseControlFunction

1898 Inheritance path = [ControlFunctionBlock](#) : [FunctionBlock](#) : [IdentifiedObject](#)

1899 Phase control function is a function block that calculate the operating point of the controlled  
1900 equipment to achieve the target voltage.

1901 Table 173 shows all attributes of PhaseControlFunction.

1902 **Table 173 – Attributes of EquipmentReliabilityProfile::PhaseControlFunction**

name	mult	type	description
isDiscrete	1..1	<a href="#">Boolean</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
targetDeadband	0..1	<a href="#">Float</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
maxAllowedTargetValue	0..1	<a href="#">PerCent</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
minAllowedTargetValue	0..1	<a href="#">PerCent</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
priority	0..1	<a href="#">Integer</a>	(NC) inherited from: <a href="#">FunctionBlock</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1903

1904 Table 174 shows all association ends of PhaseControlFunction with other classes.

1905 **Table 174 – Association ends of EquipmentReliabilityProfile::PhaseControlFunction**  
1906 **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>

1907

### 1908 3.102 (NC) PinTerminal

1909 Inheritance path = [GateInputPin](#) : [FunctionInputVariable](#) : [IdentifiedObject](#)

1910 Input pin associated with a Terminal. It is used for comparison.

1911 Table 175 shows all attributes of PinTerminal.

1912 **Table 175 – Attributes of EquipmentReliabilityProfile::PinTerminal**

name	mult	type	description
kind	1..1	<a href="#">PinTerminalKind</a>	(NC) The kind of quantity which is used as an input value.
absoluteValue	0..1	<a href="#">Boolean</a>	(NC) inherited from: <a href="#">GateInputPin</a>
logicKind	0..1	<a href="#">LogicalOperatorsKind</a>	(NC) inherited from: <a href="#">GateInputPin</a>
duration	0..1	<a href="#">Duration</a>	(NC) inherited from: <a href="#">GateInputPin</a>
negate	0..1	<a href="#">Boolean</a>	(NC) inherited from: <a href="#">GateInputPin</a>
thresholdPercentage	0..1	<a href="#">PerCent</a>	(NC) inherited from: <a href="#">GateInputPin</a>
thresholdValue	0..1	<a href="#">Float</a>	(NC) inherited from: <a href="#">GateInputPin</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1913

1914 Table 176 shows all association ends of PinTerminal with other classes.

1915 **Table 176 – Association ends of EquipmentReliabilityProfile::PinTerminal with other**  
1916 **classes**

mult from	name	mult to	type	description
1..*	Function	1..1	<a href="#">FunctionBlock</a>	(NC) inherited from: <a href="#">FunctionInputVariable</a>

1917

### 1918 3.103 (NC) PowerElectricalChemicalUnit

1919 Inheritance path = [PowerElectronicsUnit](#) : [Equipment](#) : [PowerSystemResource](#) :  
1920 [IdentifiedObject](#)

1921 A unit capable of either generating electrical energy from chemical reactions or using electrical  
1922 energy to cause chemical reactions.

1923 Table 177 shows all attributes of PowerElectricalChemicalUnit.

1924 **Table 177 – Attributes of EquipmentReliabilityProfile::PowerElectricalChemicalUnit**

name	mult	type	description
kind	1..1	<a href="#">PowerElectricalChemicalUnitKind</a>	(NC) Kind of power electrical chemical unit.
longPF	0..1	<a href="#">Float</a>	(NC) inherited from: <a href="#">PowerElectronicsUnit</a>
maxEconomicP	0..1	<a href="#">ActivePower</a>	(NC) inherited from: <a href="#">PowerElectronicsUnit</a>
minEconomicP	0..1	<a href="#">ActivePower</a>	(NC) inherited from: <a href="#">PowerElectronicsUnit</a>
shortPF	0..1	<a href="#">Float</a>	(NC) inherited from: <a href="#">PowerElectronicsUnit</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1925

1926 Table 178 shows all association ends of PowerElectricalChemicalUnit with other classes.

1927 **Table 178 – Association ends of**  
1928 **EquipmentReliabilityProfile::PowerElectricalChemicalUnit with other classes**

mult from	name	mult to	type	description
0..*	PrimaryEnergySource	0..1	<a href="#">EnergyTypeReference</a>	inherited from: <a href="#">PowerElectronicsUnit</a>
0..*	ScheduleResource	0..1	<a href="#">ScheduleResource</a>	(NC) inherited from: <a href="#">PowerElectronicsUnit</a>
1..*	Circuit	0..1	<a href="#">Circuit</a>	(NC) inherited from: <a href="#">Equipment</a>
0..*	AggregatedEquipment	0..1	<a href="#">Equipment</a>	(NC) inherited from: <a href="#">Equipment</a>

1929

### 1930 3.104 (NC) PowerElectronicsMarineUnit

1931 Inheritance path = [PowerElectronicsUnit](#) : [Equipment](#) : [PowerSystemResource](#) :  
1932 [IdentifiedObject](#)

1933 A unit that capture energy from marine sources, e.g. waves, for generating electrical power.

1934 Table 179 shows all attributes of PowerElectronicsMarineUnit.

1935 **Table 179 – Attributes of EquipmentReliabilityProfile::PowerElectronicsMarineUnit**

name	mult	type	description
kind	1..1	<a href="#">MarineUnitKind</a>	(NC) Kind of marine unit.
longPF	0..1	<a href="#">Float</a>	(NC) inherited from: <a href="#">PowerElectronicsUnit</a>
maxEconomicP	0..1	<a href="#">ActivePower</a>	(NC) inherited from: <a href="#">PowerElectronicsUnit</a>
minEconomicP	0..1	<a href="#">ActivePower</a>	(NC) inherited from: <a href="#">PowerElectronicsUnit</a>
shortPF	0..1	<a href="#">Float</a>	(NC) inherited from: <a href="#">PowerElectronicsUnit</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1936

1937

Table 180 shows all association ends of PowerElectronicsMarineUnit with other classes.

1938

1939

**Table 180 – Association ends of  
EquipmentReliabilityProfile::PowerElectronicsMarineUnit with other classes**

mult from	name	mult to	type	description
0..*	PrimaryEnergySource	0..1	<a href="#">EnergyTypeReference</a>	inherited from: <a href="#">PowerElectronicsUnit</a>
0..*	ScheduleResource	0..1	<a href="#">ScheduleResource</a>	(NC) inherited from: <a href="#">PowerElectronicsUnit</a>
1..*	Circuit	0..1	<a href="#">Circuit</a>	(NC) inherited from: <a href="#">Equipment</a>
0..*	AggregatedEquipment	0..1	<a href="#">Equipment</a>	(NC) inherited from: <a href="#">Equipment</a>

1940

### 1941 3.105 (Description) PowerElectronicsUnit

1942 Inheritance path = [Equipment](#) : [PowerSystemResource](#) : [IdentifiedObject](#)

1943 A generating unit or battery or aggregation that connects to the AC network using power electronics rather than rotating machines.

1944 Table 181 shows all attributes of PowerElectronicsUnit.

1946

**Table 181 – Attributes of EquipmentReliabilityProfile::PowerElectronicsUnit**

name	mult	type	description
longPF	0..1	<a href="#">Float</a>	(NC) Power electronics unit long term economic participation factor.
maxEconomicP	0..1	<a href="#">ActivePower</a>	(NC) Maximum high economic active power limit, that should not exceed the maximum operating active power limit.
minEconomicP	0..1	<a href="#">ActivePower</a>	(NC) Low economic active power limit that shall be greater than or equal to the minimum operating active power limit.
shortPF	0..1	<a href="#">Float</a>	(NC) Power electronics unit short term economic participation factor.
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1947  
1948  
1949  
1950

Table 182 shows all association ends of PowerElectronicsUnit with other classes.

**Table 182 – Association ends of EquipmentReliabilityProfile::PowerElectronicsUnit with other classes**

mult from	name	mult to	type	description
0..*	PrimaryEnergySource	0..1	<a href="#">EnergyTypeReference</a>	Primary energy source for this power electronics unit.
0..*	ScheduleResource	0..1	<a href="#">ScheduleResource</a>	(NC) The schedule resource that has this power electronics unit.
1..*	Circuit	0..1	<a href="#">Circuit</a>	(NC) inherited from: <a href="#">Equipment</a>
0..*	AggregatedEquipment	0..1	<a href="#">Equipment</a>	(NC) inherited from: <a href="#">Equipment</a>

1951  
1952  
1953  
1954  
1955  
1956  
1957

### 3.106 (NC) PowerFactorControlFunction

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

Power factor control function is a function block that calculates the operating point of the controlled equipment to achieve the target power factor.

Table 183 shows all attributes of PowerFactorControlFunction.

**Table 183 – Attributes of EquipmentReliabilityProfile::PowerFactorControlFunction**

name	mult	type	description
isDiscrete	1..1	<a href="#">Boolean</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
targetDeadband	0..1	<a href="#">Float</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
maxAllowedTargetValue	0..1	<a href="#">PerCent</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
minAllowedTargetValue	0..1	<a href="#">PerCent</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
priority	0..1	<a href="#">Integer</a>	(NC) inherited from: <a href="#">FunctionBlock</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1958  
1959  
1960  
1961

Table 184 shows all association ends of PowerFactorControlFunction with other classes.

**Table 184 – Association ends of EquipmentReliabilityProfile::PowerFactorControlFunction 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>

1962  
1963  
1964  
1965  
1966  
1967

### 3.107 (NC) PowerPlantController

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

Power plant controller is controlling the equipment of a power plant.

Table 185 shows all attributes of PowerPlantController.

1968

**Table 185 – Attributes of EquipmentReliabilityProfile::PowerPlantController**

name	mult	type	description
type	0..1	<a href="#">String</a>	(NC) inherited from: <a href="#">AutomationFunction</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1969

1970

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

1971

**Table 186 – Association ends of EquipmentReliabilityProfile::PowerPlantController with other classes**

1972

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

1973

1974

**3.108 (abstract,NC) PowerSystemOrganisationRole**

1975

Inheritance path = [OrganisationRole](#) : [IdentifiedObject](#)

1976

A role that is responsible for the functional operational of a power system resource.

