

DIN EN IEC 61970-600-2

ICS 33.200; 35.240.50

Einsprüche bis 2022-01-12

Entwurf

**Schnittstelle der Anwendungsprotokolle von
Energieverwaltungssystemen (EMS-API) –
Teil 600-2: Spezifikation für den Austausch von
Elektrizitätsversorgungssystemmodellen (CGMES) –
Spezifikation der Austauschprofile
(IEC 57/2170/CDV:2020);
Englische Fassung prEN IEC 61970-600-2:2020**

Energy management system application program interface (EMS-API) –
Part 600-2: Common Grid Model Exchange Specification (CGMES) –
Exchange profiles specification
(IEC 57/2170/CDV:2020);
English version prEN IEC 61970-600-2:2020

Anwendungswarnvermerk

Dieser Norm-Entwurf mit Erscheinungsdatum 2021-11-12 wird der Öffentlichkeit zur Prüfung und Stellungnahme vorgelegt.

Weil die beabsichtigte Norm von der vorliegenden Fassung abweichen kann, ist die Anwendung dieses Entwurfs besonders zu vereinbaren.

Stellungnahmen werden erbeten

- vorzugsweise online im Norm-Entwurfs-Portal von DIN unter www.din.de/go/entwuerfe bzw. für Norm-Entwürfe der DKE auch im Norm-Entwurfs-Portal der DKE unter www.entwuerfe.normenbibliothek.de, sofern dort wiedergegeben;
- oder als Datei per E-Mail an dke@vde.com möglichst in Form einer Tabelle. Die Vorlage dieser Tabelle kann im Internet unter www.din.de/go/stellungnahmen-norm-entwuerfe oder für Stellungnahmen zu Norm-Entwürfen der DKE unter www.dke.de/stellungnahme abgerufen werden;
- oder in Papierform an die DKE Deutsche Kommission Elektrotechnik Elektronik Informationstechnik in DIN und VDE oder Stresemannallee 15, 60596 Frankfurt am Main.

Die Empfänger dieses Norm-Entwurfs werden gebeten, mit ihren Kommentaren jegliche relevanten Patentrechte, die sie kennen, mitzuteilen und unterstützende Dokumentationen zur Verfügung zu stellen.

Gesamtumfang 787 Seiten

DKE Deutsche Kommission Elektrotechnik Elektronik Informationstechnik in DIN und VDE

Nationales Vorwort

Die Englische Fassung des europäischen Dokuments prEN IEC 61970-600-2:2020-01 "Schnittstelle der Anwendungsprotokolle von Energieverwaltungssystemen (EMS-API) – Teil 600-2: Spezifikation für den Austausch von Elektrizitätsversorgungssystemmodellen (CGMES) – Spezifikation der Austauschprofile" (Entwurf in der Umfrage) ist unverändert in diesen Norm-Entwurf übernommen worden.

Die Internationale Elektrotechnische Kommission (IEC) und das Europäische Komitee für Elektrotechnische Normung (CENELEC) haben vereinbart, dass ein auf IEC-Ebene erarbeiteter Entwurf für eine Internationale Norm zeitgleich (parallel) bei IEC und CENELEC zur Umfrage (CDV-Stadium) und Abstimmung als FDIS (en: Final Draft International Standard) bzw. Schluss-Entwurf für eine Europäische Norm gestellt wird, um eine Beschleunigung und Straffung der Normungsarbeit zu erreichen. Dem entsprechend ist das internationale Dokument IEC 57/2170/CDV:2020-01 "Energy management system application program interface (EMS-API) – Part 600-2: Common Grid Model Exchange Specification (CGMES) – Exchange profiles specification" unverändert in den Entwurf prEN IEC 61970-600-2:2020-01 übernommen worden.

Das internationale Dokument wurde vom IEC/TC 57 "Power systems management and associated information exchange" der Internationalen Elektrotechnischen Kommission (IEC) erarbeitet und unterliegt dem Copyright der IEC . Das Dokument wurde den nationalen Komitees zur Stellungnahme vorgelegt.

Bei der Abstimmung zu dem Europäischen Schluss-Entwurf bei CENELEC und dem Internationalen Schluss-Entwurf bei IEC [Final Draft International Standard (FDIS)] sind jeweils nur "JA/NEIN"-Entscheidungen möglich, wobei "NEIN"-Entscheidungen fundiert begründet werden müssen. Dokumente, die bei CENELEC als Europäische Norm angenommen und ratifiziert werden, sind unverändert als Deutsche Normen zu übernehmen.