1977

Table 187 shows all attributes of PowerSystemOrganisationRole.

1978

**Table 187 – Attributes of EquipmentReliabilityProfile::PowerSystemOrganisationRole**

name	mult	type	description
globalLocationNumber	0..1	<a href="#">String</a>	(NC) inherited from: <a href="#">OrganisationRole</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1979

1980

Table 188 shows all association ends of PowerSystemOrganisationRole with other classes.

1981

**Table 188 – Association ends of EquipmentReliabilityProfile::PowerSystemOrganisationRole with other classes**

1982

mult from	name	mult to	type	description
0..*	Organisation	0..1	<a href="#">Organisation</a>	inherited from: <a href="#">OrganisationRole</a>

1983

1984

**3.109 (abstract) PowerSystemResource**

1985

Inheritance path = [IdentifiedObject](#)

1986

A power system resource (PSR) can be an item of equipment such as a switch, an equipment container containing many individual items of equipment such as a substation, or an organisational entity such as sub-control area. Power system resources can have measurements associated.

1987

1988

1989

1990

Table 189 shows all attributes of PowerSystemResource.



1991 **Table 189 – Attributes of EquipmentReliabilityProfile::PowerSystemResource**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

1992

1993 **3.110 (abstract,NC) PowerTransferCorridor**1994 Inheritance path = [PowerSystemResource](#) : [IdentifiedObject](#)1995 A power transfer corridor is defined as a set of circuits (transmission lines or transformers)  
1996 separating two portions of the power system, or a subset of circuits exposed to a substantial  
1997 portion of the transmission exchange between two parts of the system.

1998 Table 190 shows all attributes of PowerTransferCorridor.

1999 **Table 190 – Attributes of EquipmentReliabilityProfile::PowerTransferCorridor**

name	mult	type	description
normalEnabled	0..1	<a href="#">Boolean</a>	(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.
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

2000

2001 **3.111 (NC) PowerTransformerCircuit**2002 Inheritance path = [Circuit](#) : [PowerSystemResource](#) : [IdentifiedObject](#)2003 A power transformer circuit is a circuit that has at least one PowerTransformer and may or may  
2004 not include related switching and/or auxiliary equipment.

2005 Table 191 shows all attributes of PowerTransformerCircuit.

2006 **Table 191 – Attributes of EquipmentReliabilityProfile::PowerTransformerCircuit**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

2007

2008 **3.112 (abstract,NC) PropertyReference root class**

2009 The reference to a class and one of its properties.

2010 **3.113 (NC) ProportionalEnergyComponent**2011 Inheritance path = [EnergyComponent](#) : [IdentifiedObject](#)

2012 Serves for grouping components within an energy group, with proportional active power  
2013 allocation to all components.

2014 Table 192 shows all attributes of ProportionalEnergyComponent.

2015 **Table 192 – Attributes of EquipmentReliabilityProfile::ProportionalEnergyComponent**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

2016

2017 Table 193 shows all association ends of ProportionalEnergyComponent with other classes.

2018 **Table 193 – Association ends of**

2019 **EquipmentReliabilityProfile::ProportionalEnergyComponent with other classes**

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

2020

2021 **3.114 (NC,Description) PTCTriggeredEquipment**

2022 Inheritance path = [IdentifiedObject](#)

2023 Power Transfer Corridor triggered equipment connects the equipment that will create the  
2024 exceptional power transfer corridor when taking out of service. e.g. A system with three lines  
2025 gets an exceptional power transfer corridor when one of the lines is taken out of service.

2026 Table 194 shows all attributes of PTCTriggeredEquipment.

2027 **Table 194 – Attributes of EquipmentReliabilityProfile::PTCTriggeredEquipment**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

2028

2029 Table 195 shows all association ends of PTCTriggeredEquipment with other classes.

2030 **Table 195 – Association ends of EquipmentReliabilityProfile::PTCTriggeredEquipment**  
2031 **with other classes**

mult from	name	mult to	type	description
0..*	Equipment	1..1	<a href="#">Equipment</a>	(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.

2032

2033 **3.115 ReactiveCapabilityCurve**2034 Inheritance path = [Curve](#) : [IdentifiedObject](#)

2035 Reactive power rating envelope versus the synchronous machine's active power, in both the  
 2036 generating and motoring modes. For each active power value there is a corresponding high and  
 2037 low reactive power limit value. Typically there will be a separate curve for each coolant  
 2038 condition, such as hydrogen pressure. The Y1 axis values represent reactive minimum and the  
 2039 Y2 axis values represent reactive maximum.

2040 Table 196 shows all attributes of ReactiveCapabilityCurve.

2041 **Table 196 – Attributes of EquipmentReliabilityProfile::ReactiveCapabilityCurve**

name	mult	type	description
referenceVoltage	1..1	<a href="#">Voltage</a>	(NC) The reference voltage for which the capability curve is valid.
coolantTemperature	0..1	<a href="#">Temperature</a>	The machine's coolant temperature (e.g., ambient air or stator circulating water).
hydrogenPressure	0..1	<a href="#">Pressure</a>	The hydrogen coolant pressure.
curveStyle	1..1	<a href="#">CurveStyle</a>	inherited from: <a href="#">Curve</a>
xMultiplier	0..1	<a href="#">UnitMultiplier</a>	inherited from: <a href="#">Curve</a>
xUnit	1..1	<a href="#">UnitSymbol</a>	inherited from: <a href="#">Curve</a>
y1Multiplier	0..1	<a href="#">UnitMultiplier</a>	inherited from: <a href="#">Curve</a>
y1Unit	0..1	<a href="#">UnitSymbol</a>	inherited from: <a href="#">Curve</a>
y2Multiplier	0..1	<a href="#">UnitMultiplier</a>	inherited from: <a href="#">Curve</a>
y2Unit	0..1	<a href="#">UnitSymbol</a>	inherited from: <a href="#">Curve</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

2042

2043 Table 197 shows all association ends of ReactiveCapabilityCurve with other classes.

2044 **Table 197 – Association ends of EquipmentReliabilityProfile::ReactiveCapabilityCurve  
with other classes**

2045

mult from	name	mult to	type	description
0..*	SynchronousMachine2	0..1	<a href="#">SynchronousMachine</a>	(NC) Synchronous machine using this curve.
0..*	EquivalentInjection2	0..1	<a href="#">EquivalentInjection</a>	(NC) The equivalent injection using this reactive capability curve.

2046

2047 **3.116 (NC) ReactivePowerControlFunction**2048 Inheritance path = [ControlFunctionBlock](#) : [FunctionBlock](#) : [IdentifiedObject](#)

2049 Reactive power control function is a function block that calculate the operating point of the  
 2050 controlled equipment to achieve the target reactive power.

2051 Table 198 shows all attributes of ReactivePowerControlFunction.

2052 **Table 198 – Attributes of EquipmentReliabilityProfile::ReactivePowerControlFunction**

name	mult	type	description
isDiscrete	1..1	<a href="#">Boolean</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
targetDeadband	0..1	<a href="#">Float</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
maxAllowedTargetValue	0..1	<a href="#">PerCent</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
minAllowedTargetValue	0..1	<a href="#">PerCent</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
priority	0..1	<a href="#">Integer</a>	(NC) inherited from: <a href="#">FunctionBlock</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

2053

2054 Table 199 shows all association ends of ReactivePowerControlFunction with other classes.

2055

2056

**Table 199 – Association ends of  
EquipmentReliabilityProfile::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>

2057

2058 **3.117 (NC) RecoveryOverloadLimitCurve**2059 Inheritance path = [LimitDependencyCurve](#) : [Curve](#) : [IdentifiedObject](#)

2060 The relation between the recovery time and an overload limit.

2061 Table 200 shows all attributes of RecoveryOverloadLimitCurve.

2062 **Table 200 – Attributes of EquipmentReliabilityProfile::RecoveryOverloadLimitCurve**

name	mult	type	description
curveStyle	1..1	<a href="#">CurveStyle</a>	inherited from: <a href="#">Curve</a>
xMultiplier	0..1	<a href="#">UnitMultiplier</a>	inherited from: <a href="#">Curve</a>
xUnit	1..1	<a href="#">UnitSymbol</a>	inherited from: <a href="#">Curve</a>
y1Multiplier	0..1	<a href="#">UnitMultiplier</a>	inherited from: <a href="#">Curve</a>
y1Unit	0..1	<a href="#">UnitSymbol</a>	inherited from: <a href="#">Curve</a>
y2Multiplier	0..1	<a href="#">UnitMultiplier</a>	inherited from: <a href="#">Curve</a>
y2Unit	0..1	<a href="#">UnitSymbol</a>	inherited from: <a href="#">Curve</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

2063

2064 **3.118 (abstract,NC) Region**2065 Inheritance path = [PowerSystemResource](#) : [IdentifiedObject](#)

2066 A region where the system operator belongs to.

2067 Table 201 shows all attributes of Region.

2068

**Table 201 – Attributes of EquipmentReliabilityProfile::Region**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

2069

2070

Table 202 shows all association ends of Region with other classes.

2071

**Table 202 – Association ends of EquipmentReliabilityProfile::Region with other classes**

mult from	name	mult to	type	description
0..*	OverlappingZone	0..1	<a href="#">OverlappingZone</a>	(NC) The overlapping zone which is impacted by this region.

2072

2073

**3.119 (abstract) RegulatingCondEq**

2074

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

2075

2076

A type of conducting equipment that can regulate a quantity (i.e. voltage or flow) at a specific point in the network.

2077

2078

Table 203 shows all attributes of RegulatingCondEq.

2079

**Table 203 – Attributes of EquipmentReliabilityProfile::RegulatingCondEq**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

2080

2081

Table 204 shows all association ends of RegulatingCondEq with other classes.