Für dieses Dokument ist das nationale Arbeitsgremium DKE/K 952 "Netzleittechnik" der DKE Deutsche Kommission Elektrotechnik Elektronik Informationstechnik in DIN und VDE (www.dke.de) zuständig.

Aktuelle Informationen zu diesem Dokument können über die Internetseiten von DKE (www.dke.de) und DIN (www.din.de) durch eine Suche nach der Dokumentennummer aufgerufen werden.

Für den Fall einer undatierten Verweisung im normativen Text (Verweisung auf ein Dokument ohne Angabe des Ausgabedatums und ohne Hinweis auf eine Abschnittsnummer, eine Tabelle, ein Bild usw.) bezieht sich die Verweisung auf die jeweils aktuellste Ausgabe des in Bezug genommenen Dokuments.

Für den Fall einer datierten Verweisung im normativen Text bezieht sich die Verweisung immer auf die in Bezug genommene Ausgabe des Dokuments.

Der Zusammenhang der zitierten Dokumente mit den entsprechenden deutschen Dokumenten ergibt sich, soweit ein Zusammenhang besteht, grundsätzlich über die Nummer der entsprechenden IEC-Publikation. Beispiel: IEC 60068 ist als EN 60068 als Europäische Norm durch CENELEC übernommen und als DIN EN 60068 ins Deutsche Normenwerk aufgenommen.

Das Präsidium des DIN hat mit Präsidialbeschluss 1/2004 festgelegt, dass DIN-Normen, deren Inhalt sich auf internationale Arbeitsergebnisse der Informationsverarbeitung gründet, unter bestimmten Bedingungen allein in englischer Sprache veröffentlicht werden dürfen. Diese Bedingungen sind für den vorliegenden Normentwurf erfüllt.

Da sich die Benutzer des vorliegenden Normentwurfs der englischen Sprache als Fachsprache bedienen, wird die Englische Fassung der IEC 57/2170/CDV veröffentlicht. Zu Abschnitt 1, der den Anwendungsbereich festlegt, und Abschnitt 3, der die Begriffe festlegt, wurde eine Übersetzung angefertigt und als informativer Nationaler Anhang NA des vorliegenden Norm-Entwurfs hinzugefügt. Für viele der verwendeten Begriffe existieren keine gebräuchlichen deutschen Benennungen, da sich die deutschen Anwender in der Regel ebenfalls der englischen Benennungen bedienen. Dieser Norm-Entwurf steht nicht in unmittelbarem Zusammenhang mit Rechtsvorschriften und ist nicht als Sicherheitsnorm anzusehen.

Es ist vorgesehen, auch bei der entsprechenden zukünftigen Deutschen Norm auf die deutsche Sprachfassung zu verzichten und diese in der englischsprachigen Fassung zu veröffentlichen.

Das Original-Dokument enthält Bilder in Farbe, die in der Papierversion in einer Graustufen-Darstellung wiedergegeben werden. Elektronische Versionen dieses Dokuments enthalten die Bilder in der originalen Farbdarstellung.

Es wird auf die Möglichkeit hingewiesen, dass einige Elemente dieses Dokuments Patentrechte berühren können. IEC ist nicht dafür verantwortlich, einige oder alle diesbezüglichen Patentrechte zu identifizieren.

Nationaler Anhang NA (informativ)

Auszugsweise Übersetzung

Reihenfolge und Inhalt der folgenden Abschnitte sind identisch mit denen in den jeweiligen Abschnitten der Englischen Fassung.

1 Anwendungsbereich

Dieser Teil von IEC 61970 enthält die ausführlichen Anforderungen an die zum CGMES gehörigen Austauschprofile. Die zur Umsetzung des CGMES erforderlichen, dazugehörigen technischen Informationen und Dokumente (d. h. RDFS, OCL, XMI und HTML), welche nicht durch das Urheberrecht der IEC oder CENELEC geschützt sind, sind auf der Website der ENTSO-E (www.entsoe.eu) verfügbar.

Die Definition des CGMES erfolgt mithilfe von Informationen zum Common Information Model (CIM), welche öffentlich verfügbar sind.

3 Begriffe und Abkürzungen

Für die Anwendung dieses Dokuments gelten die folgenden Begriffe.

ISO und IEC stellen terminologische Datenbanken für die Verwendung in der Normung unter den folgenden Adressen bereit:

- IEC Electropedia: verfügbar unter <http://www.electropedia.org/>
- ISO Online Browsing Platform: verfügbar unter <http://www.iso.org/obp>

ANMERKUNG: Für Begriffe, die in den CGMES nicht angegeben sind, sind die Begriffe in den Normen IEC 61970 anzuwenden.

3.1 Begriffe

3.1.1

Standard für den Austausch von Elektrizitätsversorgungssystemmodellen

CGMES, en: Common Grid Model Exchange Standard

Europäische Norm für den Austausch von Elektrizitätsversorgungssystemmodellen unter TSOs für die Durchführung von bilateralen, regionalen oder gesamteuropäischen Studien oder Datenaustauschs im Rahmen des Systembetriebs, der Systementwicklung oder von Projekten der TSOs entsprechend der Definition in der EU-Gesetzgebung

3.1.2

Profil

eindeutig benannte Teilmenge von Klassen, Beziehungen und Attributen, die benötigt wird, um einen speziellen Schnittstellentyp zu definieren und auf einem kanonischen Modell beruht

Anmerkung 1 zum Begriff: Dieser Begriff darf verwendet werden, um entweder das semantische Modell für die Nutzdaten einer Instanz oder das Syntax-Schema der Nutzdaten einer Instanz zu definieren. Ein Profil darf in XSD-, RDF- und/oder OWL-Dateien beschrieben werden. Die Konformität von Instanzdaten mit einem Profil kann durch Datenaustausch zwischen Anwendungen geprüft werden. Ein Profil ist notwendig, um das kanonische Modell „verwenden“ zu können.

3.1.3

CIM-Erweiterung

Sammlung von Klassen, Attributen und Beziehungen, die das herkömmliche CIM-Modell der IEC erweitert, um Anwendungsfälle abzudecken, die zurzeit nicht durch IEC-Normen unterstützt werden und nicht als internationale Anwendungsfälle gelten oder erst von einer neueren Version der Norm unterstützt werden, welche noch nicht unterstützt wird

3.1.4

Europäische Erweiterung

spezifisch für Europa entwickelte CIM-Erweiterung unter Verwaltung der ENTSO-E

3.1.5

Grenzsatz

Satz, der alle Grenzpunkte enthält, die für einen gegebenen Netzmodellaustausch benötigt werden

Anmerkung 1 zum Begriff: Ein Grenzsatz kann je nach Anforderungen für den Austausch von Elektrizitätsversorgungssystemmodellen unterschiedliche Bereiche abdecken. Für die Definition eines gesamteuropäischen Elektrizitätsversorgungssystemmodells ist ein vollständiger Grenzsatz erforderlich.

3.1.6

Grenzpunkt

BP

Anschlusspunkt zwischen zwei Model Authority Sets (MAS)

Anmerkung 1 zum Begriff: Ein Grenzpunkt könnte eine ConnectivityNode oder eine TopologicalNode auf einer Verbindungsleitung oder in einer Station sein. Ein Grenzpunkt muss Bestandteil eines Grenzsatzes sein und darf nicht Bestandteil des MAS eines TSO sein. Ein Grenzpunkt wird durch Anschlusspunkte im MAS eines TSO referenziert. ConnectivityNode und TopologicalNode sind Begriffe, die in den CIM-Normen der IEC festgelegt werden. Wenn der Grenzpunkt auf einer Verbindungsleitung liegt, wird statt Grenzpunkt oft der Begriff X-Node verwendet. Eine X-Node ist somit eine spezielle Art von Grenzpunkt.

3.2 Abkürzungen

IEC	die Internationale Elektrotechnische Kommission (en: International Electrotechnical Commission) mit Sitz in Genf
TSO	Übertragungsnetzbetreiber (en: Transmission System Operator)
ENTSO-E	Verband Europäischer Übertragungsnetzbetreiber (en: European Network of Transmission System Operators for Electricity) (ENTSO-E hat 43 TSO-Mitglieder)
mRID	CIM Master Resource Identifier
CIM	Common Information Model (Energiebranche)
CGMES	Standard für den Austausch von Elektrizitätsversorgungssystemmodellen (en: Common Grid Model Exchange Standard)
MAS	Model Authority Set
RDF	Resource Description Framework
EQ_BD	Grenzbetriebsmittelpprofil- oder Instanzdatei
EQ_BD	Grenztopologieprofil- oder Instanzdatei
EQCO	Kern-Betriebsmittelpprofil- oder Instanzdatei
OP	Betriebsprofil- oder Instanzdatei
TP	Topologieprofil- oder Instanzdatei
SSH	Steady State Hypothesis-Profil- oder Instanzdatei
SV	Zustandsvariablenprofil- oder Instanzdatei
SC	Kurzschlussprofil- oder Instanzdatei
DL	Diagrammlayout-Profil- oder Instanzdatei
GL	Standortprofil- oder Instanzdatei
BP	Grenzpunkt