2082

**Table 204 – Association ends of EquipmentReliabilityProfile::RegulatingCondEq with other classes**

2083

mult from	name	mult to	type	description
0..*	EquipmentController	0..1	<a href="#">EquipmentController</a>	(NC) The equipment controller for this regulating conducting equipment.
1..*	Circuit	0..1	<a href="#">Circuit</a>	(NC) inherited from: <a href="#">Equipment</a>
0..*	AggregatedEquipment	0..1	<a href="#">Equipment</a>	(NC) inherited from: <a href="#">Equipment</a>

2084

2085

**3.120 Reservoir**

2086

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

2087

A water storage facility within a hydro system, including: ponds, lakes, lagoons, and rivers. The storage is usually behind some type of dam.

2088

2089

Table 205 shows all attributes of Reservoir.

2090

**Table 205 – Attributes of EquipmentReliabilityProfile::Reservoir**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

2091

**3.121 (NC) RotatingMachineController**

2093 Inheritance path = [EquipmentController](#) : [AutomationFunction](#) : [PowerSystemResource](#) :  
2094 [IdentifiedObject](#)

2095 Rotating machine controller is controlling the equipment which may be used as a generator or  
2096 motor.

2097 Table 206 shows all attributes of RotatingMachineController.

2098

**Table 206 – Attributes of EquipmentReliabilityProfile::RotatingMachineController**

name	mult	type	description
type	0..1	<a href="#">String</a>	(NC) inherited from: <a href="#">AutomationFunction</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

2099

2100 Table 207 shows all association ends of RotatingMachineController with other classes.

2101

**Table 207 – Association ends of**

2102

**EquipmentReliabilityProfile::RotatingMachineController with other classes**

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

2103

**3.122 (NC) ScheduleResource**

2105 Inheritance path = [PowerSystemResource](#) : [IdentifiedObject](#)

2106 A schedule resource is a market-based method for handling participation of small units,  
2107 particularly located on the lower voltage level that is controlled by a Distributed System  
2108 Operator (DSO). It is a collection of units that can operate in the market by providing bids, offers  
2109 and a resulting committed operational schedule for the collection.

2110 Table 208 shows all attributes of ScheduleResource.

2111

**Table 208 – Attributes of EquipmentReliabilityProfile::ScheduleResource**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

2112

2113 Table 209 shows all association ends of ScheduleResource with other classes.

2114 **Table 209 – Association ends of EquipmentReliabilityProfile::ScheduleResource with**  
2115 **other classes**

mult from	name	mult to	type	description
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.

2116

### 2117 3.123 (NC) SchedulingArea

2118 Inheritance path = [PowerSystemResource](#) : [IdentifiedObject](#)

2119 An area where production and/or consumption of energy can be forecasted, scheduled and  
2120 measured. The area is operated by only one system operator, typically a Transmission System  
2121 Operator (TSO). The area can consist of a sub area, which has the same definition as the main  
2122 area, but it can be operated by another system operator (typically Distributed System Operator  
2123 (DSO) or a Closed Distributed System Operator (CDSO)). This includes microgrid concept. A  
2124 substation is the smallest grouping that can be included in the area. The area size should be  
2125 considered in terms of the possibility of accumulated reading (settlement metering) and the  
2126 capability of operating as an island.

2127 Table 210 shows all attributes of SchedulingArea.

2128 **Table 210 – Attributes of EquipmentReliabilityProfile::SchedulingArea**

name	mult	type	description
isIslandingEnabled	0..1	<a href="#">Boolean</a>	(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	<a href="#">Boolean</a>	(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.
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

2129

2130 Table 211 shows all association ends of SchedulingArea with other classes.

2131 **Table 211 – Association ends of EquipmentReliabilityProfile::SchedulingArea with other**  
2132 **classes**

mult from	name	mult to	type	description
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..*	SystemOperator	0..1	<a href="#">SystemOperator</a>	(NC) The system operator for this scheduling area.
0..*	SynchronousArea	0..1	<a href="#">SynchronousArea</a>	(NC) The synchronous area that has this scheduling area.



mult from	name	mult to	type	description
1..*	BiddingZone	1..1	<a href="#">BiddingZone</a>	(NC) The bidding zone related to this scheduling area.
1..*	ControlArea	0..1	<a href="#">ControlArea</a>	(NC) The control area for this scheduling area.

2133

### 2134 3.124 (NC) SecurityCoordinator

2135 Inheritance path = [SystemOperationCoordinator](#) : [PowerSystemOrganisationRole](#) :  
2136 [OrganisationRole](#) : [IdentifiedObject](#)

2137 A role that coordinates the relevant remedial actions and their optimisation to ensure efficient  
2138 use to achieve required operational security of the power system.

2139 Table 212 shows all attributes of SecurityCoordinator.

2140 **Table 212 – Attributes of EquipmentReliabilityProfile::SecurityCoordinator**

name	mult	type	description
globalLocationNumber	0..1	<a href="#">String</a>	(NC) inherited from: <a href="#">OrganisationRole</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

2141

2142 Table 213 shows all association ends of SecurityCoordinator with other classes.

2143 **Table 213 – Association ends of EquipmentReliabilityProfile::SecurityCoordinator with  
2144 other classes**

mult from	name	mult to	type	description
0..*	Organisation	0..1	<a href="#">Organisation</a>	inherited from: <a href="#">OrganisationRole</a>

2145

### 2146 3.125 (NC) SolarRadiationDependencyCurve

2147 Inheritance path = [LimitDependencyCurve](#) : [Curve](#) : [IdentifiedObject](#)

2148 A curve or functional relationship between

2149 - the solar radiation independent variable (X-axis), and

2150 - relative dependent (Y-axis) variables.

2151 Table 214 shows all attributes of SolarRadiationDependencyCurve.

2152 **Table 214 – Attributes of EquipmentReliabilityProfile::SolarRadiationDependencyCurve**

name	mult	type	description
curveStyle	1..1	<a href="#">CurveStyle</a>	inherited from: <a href="#">Curve</a>
xMultiplier	0..1	<a href="#">UnitMultiplier</a>	inherited from: <a href="#">Curve</a>
xUnit	1..1	<a href="#">UnitSymbol</a>	inherited from: <a href="#">Curve</a>
y1Multiplier	0..1	<a href="#">UnitMultiplier</a>	inherited from: <a href="#">Curve</a>
y1Unit	0..1	<a href="#">UnitSymbol</a>	inherited from: <a href="#">Curve</a>
y2Multiplier	0..1	<a href="#">UnitMultiplier</a>	inherited from: <a href="#">Curve</a>
y2Unit	0..1	<a href="#">UnitSymbol</a>	inherited from: <a href="#">Curve</a>



name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

2153

2154 **3.126 (NC) SSSCController**2155 Inheritance path = [EquipmentController](#) : [AutomationFunction](#) : [PowerSystemResource](#) :  
2156 [IdentifiedObject](#)

2157 The controller of a Static synchronous series compensator (SSSC).

2158 Table 215 shows all attributes of SSSCController.

2159

**Table 215 – Attributes of EquipmentReliabilityProfile::SSSCController**

name	mult	type	description
minVoltageInjection	1..1	<a href="#">Voltage</a>	(NC) Minimum voltage that the device can inject.
maxVoltageInjection	1..1	<a href="#">Voltage</a>	(NC) Maximum voltage that the device can inject.
maxOperatingCurrentLimit	0..1	<a href="#">CurrentFlow</a>	(NC) Maximum operating current limit applied for the controller and used by any of the available control functions.
minOperatingCurrentLimit	0..1	<a href="#">CurrentFlow</a>	(NC) Minimum operating current limit applied for the controller and used by any of the available control functions.
type	0..1	<a href="#">String</a>	(NC) inherited from: <a href="#">AutomationFunction</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

2160

2161 Table 216 shows all association ends of SSSCController with other classes.

2162 **Table 216 – Association ends of EquipmentReliabilityProfile::SSSCController with other**  
2163 **classes**

mult from	name	mult to	type	description
0..*	SSSCSimulationSettings	0..1	<a href="#">SSSCSimulationSettings</a>	(NC) The simulation settings that apply for this controller.
0..*	PartOf	0..1	<a href="#">AutomationFunction</a>	(NC) inherited from: <a href="#">AutomationFunction</a>

2164

2165 **3.127 (NC) SSSCSimulationSettings root class**

2166 SSSC control simulation settings used by the algorithm for power flow calculations.

2167 Table 217 shows all attributes of SSSCSimulationSettings.

2168

**Table 217 – Attributes of EquipmentReliabilityProfile::SSSCSimulationSettings**

name	mult	type	description
deltaReactance	1..1	<a href="#">Reactance</a>	(NC) Reactance delta for the solution algorithm. The solution “outer-loop” algorithm is based on a secant method which needs two initial points.

name	mult	type	description
			The second point is calculated from the first one by either adding or subtracting this "delta". The "seed" is assumed to be 0 ohms.
maxIterations	1..1	<a href="#">Integer</a>	(NC) Maximum number of iterations before claiming an open line condition. The algorithm uses it to assess if a line is really open by making sure low-currents are observed on various consecutive iterations.
maxMismatch	1..1	<a href="#">Voltage</a>	(NC) Maximum mismatch tolerance of voltage target value. If mismatch is lower, convergence is claimed. It is only used for voltageInjection and currentDroop control modes.
maxReactanceCorrection	1..1	<a href="#">Reactance</a>	(NC) Maximum value of the reactance correction applied between iterations of the power flow calculation algorithm for the purpose of achieving control target value.
useDIDVestimation	1..1	<a href="#">Boolean</a>	(NC) Defines if the estimate is considering the dI/dV sensitivity (true) instead of the secant algorithm (false).
mRID	1..1	<a href="#">String</a>	(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.

2169

2170 **3.128 (NC) StaticSynchronousCompensator**

2171 Inheritance path = [FACTSEquipment](#) : [RegulatingCondEq](#) : [EnergyConnection](#) :  
2172 [ConductingEquipment](#) : [Equipment](#) : [PowerSystemResource](#) : [IdentifiedObject](#)

2173 Static synchronous compensator (STATCOM), also known as a static synchronous condenser  
2174 (STATCON), is a type of flexible AC transmission system regulating equipment used on  
2175 alternating current electricity transmission networks. It is based on a power electronics voltage-  
2176 source converter and can act as either a source or sink of reactive AC power to an electricity  
2177 network. If connected to a source of power it can also provide active AC power.