CONTENTS

FOREWORD.....	53
1 Scope.....	56
2 Normative references	56
3 Terms, definitions and abbreviated terms	56
3.1 Terms and definitions.....	57
3.2 Abbreviated terms.....	57
4 Relation between this document and other standards	58
5 Package CoreEquipmentProfile	58
5.1 General.....	58
5.2 (abstract) ACDCCConverter	78
5.3 ACDCCConverterDCTerminal.....	79
5.4 (abstract) ACDCTerminal	80
5.5 ACLineSegment	81
5.6 ActivePowerLimit	81
5.7 ApparentPowerLimit.....	82
5.8 AsynchronousMachine	82
5.9 (abstract) AuxiliaryEquipment	83
5.10 BaseVoltage	84
5.11 BatteryUnit.....	84
5.12 Bay	85
5.13 (European) BoundaryPoint.....	85
5.14 Breaker.....	86
5.15 BusbarSection	87
5.16 BusNameMarker	87
5.17 CAESPlant.....	88
5.18 Clamp	88
5.19 CogenerationPlant	89
5.20 CombinedCyclePlant.....	89
5.21 (abstract) ConductingEquipment	90
5.22 (abstract) Conductor	90
5.23 ConformLoad	91
5.24 ConformLoadGroup.....	91
5.25 ConnectivityNode.....	92
5.26 (abstract) ConnectivityNodeContainer.....	92
5.27 (abstract) Connector	92
5.28 ControlArea	93
5.29 ControlAreaGeneratingUnit	94
5.30 CsConverter.....	94
5.31 CurrentLimit.....	96
5.32 CurrentTransformer	96
5.33 (abstract) Curve.....	97
5.34 CurveData root class	97
5.35 Cut.....	97
5.36 (abstract) DCBaseTerminal	98
5.37 DCBreaker	98

5.38	DCBusbar	99
5.39	DCChopper	100
5.40	(abstract) DCConductingEquipment	100
5.41	DCConverterUnit	101
5.42	DCDisconnecter	101
5.43	(abstract) DCEquipmentContainer	102
5.44	DCGround	102
5.45	DCLine	103
5.46	DCLineSegment	103
5.47	DCNode	104
5.48	DCSeriesDevice	104
5.49	DCShunt	105
5.50	DCSwitch	105
5.51	DCTerminal	106
5.52	Disconnecter	106
5.53	DisconnectingCircuitBreaker	107
5.54	(abstract) EarthFaultCompensator	108
5.55	(abstract) EnergyArea	108
5.56	(abstract) EnergyConnection	108
5.57	EnergyConsumer	109
5.58	EnergySchedulingType	110
5.59	EnergySource	110
5.60	(abstract) Equipment	110
5.61	(abstract) EquipmentContainer	111
5.62	EquivalentBranch	112
5.63	(abstract) EquivalentEquipment	112
5.64	EquivalentInjection	113
5.65	EquivalentNetwork	114
5.66	EquivalentShunt	114
5.67	ExternalNetworkInjection	115
5.68	FaultIndicator	115
5.69	FossilFuel	116
5.70	Fuse	116
5.71	GeneratingUnit	117
5.72	GeographicalRegion	118
5.73	GrossToNetActivePowerCurve	119
5.74	Ground	119
5.75	GroundDisconnecter	120
5.76	GroundingImpedance	120
5.77	HydroGeneratingUnit	121
5.78	HydroPowerPlant	122
5.79	HydroPump	122
5.80	(abstract) IdentifiedObject root class	123
5.81	Jumper	123
5.82	Junction	124
5.83	Line	124
5.84	LinearShuntCompensator	125
5.85	LoadArea	126
5.86	LoadBreakSwitch	