2178 Table 218 shows all attributes of StaticSynchronousCompensator.

2179 **Table 218 – Attributes of EquipmentReliabilityProfile::StaticSynchronousCompensator**

name	mult	type	description
capacitiveRating	1..1	<a href="#">Reactance</a>	(NC) inherited from: <a href="#">FACTSEquipment</a>
inductiveRating	1..1	<a href="#">Reactance</a>	(NC) inherited from: <a href="#">FACTSEquipment</a>
slope	1..1	<a href="#">VoltagePerReactivePower</a>	(NC) inherited from: <a href="#">FACTSEquipment</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

2180

2181 Table 219 shows all association ends of StaticSynchronousCompensator with other classes.

2182  
2183**Table 219 – Association ends of  
EquipmentReliabilityProfile::StaticSynchronousCompensator with other classes**

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

2184

**3.129 (NC) StaticSynchronousSeriesCompensator**

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

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. Moreover it can inject a voltage proportional to the difference between the line current and the pre-configured current threshold. It shall have two Terminal-s associated with it.

Table 220 shows all attributes of StaticSynchronousSeriesCompensator.

2198  
2199**Table 220 – Attributes of  
EquipmentReliabilityProfile::StaticSynchronousSeriesCompensator**

name	mult	type	description
capacitiveRating	1..1	<a href="#">Reactance</a>	(NC) inherited from: <a href="#">FACTSEquipment</a>
inductiveRating	1..1	<a href="#">Reactance</a>	(NC) inherited from: <a href="#">FACTSEquipment</a>
slope	1..1	<a href="#">VoltagePerReactivePower</a>	(NC) inherited from: <a href="#">FACTSEquipment</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

2200  
2201  
2202

Table 221 shows all association ends of StaticSynchronousSeriesCompensator with other classes.

2203  
2204**Table 221 – Association ends of  
EquipmentReliabilityProfile::StaticSynchronousSeriesCompensator with other classes**

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

2205

**3.130 (NC) StaticVarCompensator**

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

2208

2209 A facility for providing variable and controllable shunt reactive power. The SVC typically  
2210 consists of a stepdown transformer, filter, thyristor-controlled reactor, and thyristor-switched  
2211 capacitor arms.

2212 The SVC may operate in fixed MVar output mode or in voltage control mode. When in voltage  
2213 control mode, the output of the SVC will be proportional to the deviation of voltage at the  
2214 controlled bus from the voltage setpoint. The SVC characteristic slope defines the proportion.  
2215 If the voltage at the controlled bus is equal to the voltage setpoint, the SVC MVar output is zero.  
2216 Table 222 shows all attributes of StaticVarCompensator.

2217 **Table 222 – Attributes of EquipmentReliabilityProfile::StaticVarCompensator**

name	mult	type	description
capacitiveRating	1..1	<a href="#">Reactance</a>	(NC) inherited from: <a href="#">FACTSEquipment</a>
inductiveRating	1..1	<a href="#">Reactance</a>	(NC) inherited from: <a href="#">FACTSEquipment</a>
slope	1..1	<a href="#">VoltagePerReactivePower</a>	(NC) inherited from: <a href="#">FACTSEquipment</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

2218

2219 Table 223 shows all association ends of StaticVarCompensator with other classes.

2220 **Table 223 – Association ends of EquipmentReliabilityProfile::StaticVarCompensator**  
2221 **with other classes**

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

2222

### 2223 3.131 (NC) SubSchedulingArea

2224 Inheritance path = [SchedulingArea](#) : [PowerSystemResource](#) : [IdentifiedObject](#)

2225 An area that is a part of another scheduling area. Typically part of a Transmission System  
2226 Operator (TSO) scheduling area operated by a Distributed System Operator (DSO) or a Close  
2227 Distributed System Operator (CDSO). This includes microgrid concept. A sub scheduling area  
2228 can contain other sub areas. A sub scheduling area leaf will form the smallest entity of any  
2229 given energy area.

2230 Table 224 shows all attributes of SubSchedulingArea.

2231 **Table 224 – Attributes of EquipmentReliabilityProfile::SubSchedulingArea**

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

2232

2233 Table 225 shows all association ends of SubSchedulingArea with other classes.

2234 **Table 225 – Association ends of EquipmentReliabilityProfile::SubSchedulingArea with**  
2235 **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..*	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..*	SystemOperator	0..1	<a href="#">SystemOperator</a>	(NC) inherited from: <a href="#">SchedulingArea</a>
0..*	SynchronousArea	0..1	<a href="#">SynchronousArea</a>	(NC) inherited from: <a href="#">SchedulingArea</a>
1..*	BiddingZone	1..1	<a href="#">BiddingZone</a>	(NC) inherited from: <a href="#">SchedulingArea</a>
1..*	ControlArea	0..1	<a href="#">ControlArea</a>	(NC) inherited from: <a href="#">SchedulingArea</a>

2236

2237 **3.132 (Description) Substation**2238 Inheritance path = [EquipmentContainer](#) : [ConnectivityNodeContainer](#) : [PowerSystemResource](#) :  
2239 [IdentifiedObject](#)2240 A collection of equipment for purposes other than generation or utilization, through which  
2241 electric energy in bulk is passed for the purposes of switching or modifying its characteristics.

2242 Table 226 shows all attributes of Substation.

2243 **Table 226 – Attributes of EquipmentReliabilityProfile::Substation**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

2244

2245 Table 227 shows all association ends of Substation with other classes.

2246 **Table 227 – Association ends of EquipmentReliabilityProfile::Substation with other**  
2247 **classes**

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

2248

2249 **3.133 (NC) SubstationController**2250 Inheritance path = [EquipmentController](#) : [AutomationFunction](#) : [PowerSystemResource](#) :  
2251 [IdentifiedObject](#)2252 Substation controller is controlling the equipment to optimize the use of the controlling  
2253 equipment within a substation.

2254 Table 228 shows all attributes of SubstationController.

2255 **Table 228 – Attributes of EquipmentReliabilityProfile::SubstationController**

name	mult	type	description
type	0..1	<a href="#">String</a>	(NC) inherited from: <a href="#">AutomationFunction</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

2256

2257 Table 229 shows all association ends of SubstationController with other classes.

2258 **Table 229 – Association ends of EquipmentReliabilityProfile::SubstationController with**  
2259 **other classes**

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

2260

2261 **3.134 (NC) SynchronousArea**2262 Inheritance path = [PowerSystemResource](#) : [IdentifiedObject](#)2263 A synchronous area is an electrical area covered by interconnect with a common system  
2264 frequency in a steady-state.

2265 Table 230 shows all attributes of SynchronousArea.

2266 **Table 230 – Attributes of EquipmentReliabilityProfile::SynchronousArea**

name	mult	type	description
nominalFrequency	1..1	<a href="#">Frequency</a>	(NC) The nominal frequency for the Synchronous Area, e.g. 50 Hz for Europe.
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

2267

2268 **3.135 (abstract) SynchronousMachine root class**

2269 An electromechanical device that operates with shaft rotating synchronously with the network.

2270 It is a single machine operating either as a generator or synchronous condenser or pump.

2271 **3.136 (abstract,NC) SystemOperationCoordinator**2272 Inheritance path = [PowerSystemOrganisationRole](#) : [OrganisationRole](#) : [IdentifiedObject](#)2273 A role that coordinates relevant information and impact in regards to operating the power  
2274 system.

2275 Table 231 shows all attributes of SystemOperationCoordinator.

2276 **Table 231 – Attributes of EquipmentReliabilityProfile::SystemOperationCoordinator**

name	mult	type	description
globalLocationNumber	0..1	<a href="#">String</a>	(NC) inherited from: <a href="#">OrganisationRole</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>

name	mult	type	description
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

2277  
2278 Table 232 shows all association ends of SystemOperationCoordinator with other classes.

2279  
2280 **Table 232 – Association ends of EquipmentReliabilityProfile::SystemOperationCoordinator with other classes**

mult from	name	mult to	type	description
0..*	Organisation	0..1	<a href="#">Organisation</a>	inherited from: <a href="#">OrganisationRole</a>

2281

### 2282 3.137 (abstract,NC) SystemOperator

2283 Inheritance path = [PowerSystemOrganisationRole](#) : [OrganisationRole](#) : [IdentifiedObject](#)

2284 System operator.

2285 Table 233 shows all attributes of SystemOperator.

2286 **Table 233 – Attributes of EquipmentReliabilityProfile::SystemOperator**

name	mult	type	description
globalLocationNumber	0..1	<a href="#">String</a>	(NC) inherited from: <a href="#">OrganisationRole</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

2287

2288 Table 234 shows all association ends of SystemOperator with other classes.

2289  
2290 **Table 234 – Association ends of EquipmentReliabilityProfile::SystemOperator with other classes**

mult from	name	mult to	type	description
0..*	Organisation	0..1	<a href="#">Organisation</a>	inherited from: <a href="#">OrganisationRole</a>

2291

### 2292 3.138 (Description) TapChanger root class

2293 Mechanism for changing transformer winding tap positions.

2294 Table 235 shows all association ends of TapChanger with other classes.

2295  
2296 **Table 235 – Association ends of EquipmentReliabilityProfile::TapChanger with other classes**

mult from	name	mult to	type	description
0..*	TapChangeController	0..1	<a href="#">TapChangerController</a>	(NC) The tap changer controller that controls this TapChanger.

2297



2298 **3.139 (NC) TapChangerController**2299 Inheritance path = [EquipmentController](#) : [AutomationFunction](#) : [PowerSystemResource](#) :  
2300 [IdentifiedObject](#)2301 Tap changer controller is an equipment controller that controls a tap changer, e.g. how the  
2302 voltage at the end of a line varies with the load level and compensation of the voltage drop by  
2303 tap adjustment.

2304 Table 236 shows all attributes of TapChangerController.

2305 **Table 236 – Attributes of EquipmentReliabilityProfile::TapChangerController**

name	mult	type	description
type	0..1	<a href="#">String</a>	(NC) inherited from: <a href="#">AutomationFunction</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

2306

2307 Table 237 shows all association ends of TapChangerController with other classes.

2308 **Table 237 – Association ends of EquipmentReliabilityProfile::TapChangerController**  
2309 **with other classes**

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

2310

2311 **3.140 (NC) TCSCCompensationPoint root class**

2312 Compensation point of a TCSC compensator.

2313 Table 238 shows all attributes of TCSCCompensationPoint.

2314 **Table 238 – Attributes of EquipmentReliabilityProfile::TCSCCompensationPoint**

name	mult	type	description
compensationImpedance	1..1	<a href="#">Impedance</a>	(NC) The compensation impedance for this compensation point.
mRID	1..1	<a href="#">String</a>	(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.
sectionNumber	1..1	<a href="#">Integer</a>	(NC) The number of the section.

2315

2316 Table 239 shows all association ends of TCSCCompensationPoint with other classes.



2317 **Table 239 – Association ends of EquipmentReliabilityProfile::TCSCCompensationPoint**  
2318 **with other classes**

mult from	name	mult to	type	description
0..*	ThyristorControlledSeriesCompensator	1..1	<a href="#">ThyristorControlledSeriesCompensator</a>	(NC) TCSC that has different compensation points.

2319

### 2320 3.141 (NC) TCSCController

2321 Inheritance path = [EquipmentController](#) : [AutomationFunction](#) : [PowerSystemResource](#) :  
2322 [IdentifiedObject](#)

2323 TCSC controller is controlling the equipment to optimize the performance of the TCSC.

2324 Table 240 shows all attributes of TCSCController.

2325 **Table 240 – Attributes of EquipmentReliabilityProfile::TCSCController**

name	mult	type	description
type	0..1	<a href="#">String</a>	(NC) inherited from: <a href="#">AutomationFunction</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

2326

2327 Table 241 shows all association ends of TCSCController with other classes.

2328 **Table 241 – Association ends of EquipmentReliabilityProfile::TCSCController with other**  
2329 **classes**

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

2330

### 2331 3.142 (abstract) Terminal

2332 Inheritance path = [ACDCTerminal](#)

2333 An AC electrical connection point to a piece of conducting equipment. Terminals are connected  
2334 at physical connection points called connectivity nodes.

### 2335 3.143 (NC) ThyristorControlledSeriesCompensator

2336 Inheritance path = [FACTSEquipment](#) : [RegulatingCondEq](#) : [EnergyConnection](#) :  
2337 [ConductingEquipment](#) : [Equipment](#) : [PowerSystemResource](#) : [IdentifiedObject](#)

2338 Thyristor-controlled series capacitors (TCSC) is a type of flexible AC transmission system  
2339 regulating equipment that is configured with controlled reactors in parallel with sections of a  
2340 capacitor bank. This combination allows smooth control of the fundamental frequency  
2341 capacitive reactance over a wide range. The thyristor valve contains a string of series connected  
2342 high power thyristors. TCSC can control power flows in order to achieve eliminating of line  
2343 overloads, reducing loop flows and minimising system losses.

2344 Table 242 shows all attributes of ThyristorControlledSeriesCompensator.

2345  
2346**Table 242 – Attributes of  
EquipmentReliabilityProfile::ThyristorControlledSeriesCompensator**

name	mult	type	description
flexibleCapacitiveImpedance	1..1	<a href="#">Impedance</a>	(NC) Flexible impedance that can be controlled by the compensator when operating in the capacitive range. Shall always be positive.
flexibleInductiveImpedance	1..1	<a href="#">Impedance</a>	(NC) Flexible impedance that can be controlled by the compensator when operating in the inductive range. Shall always be negative.
minimumCurrent	1..1	<a href="#">CurrentFlow</a>	(NC) Minimum current below which the device bypassed.
reconnectionCurrent	1..1	<a href="#">CurrentFlow</a>	(NC) The current for which the TCSC returns back to operation after bypass.
capacitiveRating	1..1	<a href="#">Reactance</a>	(NC) inherited from: <a href="#">FACTSEquipment</a>
inductiveRating	1..1	<a href="#">Reactance</a>	(NC) inherited from: <a href="#">FACTSEquipment</a>
slope	1..1	<a href="#">VoltagePerReactivePower</a>	(NC) inherited from: <a href="#">FACTSEquipment</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

2347  
2348  
2349

Table 243 shows all association ends of ThyristorControlledSeriesCompensator with other classes.

2350  
2351**Table 243 – Association ends of  
EquipmentReliabilityProfile::ThyristorControlledSeriesCompensator with other classes**

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

2352

**3.144 (NC) TieCorridor**2354 Inheritance path = [PowerSystemResource](#) : [IdentifiedObject](#)

2355 A collection of one or more tie-lines or direct current poles that connect two different control areas.

2357 Table 244 shows all attributes of TieCorridor.

2358

**Table 244 – Attributes of EquipmentReliabilityProfile::TieCorridor**

name	mult	type	description
delayRegulatingReserve	0..1	<a href="#">Seconds</a>	(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.
maxRegulatingReserveRamp	0..1	<a href="#">Float</a>	(NC) Maximum authorized ramp for regulating reserve.
thresholdRegulatingReserve	0..1	<a href="#">ActivePower</a>	(NC) Regulating reserve threshold.

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

2359

2360 Table 245 shows all association ends of TieCorridor with other classes.

2361 **Table 245 – Association ends of EquipmentReliabilityProfile::TieCorridor with other**  
2362 **classes**

mult from	name	mult to	type	description
0..*	LoadFrequencyControlArea	0..1	<a href="#">LoadFrequencyControlArea</a>	(NC) LoadFrequencyControlArea controlling the TieCorridor.
0..*	BiddingZoneBorder	0..1	<a href="#">BiddingZoneBorder</a>	(NC) Bidding zone border in which the tie corridor is located.

2363

2364 **3.145 (Description) TieFlow**2365 Inheritance path = [IdentifiedObject](#)

2366 Defines the structure (in terms of location and direction) of the net interchange constraint for a control area. This constraint may be used by either AGC or power flow.

2367 Table 246 shows all attributes of TieFlow.

2368 **Table 246 – Attributes of EquipmentReliabilityProfile::TieFlow**

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

2370

2371 Table 247 shows all association ends of TieFlow with other classes.

2372 **Table 247 – Association ends of EquipmentReliabilityProfile::TieFlow with other classes**

mult from	name	mult to	type	description
0..*	TieCorridor	0..1	<a href="#">TieCorridor</a>	(NC) Tie corridor which has the tie flow.

2373

2374 **3.146 (NC) TransmissionSystemOperator**2375 Inheritance path = [SystemOperator](#) : [PowerSystemOrganisationRole](#) : [OrganisationRole](#) : [IdentifiedObject](#)

2376 A system operator role that is responsible for operating of an energy transmission network.

2377 Table 248 shows all attributes of TransmissionSystemOperator.

2378 **Table 248 – Attributes of EquipmentReliabilityProfile::TransmissionSystemOperator**

name	mult	type	description
globalLocationNumber	0..1	<a href="#">String</a>	(NC) inherited from: <a href="#">OrganisationRole</a>

name	mult	type	description
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

2380

2381 Table 249 shows all association ends of TransmissionSystemOperator with other classes.

2382

2383

**Table 249 – Association ends of  
EquipmentReliabilityProfile::TransmissionSystemOperator with other classes**

mult from	name	mult to	type	description
0..*	Organisation	0..1	<a href="#">Organisation</a>	inherited from: <a href="#">OrganisationRole</a>

2384

### 2385 3.147 (NC) UnifiedPowerFlowController

2386 Inheritance path = [EquipmentController](#) : [AutomationFunction](#) : [PowerSystemResource](#) :  
2387 [IdentifiedObject](#)

2388 Unified power flow controller (UPFC) is providing fast-acting reactive power compensation on  
2389 high-voltage electricity transmission networks.

2390 Table 250 shows all attributes of UnifiedPowerFlowController.

2391

**Table 250 – Attributes of EquipmentReliabilityProfile::UnifiedPowerFlowController**

name	mult	type	description
type	0..1	<a href="#">String</a>	(NC) inherited from: <a href="#">AutomationFunction</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

2392

2393 Table 251 shows all association ends of UnifiedPowerFlowController with other classes.

2394

2395

**Table 251 – Association ends of  
EquipmentReliabilityProfile::UnifiedPowerFlowController with other classes**

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

2396

### 2397 3.148 (NC) VoltageAngleLimit

2398 Inheritance path = [OperationalLimit](#) : [IdentifiedObject](#)

2399 Voltage angle limit between two terminals. The association end OperationalLimitSet.Terminal  
2400 defines one end and the host of the limit. The association end  
2401 VoltageAngleLimit.AngleReferenceTerminal defines the reference terminal.

2402 Table 252 shows all attributes of VoltageAngleLimit.

2403 **Table 252 – Attributes of EquipmentReliabilityProfile::VoltageAngleLimit**

name	mult	type	description
normalValue	1..1	<a href="#">AngleDegrees</a>	(NC) The difference in angle degrees between referenced by the association end OperationalLimitSet.Terminal and the Terminal referenced by the association end VoltageAngleLimit.AngleReferenceTerminal. The value shall be positive (greater than zero).
isFlowToRefTerminal	0..1	<a href="#">Boolean</a>	(NC) True if the flow is from the operating limit terminal to the angle reference terminal. False means that the flow is the other direction. When it is not given, the limit is the same for both directions.
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

2404

2405 Table 253 shows all association ends of VoltageAngleLimit with other classes.

2406 **Table 253 – Association ends of EquipmentReliabilityProfile::VoltageAngleLimit with other classes**  
2407

mult from	name	mult to	type	description
0..*	AngleReferenceTerminal	1..1	<a href="#">Terminal</a>	(NC) The angle reference terminal for the voltage angle limit.
1..*	OperationalLimitType	1..1	<a href="#">OperationalLimitType</a>	inherited from: <a href="#">OperationalLimit</a>
1..*	OperationalLimitSet	1..1	<a href="#">OperationalLimitSet</a>	inherited from: <a href="#">OperationalLimit</a>

2408

2409 **3.149 (NC) VoltageControlFunction**2410 Inheritance path = [ControlFunctionBlock](#) : [FunctionBlock](#) : [IdentifiedObject](#)2411 Voltage control function is a function block that calculate the operating point of the controlled  
2412 equipment to achieve the target voltage.

2413 Table 254 shows all attributes of VoltageControlFunction.

2414 **Table 254 – Attributes of EquipmentReliabilityProfile::VoltageControlFunction**

name	mult	type	description
isDiscrete	1..1	<a href="#">Boolean</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
targetDeadband	0..1	<a href="#">Float</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
maxAllowedTargetValue	0..1	<a href="#">PerCent</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
minAllowedTargetValue	0..1	<a href="#">PerCent</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
priority	0..1	<a href="#">Integer</a>	(NC) inherited from: <a href="#">FunctionBlock</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

2415

2416 Table 255 shows all association ends of VoltageControlFunction with other classes.

2417 **Table 255 – Association ends of EquipmentReliabilityProfile::VoltageControlFunction**  
2418 **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>

2419

### 2420 3.150 (NC) VoltageInjectionControlFunction

2421 Inheritance path = [ControlFunctionBlock](#) : [FunctionBlock](#) : [IdentifiedObject](#)

2422 Voltage injection control function is a function block that calculates the operating point of the  
2423 controlled equipment to achieve the target voltage injection. The controlled point is the Terminal  
2424 with sequenceNumber =1.

2425 Table 256 shows all attributes of VoltageInjectionControlFunction.

2426 **Table 256 – Attributes of EquipmentReliabilityProfile::VoltageInjectionControlFunction**

name	mult	type	description
isDiscrete	1..1	<a href="#">Boolean</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
targetDeadband	0..1	<a href="#">Float</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
maxAllowedTargetValue	0..1	<a href="#">PerCent</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
minAllowedTargetValue	0..1	<a href="#">PerCent</a>	(NC) inherited from: <a href="#">ControlFunctionBlock</a>
priority	0..1	<a href="#">Integer</a>	(NC) inherited from: <a href="#">FunctionBlock</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

2427

2428 Table 257 shows all association ends of VoltageInjectionControlFunction with other classes.

2429 **Table 257 – Association ends of**  
2430 **EquipmentReliabilityProfile::VoltageInjectionControlFunction 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>

2431

### 2432 3.151 VsCapabilityCurve

2433 Inheritance path = [Curve](#) : [IdentifiedObject](#)

2434 The P-Q capability curve for a voltage source converter, with P on X-axis and Qmin and Qmax  
2435 on Y1-axis and Y2-axis.

2436 Table 258 shows all attributes of VsCapabilityCurve.

2437 **Table 258 – Attributes of EquipmentReliabilityProfile::VsCapabilityCurve**

name	mult	type	description
referenceVoltage	1..1	<a href="#">Voltage</a>	(NC) The reference voltage for which the capability curve is valid.
curveStyle	1..1	<a href="#">CurveStyle</a>	inherited from: <a href="#">Curve</a>
xMultiplier	0..1	<a href="#">UnitMultiplier</a>	inherited from: <a href="#">Curve</a>
xUnit	1..1	<a href="#">UnitSymbol</a>	inherited from: <a href="#">Curve</a>

name	mult	type	description
y1Multiplier	0..1	<a href="#">UnitMultiplier</a>	inherited from: <a href="#">Curve</a>
y1Unit	0..1	<a href="#">UnitSymbol</a>	inherited from: <a href="#">Curve</a>
y2Multiplier	0..1	<a href="#">UnitMultiplier</a>	inherited from: <a href="#">Curve</a>
y2Unit	0..1	<a href="#">UnitSymbol</a>	inherited from: <a href="#">Curve</a>
energyIdentCodeEic	0..1	<a href="#">String</a>	(deprecated,European) inherited from: <a href="#">IdentifiedObject</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

2438

2439

Table 259 shows all association ends of VsCapabilityCurve with other classes.

2440

**Table 259 – Association ends of EquipmentReliabilityProfile::VsCapabilityCurve with other classes**

2441

mult from	name	mult to	type	description
0..*	VsConverter	1..1	<a href="#">VsConverter</a>	(NC) Converter with this capability curve.

2442

2443

### 3.152 (abstract) VsConverter root class

2444

DC side of the voltage source converter (VSC).

2445

### 3.153 Currency enumeration

2446

Monetary currencies. ISO 4217 standard including 3-character currency code.

2447

Table 260 shows all literals of Currency.

2448

**Table 260 – Literals of EquipmentReliabilityProfile::Currency**

literal	value	description
AED	784	United Arab Emirates dirham.
AFN	971	Afghan afghani.
ALL	008	Albanian lek.
AMD	051	Armenian dram.
ANG	532	Netherlands Antillean guilder.
AOA	973	Angolan kwanza.
ARS	032	Argentine peso.
AUD	036	Australian dollar.
AWG	533	Aruban florin.
AZN	944	Azerbaijani manat.
BAM	977	Bosnia and Herzegovina convertible mark.
BBD	052	Barbados dollar.
BDT	050	Bangladeshi taka.
BGN	975	Bulgarian lev.
BHD	048	Bahraini dinar.
BIF	108	Burundian franc.

literal	value	description
BMD	060	Bermudian dollar (customarily known as Bermuda dollar).
BND	096	Brunei dollar.
BOB	068	Boliviano.
BOV	984	Bolivian Mvdol (funds code).
BRL	986	Brazilian real.
BSD	044	Bahamian dollar.
BTN	064	Bhutanese ngultrum.
BWP	072	Botswana pula.
BYR	974	Belarusian ruble.
BZD	084	Belize dollar.
CAD	124	Canadian dollar.
CDF	976	Congolese franc.
CHF	756	Swiss franc.
CLF	990	Unidad de Fomento (funds code), Chile.
CLP	152	Chilean peso.
CNY	156	Chinese yuan.
COP	170	Colombian peso.
COU	970	Unidad de Valor Real.
CRC	188	Costa Rican colon.
CUC	931	Cuban convertible peso.
CUP	192	Cuban peso.
CVE	132	Cape Verde escudo.
CZK	203	Czech koruna.
DJF	262	Djiboutian franc.
DKK	208	Danish krone.
DOP	214	Dominican peso.
DZD	012	Algerian dinar.
EEK	233	Estonian kroon.
EGP	818	Egyptian pound.
ERN	232	Eritrean nakfa.
ETB	230	Ethiopian birr.
EUR	978	Euro.
FJD	242	Fiji dollar.
FKP	238	Falkland Islands pound.
GBP	826	Pound sterling.
GEL	981	Georgian lari.
GHS	936	Ghanaian cedi.
GIP	929	Gibraltar pound.
GMD	270	Gambian dalasi.
GNF	324	Guinean franc.



literal	value	description
GTQ	320	Guatemalan quetzal.
GYP	328	Guyanese dollar.
HKD	344	Hong Kong dollar.
HNL	340	Honduran lempira.
HRK	191	Croatian kuna.
HTG	332	Haitian gourde.
HUF	348	Hungarian forint.
IDR	360	Indonesian rupiah.
ILS	376	Israeli new sheqel.
INR	356	Indian rupee.
IQD	368	Iraqi dinar.
IRR	364	Iranian rial.
ISK	352	Icelandic króna.
JMD	388	Jamaican dollar.
JOD	400	Jordanian dinar.
JPY	392	Japanese yen.
KES	404	Kenyan shilling.
KGS	417	Kyrgyzstani som.
KHR	116	Cambodian riel.
KMF	174	Comoro franc.
KPW	408	North Korean won.
KRW	410	South Korean won.
KWD	414	Kuwaiti dinar.
KYD	136	Cayman Islands dollar.
KZT	398	Kazakhstani tenge.
LAK	418	Lao kip.
LBP	422	Lebanese pound.
LKR	144	Sri Lanka rupee.
LRD	430	Liberian dollar.
LSL	426	Lesotho loti.
LTL	440	Lithuanian litas.
LVL	428	Latvian lats.
LYD	434	Libyan dinar.
MAD	504	Moroccan dirham.
MDL	498	Moldovan leu.
MGA	969	Malagasy ariary.
MKD	807	Macedonian denar.
MMK	104	Myanma kyat.
MNT	496	Mongolian tugrik.
MOP	446	Macanese pataca.
MRO	478	Mauritanian ouguiya.

literal	value	description
MUR	480	Mauritian rupee.
MVR	462	Maldivian rufiyaa.
MWK	454	Malawian kwacha.
MXN	484	Mexican peso.
MYR	458	Malaysian ringgit.
MZN	943	Mozambican metical.
NAD	516	Namibian dollar.
NGN	566	Nigerian naira.
NIO	558	Cordoba oro.
NOK	578	Norwegian krone.
NPR	524	Nepalese rupee.
NZD	554	New Zealand dollar.
OMR	512	Omani rial.
PAB	590	Panamanian balboa.
PEN	604	Peruvian nuevo sol.
PGK	598	Papua New Guinean kina.
PHP	608	Philippine peso.
PKR	586	Pakistani rupee.
PLN	985	Polish zloty.
PYG	600	Paraguayan guaraní.
QAR	634	Qatari rial.
RON	946	Romanian new leu.
RSD	941	Serbian dinar.
RUB	643	Russian rouble.
RWF	646	Rwandan franc.
SAR	682	Saudi riyal.
SBD	090	Solomon Islands dollar.
SCR	690	Seychelles rupee.
SDG	938	Sudanese pound.
SEK	752	Swedish krona/kronor.
SGD	702	Singapore dollar.
SHP	654	Saint Helena pound.
SLL	694	Sierra Leonean leone.
SOS	706	Somali shilling.
SRD	968	Surinamese dollar.
STD	678	São Tomé and Príncipe dobra.
SYP	760	Syrian pound.
SZL	748	Lilangeni.
THB	764	Thai baht.
TJS	972	Tajikistani somoni.
TMT	934	Turkmenistani manat.

literal	value	description
TND	788	Tunisian dinar.
TOP	776	Tongan pa'anga.
TRY	949	Turkish lira.
TTD	780	Trinidad and Tobago dollar.
TWD	901	New Taiwan dollar.
TZS	834	Tanzanian shilling.
UAH	980	Ukrainian hryvnia.
UGX	800	Ugandan shilling.
USD	840	United States dollar.
UYU	858	Uruguayan peso.
UZS	860	Uzbekistan som.
VEF	937	Venezuelan bolívar fuerte.
VND	704	Vietnamese Dong.
VUV	548	Vanuatu vatu.
WST	882	Samoan tala.
XAF	950	CFA franc BEAC.
XCD	951	East Caribbean dollar.
XOF	952	CFA Franc BCEAO.
XPF	953	CFP franc.
YER	886	Yemeni rial.
ZAR	710	South African rand.
ZMK	894	Zambian kwacha.
ZWL	932	Zimbabwe dollar.

2449

2450 **3.154 CurveStyle enumeration**

2451 Style or shape of curve.

2452 Table 261 shows all literals of CurveStyle.

2453

**Table 261 – Literals of EquipmentReliabilityProfile::CurveStyle**

literal	value	description
constantYValue		The Y-axis values are assumed constant until the next curve point and prior to the first curve point.
straightLineYValues		The Y-axis values are assumed to be a straight line between values. Also known as linear interpolation.

2454

2455 **3.155 (NC) GeothermalUnitKind enumeration**

2456 Kind of geothermal.

2457 Table 262 shows all literals of GeothermalUnitKind.

2458 **Table 262 – Literals of EquipmentReliabilityProfile::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.

2459

2460 **3.156 (NC) LogicalOperatorsKind enumeration**

2461 Kinds of logical operators for comparison.

2462 Table 263 shows all literals of LogicalOperatorsKind.

2463 **Table 263 – Literals of EquipmentReliabilityProfile::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.
greaterThan		Greater than comparison operation.

2464

2465 **3.157 (NC) MarineUnitKind enumeration**

2466 Kind of marine energy capture.

2467 Table 264 shows all literals of MarineUnitKind.

2468 **Table 264 – Literals of EquipmentReliabilityProfile::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.
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.

2469

2470 **3.158 (NC) NuclearReactorKind enumeration**

2471 Kind of nuclear reactor.

2472 Table 265 shows all literals of NuclearReactorKind.

2473

**Table 265 – Literals of EquipmentReliabilityProfile::NuclearReactorKind**

literal	value	description
breeder		Reactor whose heat source is a nuclear reactor that generates more fissile material than it consumes.
graphite		Reactor whose 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 whose heat source is a pressurized heavy-water reactor (PHWR) that uses heavy water (deuterium oxide D2O) as its coolant and neutron moderator.
lightWater		Reactor whose 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 whose 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.

2474

**3.159 OperationalLimitDirectionKind enumeration**

2476 The direction attribute describes the side of a limit that is a violation.

2477 Table 266 shows all literals of OperationalLimitDirectionKind.

**Table 266 – Literals of EquipmentReliabilityProfile::OperationalLimitDirectionKind**

literal	value	description
high		High means that a monitored value above the limit value is a violation. If applied to a terminal flow, the positive direction is into the terminal.
low		Low means a monitored value below the limit is a violation. If applied to a terminal flow, the positive direction is into the terminal.
absoluteValue		An absoluteValue limit means that a monitored absolute value above the limit value is a violation.

2479

**3.160 (NC) PinTerminalKind enumeration**

2481 The kind of quantities that can serve as an input value for the pin.

2482 Table 267 shows all literals of PinTerminalKind.

**Table 267 – Literals of EquipmentReliabilityProfile::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.

literal	value	description
reactivePower		Reactive power on the Terminal.

2484

2485 **3.161 (NC) PowerElectricalChemicalUnitKind enumeration**

2486 Kind of power electrical chemical unit.

2487 Table 268 shows all literals of PowerElectricalChemicalUnitKind.

2488 **Table 268 – Literals of EquipmentReliabilityProfile::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.

2489

2490 **3.162 (NC) RampingPrincipleKind enumeration**

2491 Kind of ramping principle.

2492 Table 269 shows all literals of RampingPrincipleKind.

2493 **Table 269 – Literals of EquipmentReliabilityProfile::RampingPrincipleKind**

literal	value	description
fiveMinutes		Five minutes ramping principle. Ramping starts five minutes before the schedule time point and ends five minutes after. For instance, if the schedule time point is 19:30h it starts at 19:25h and ends at 19:35h.
fifteenMinutes		Fifteen minutes ramping principle. Ramping starts 15 minutes before the schedule time point and ends 15 minutes after. For instance, if the schedule time point is 19:30h it starts at 19:15h and ends at 19:45h.
continuous		Continuous ramping principle is applied between two scheduled time point. For instance, from 10 MW to 70 MW over one hour the change is 1 MW/min.
tenMinutes		Ten minutes ramping principle. Ramping starts 10 minutes before the schedule time point and ends 10 minutes after. For instance, if the schedule time point is 19:30h it starts at 19:20h and ends at 19:40h.
maxContinuous		Maximum continuous ramping principle. The schedule is kept as long as possible and the maximum ramping rate is used to get from one point to another, symmetrically around the schedule time points. For example, there is 40 MW change in the schedule the maximum ramp rate is 20 MW/min the ramping starts 1 min before (e.g. 19:29h) and finishes 1 min after (e.g. 19:31h).

2494

2495 **3.163 UnitMultiplier enumeration**

2496 The unit multipliers defined for the CIM. When applied to unit symbols, the unit symbol is  
2497 treated as a derived unit. Regardless of the contents of the unit symbol text, the unit symbol  
2498 shall be treated as if it were a single-character unit symbol. Unit symbols should not contain  
2499 multipliers, and it should be left to the multiplier to define the multiple for an entire data type.

2500 For example, if a unit symbol is "m2Pers" and the multiplier is "k", then the value is  $k(m^{**2}/s)$ ,  
2501 and the multiplier applies to the entire final value, not to any individual part of the value. This  
2502 can be conceptualized by substituting a derived unit symbol for the unit type. If one imagines  
2503 that the symbol "P" represents the derived unit "m2Pers", then applying the multiplier "k" can  
2504 be conceptualized simply as "kP".

2505 For example, the SI unit for mass is "kg" and not "g". If the unit symbol is defined as "kg", then  
2506 the multiplier is applied to "kg" as a whole and does not replace the "k" in front of the "g". In  
2507 this case, the multiplier of "m" would be used with the unit symbol of "kg" to represent one gram.  
2508 As a text string, this violates the instructions in IEC 80000-1. However, because the unit symbol  
2509 in CIM is treated as a derived unit instead of as an SI unit, it makes more sense to conceptualize  
2510 the "kg" as if it were replaced by one of the proposed replacements for the SI mass symbol. If  
2511 one imagines that the "kg" were replaced by a symbol "P", then it is easier to conceptualize the  
2512 multiplier "m" as creating the proper unit "mP", and not the forbidden unit "mkg".

2513 Table 270 shows all literals of UnitMultiplier.

2514 **Table 270 – Literals of EquipmentReliabilityProfile::UnitMultiplier**

literal	value	description
none	0	No multiplier or equivalently multiply by 1.
k	3	Kilo $10^{**3}$ .
M	6	Mega $10^{**6}$ .

2515

2516 **3.164 UnitSymbol enumeration**

2517 The derived units defined for usage in the CIM. In some cases, the derived unit is equal to an  
2518 SI unit. Whenever possible, the standard derived symbol is used instead of the formula for the  
2519 derived unit. For example, the unit symbol Farad is defined as "F" instead of "CPerV". In cases  
2520 where a standard symbol does not exist for a derived unit, the formula for the unit is used as  
2521 the unit symbol. For example, density does not have a standard symbol and so it is represented  
2522 as "kgPerm3". With the exception of the "kg", which is an SI unit, the unit symbols do not contain  
2523 multipliers and therefore represent the base derived unit to which a multiplier can be applied as  
2524 a whole.

2525 Every unit symbol is treated as an unparseable text as if it were a single-letter symbol. The  
2526 meaning of each unit symbol is defined by the accompanying descriptive text and not by the  
2527 text contents of the unit symbol.

2528 To allow the widest possible range of serializations without requiring special character handling,  
2529 several substitutions are made which deviate from the format described in IEC 80000-1. The  
2530 division symbol "/" is replaced by the letters "Per". Exponents are written in plain text after the  
2531 unit as "m3" instead of being formatted as "m" with a superscript of 3 or introducing a symbol  
2532 as in "m^3". The degree symbol "°" is replaced with the letters "deg". Any clarification of the  
2533 meaning for a substitution is included in the description for the unit symbol.

2534 Non-SI units are included in list of unit symbols to allow sources of data to be correctly labelled  
2535 with their non-SI units (for example, a GPS sensor that is reporting numbers that represent feet  
2536 instead of meters). This allows software to use the unit symbol information correctly convert  
2537 and scale the raw data of those sources into SI-based units.

2538 The integer values are used for harmonization with IEC 61850.

2539 Table 271 shows all literals of UnitSymbol.

2540

**Table 271 – Literals of EquipmentReliabilityProfile::UnitSymbol**

literal	value	description
none	0	Dimension less quantity, e.g. count, per unit, etc.
s	4	Time in seconds.
A	5	Current in amperes.
deg	9	Plane angle in degrees.
degC	23	Relative temperature in degrees Celsius. In the SI unit system the symbol is °C. Electric charge is measured in coulomb that has the unit symbol C. To distinguish degree Celsius from coulomb the symbol used in the UML is degC. The reason for not using °C is that the special character ° is difficult to manage in software.
V	29	Electric potential in volts (W/A).
ohm	30	Electric resistance in ohms (V/A).
Hz	33	Frequency in hertz (1/s).
W	38	Real power in watts (J/s). Electrical power may have real and reactive components. The real portion of electrical power ( $I^2R$ or $VI\cos(\phi)$ ), is expressed in Watts. See also apparent power and reactive power.
Pa	39	Pressure in pascals (N/m <sup>2</sup> ). Note: the absolute or relative measurement of pressure is implied with this entry. See below for more explicit forms.
WPerm2	55	Heat flux density, irradiance, watts per square metre.
VAr	63	Reactive power in volt amperes reactive. The "reactive" or "imaginary" component of electrical power ( $VI\sin(\phi)$ ). (See also real power and apparent power).  Note: Different meter designs use different methods to arrive at their results. Some meters may compute reactive power as an arithmetic value, while others compute the value vectorially. The data consumer should determine the method in use and the suitability of the measurement for the intended purpose.
WPers	81	Ramp rate in watts per second.
VPerVAr		Power factor, PF, the ratio of the active power to the apparent power. Note: The sign convention used for power factor will differ between IEC meters and EEI (ANSI) meters. It is assumed that the data consumers understand the type of meter being used and agree on the sign convention in use at any given utility.

2541

**2542 3.165 CurrentFlow datatype**

2543 Electrical current with sign convention: positive flow is out of the conducting equipment into the connectivity node. Can be both AC and DC.

2544 Table 272 shows all attributes of CurrentFlow.

2546

**Table 272 – Attributes of EquipmentReliabilityProfile::CurrentFlow**

name	mult	type	description
multiplier	0..1	<a href="#">UnitMultiplier</a>	(const=none)



name	mult	type	description
unit	0..1	<a href="#">UnitSymbol</a>	(const=A)
value	0..1	<a href="#">Float</a>	

2547

2548 **3.166 ActivePower datatype**2549 Product of RMS value of the voltage and the RMS value of the in-phase component of the  
2550 current.

2551 Table 273 shows all attributes of ActivePower.

2552

**Table 273 – Attributes of EquipmentReliabilityProfile::ActivePower**

name	mult	type	description
multiplier	0..1	<a href="#">UnitMultiplier</a>	(const=M)
unit	0..1	<a href="#">UnitSymbol</a>	(const=W)
value	0..1	<a href="#">Float</a>	

2553

2554 **3.167 ActivePowerChangeRate datatype**

2555 Rate of change of active power per time.

2556 Table 274 shows all attributes of ActivePowerChangeRate.

2557

**Table 274 – Attributes of EquipmentReliabilityProfile::ActivePowerChangeRate**

name	mult	type	description
multiplier	0..1	<a href="#">UnitMultiplier</a>	(const=M)
unit	0..1	<a href="#">UnitSymbol</a>	(const=WPers)
value	0..1	<a href="#">Float</a>	

2558

2559 **3.168 Resistance datatype**

2560 Resistance (real part of impedance).

2561 Table 275 shows all attributes of Resistance.

2562

**Table 275 – Attributes of EquipmentReliabilityProfile::Resistance**

name	mult	type	description
value	0..1	<a href="#">Float</a>	
unit	0..1	<a href="#">UnitSymbol</a>	(const=ohm)
multiplier	0..1	<a href="#">UnitMultiplier</a>	(const=none)

2563

2564 **3.169 Pressure datatype**

2565 Pressure in pascals.

2566 Table 276 shows all attributes of Pressure.

2567

**Table 276 – Attributes of EquipmentReliabilityProfile::Pressure**

name	mult	type	description
value	0..1	<a href="#">Float</a>	
unit	0..1	<a href="#">UnitSymbol</a>	(const=Pa)
multiplier	0..1	<a href="#">UnitMultiplier</a>	(const=k)

2568

2569 **3.170 PU datatype**2570 Per Unit - a positive or negative value referred to a defined base. Values typically range from -  
2571 10 to +10.

2572 Table 277 shows all attributes of PU.

2573 **Table 277 – Attributes of EquipmentReliabilityProfile::PU**

name	mult	type	description
value	0..1	<a href="#">Float</a>	
unit	0..1	<a href="#">UnitSymbol</a>	(const=none)
multiplier	0..1	<a href="#">UnitMultiplier</a>	(const=none)

2574

2575 **3.171 AngleDegrees datatype**

2576 Measurement of angle in degrees.

2577 Table 278 shows all attributes of AngleDegrees.

2578 **Table 278 – Attributes of EquipmentReliabilityProfile::AngleDegrees**

name	mult	type	description
value	0..1	<a href="#">Float</a>	
unit	0..1	<a href="#">UnitSymbol</a>	(const=deg)
multiplier	0..1	<a href="#">UnitMultiplier</a>	(const=none)

2579

2580 **3.172 Voltage datatype**

2581 Electrical voltage, can be both AC and DC.

2582 Table 279 shows all attributes of Voltage.

2583 **Table 279 – Attributes of EquipmentReliabilityProfile::Voltage**

name	mult	type	description
multiplier	0..1	<a href="#">UnitMultiplier</a>	(const=k)
unit	0..1	<a href="#">UnitSymbol</a>	(const=V)
value	0..1	<a href="#">Float</a>	

2584

2585 **3.173 Temperature datatype**

2586 Value of temperature in degrees Celsius.

2587 Table 280 shows all attributes of Temperature.

2588 **Table 280 – Attributes of EquipmentReliabilityProfile::Temperature**

name	mult	type	description
multiplier	0..1	<a href="#">UnitMultiplier</a>	(const=none)
unit	0..1	<a href="#">UnitSymbol</a>	(const=degC)
value	0..1	<a href="#">Float</a>	

2589

2590 **3.174 Frequency datatype**

2591 Cycles per second.

2592 Table 281 shows all attributes of Frequency.

2593

**Table 281 – Attributes of EquipmentReliabilityProfile::Frequency**

name	mult	type	description
value	0..1	<a href="#">Float</a>	
unit	0..1	<a href="#">UnitSymbol</a>	(const=Hz)
multiplier	0..1	<a href="#">UnitMultiplier</a>	(const=none)

2594

**3.175 Impedance datatype**

2596 Ratio of voltage to current.

2597 Table 282 shows all attributes of Impedance.

2598

**Table 282 – Attributes of EquipmentReliabilityProfile::Impedance**

name	mult	type	description
value	0..1	<a href="#">Float</a>	
unit	0..1	<a href="#">UnitSymbol</a>	(const=ohm)
multiplier	0..1	<a href="#">UnitMultiplier</a>	(const=none)

2599

**3.176 Money datatype**

2601 Amount of money.

2602 Table 283 shows all attributes of Money.

2603

**Table 283 – Attributes of EquipmentReliabilityProfile::Money**

name	mult	type	description
multiplier	0..1	<a href="#">UnitMultiplier</a>	(const=none)
unit	0..1	<a href="#">Currency</a>	
value	0..1	<a href="#">Decimal</a>	

2604

**3.177 PerCent datatype**

2606 Percentage on a defined base. For example, specify as 100 to indicate at the defined base.

2607 Table 284 shows all attributes of PerCent.

2608

**Table 284 – Attributes of EquipmentReliabilityProfile::PerCent**

name	mult	type	description
value	0..1	<a href="#">Float</a>	Normally 0 to 100 on a defined base.
unit	0..1	<a href="#">UnitSymbol</a>	(const=none)
multiplier	0..1	<a href="#">UnitMultiplier</a>	(const=none)

2609

**3.178 Reactance datatype**

2611 Reactance (imaginary part of impedance), at rated frequency.

2612 Table 285 shows all attributes of Reactance.

2613

**Table 285 – Attributes of EquipmentReliabilityProfile::Reactance**

name	mult	type	description
value	0..1	<a href="#">Float</a>	
unit	0..1	<a href="#">UnitSymbol</a>	(const=ohm)

name	mult	type	description
multiplier	0..1	<a href="#">UnitMultiplier</a>	(const=none)

2614

2615 **3.179 Seconds datatype**

2616 Time, in seconds.

2617 Table 286 shows all attributes of Seconds.

2618

**Table 286 – Attributes of EquipmentReliabilityProfile::Seconds**

name	mult	type	description
value	0..1	<a href="#">Float</a>	Time, in seconds
unit	0..1	<a href="#">UnitSymbol</a>	(const=s)
multiplier	0..1	<a href="#">UnitMultiplier</a>	(const=none)

2619

2620 **3.180 VoltagePerReactivePower datatype**

2621 Voltage variation with reactive power.

2622 Table 287 shows all attributes of VoltagePerReactivePower.

2623

**Table 287 – Attributes of EquipmentReliabilityProfile::VoltagePerReactivePower**

name	mult	type	description
multiplier	0..1	<a href="#">UnitMultiplier</a>	(const=k)
unit	0..1	<a href="#">UnitSymbol</a>	(const=VPerVAr)
value	0..1	<a href="#">Float</a>	

2624

2625 **3.181 Boolean primitive**

2626 A type with the value space "true" and "false".

2627 **3.182 Decimal primitive**

2628 Decimal is the base-10 notational system for representing real numbers.

2629 **3.183 Duration primitive**

2630 Duration as "PnYnMnDTnHnMnS" which conforms to ISO 8601, where nY expresses a number  
 2631 of years, nM a number of months, nD a number of days. The letter T separates the date  
 2632 expression from the time expression and, after it, nH identifies a number of hours, nM a number  
 2633 of minutes and nS a number of seconds. The number of seconds could be expressed as a  
 2634 decimal number, but all other numbers are integers.

2635 **3.184 Float primitive**

2636 A floating point number. The range is unspecified and not limited.

2637 **3.185 Integer primitive**

2638 An integer number. The range is unspecified and not limited.

2639 **3.186 String primitive**

2640 A string consisting of a sequence of characters. The character encoding is UTF-8. The string  
 2641 length is unspecified and unlimited.

2642

2643

2644

**Annex A(informative): Sample data**2645 **A.1 General**

2646 This Annex is designed to illustrate the profile by using fragments of sample data. It is not meant  
2647 to be a complete set of examples covering all possibilities of using the profile. Defining a  
2648 complete set of test data is considered a separate activity to be performed for the purpose of  
2649 setting up interoperability testing and conformity related to this profile.

2650 **A.2 Sample instance data**

2651 Test data files are available in the CIM EG SharePoint.