5.87	(abstract) LoadGroup	126
5.88	LoadResponseCharacteristic	127
5.89	NonConformLoad	128
5.90	NonConformLoadGroup	129
5.91	NonlinearShuntCompensator	129
5.92	NonlinearShuntCompensatorPoint root class	130
5.93	NuclearGeneratingUnit.....	130
5.94	(abstract) OperationalLimit.....	131
5.95	OperationalLimitSet	132
5.96	OperationalLimitType	132
5.97	PetersenCoil	133
5.98	(abstract) PhaseTapChanger	133
5.99	PhaseTapChangerAsymmetrical	134
5.100	PhaseTapChangerLinear	135
5.101	(abstract) PhaseTapChangerNonLinear	136
5.102	PhaseTapChangerSymmetrical	137
5.103	PhaseTapChangerTable	138
5.104	PhaseTapChangerTablePoint	138
5.105	PhaseTapChangerTabular	138
5.106	PhotoVoltaicUnit	139
5.107	PostLineSensor	140
5.108	PotentialTransformer	140
5.109	PowerElectronicsConnection.....	141
5.110	(abstract) PowerElectronicsUnit	141
5.111	PowerElectronicsWindUnit	142
5.112	(abstract) PowerSystemResource	143
5.113	PowerTransformer	143
5.114	PowerTransformerEnd	143
5.115	(abstract) ProtectedSwitch	145
5.116	RatioTapChanger.....	145
5.117	RatioTapChangerTable	146
5.118	RatioTapChangerTablePoint	146
5.119	ReactiveCapabilityCurve	147
5.120	(abstract) RegulatingCondEq	147
5.121	RegulatingControl	148
5.122	ReportingGroup	149
5.123	(abstract) RotatingMachine	149
5.124	(abstract) Sensor	150
5.125	SeriesCompensator	150
5.126	(abstract) ShuntCompensator	151
5.127	SolarGeneratingUnit	152
5.128	(European) SolarPowerPlant.....	153
5.129	StaticVarCompensator	153
5.130	StationSupply	154
5.131	SubGeographicalRegion	154
5.132	SubLoadArea	155
5.133	Substation	155
5.134	SurgeArrester	156
5.135	Switch.....	

5.136	SynchronousMachine	157
5.137	(abstract) TapChanger	158
5.138	TapChangerControl	159
5.139	(abstract) TapChangerTablePoint root class	159
5.140	Terminal	160
5.141	ThermalGeneratingUnit	161
5.142	TieFlow	162
5.143	(abstract) TransformerEnd	163
5.144	VoltageLevel	163
5.145	VoltageLimit	164
5.146	VsCapabilityCurve	164
5.147	VsConverter	165
5.148	WaveTrap	166
5.149	WindGeneratingUnit	166
5.150	(European) WindPowerPlant	167
5.151	ControlAreaTypeKind enumeration	167
5.152	Currency enumeration	168
5.153	CurveStyle enumeration	171
5.154	DCConverterOperatingModeKind enumeration	172
5.155	DCPolarityKind enumeration	172
5.156	FuelType enumeration	172
5.157	GeneratorControlSource enumeration	173
5.158	HydroEnergyConversionKind enumeration	173
5.159	HydroPlantStorageKind enumeration	173
5.160	HydroTurbineKind enumeration	173
5.161	(European) LimitKind enumeration	173
5.162	OperationalLimitDirectionKind enumeration	175
5.163	PhaseCode enumeration	175
5.164	RegulatingControlModeKind enumeration	176
5.165	SynchronousMachineKind enumeration	176
5.166	(deprecated) SVCControlMode enumeration	177
5.167	UnitMultiplier enumeration	177
5.168	UnitSymbol enumeration	178
5.169	WindGenUnitKind enumeration	183
5.170	WindingConnection enumeration	183
5.171	ActivePower datatype	183
5.172	ActivePowerPerCurrentFlow datatype	184
5.173	ActivePowerPerFrequency datatype	184
5.174	AngleDegrees datatype	184
5.175	ApparentPower datatype	184
5.176	Capacitance datatype	184
5.177	Conductance datatype	185
5.178	CurrentFlow datatype	185
5.179	Frequency datatype	185
5.180	Inductance datatype	185
5.181	Length datatype	186
5.182	Money datatype	186
5.183	PerCent datatype	186
5.184	Reactance datatype	186

5.185	ReactivePower datatype	186
5.186	RealEnergy datatype.....	187
5.187	Resistance datatype	187
5.188	RotationSpeed datatype.....	187
5.189	Seconds datatype	187
5.190	Susceptance datatype.....	187
5.191	Voltage datatype.....	188
5.192	VoltagePerReactivePower datatype	188
5.193	Boolean primitive	188
5.194	Date primitive.....	188
5.195	Decimal primitive	188
5.196	Float primitive	188
5.197	Integer primitive.....	188
5.198	String primitive.....	188
5.199	(abstract) CoreEquipmentProfileVersion root class	188
6	Package OperationProfile	189
6.1	General.....	189
6.2	Accumulator.....	193
6.3	AccumulatorLimit	194
6.4	AccumulatorLimitSet	194
6.5	AccumulatorReset.....	195
6.6	AccumulatorValue	195
6.7	(abstract) ACDCTerminal	196
6.8	Analog	196
6.9	(abstract) AnalogControl	197
6.10	AnalogLimit.....	197
6.11	AnalogLimitSet.....	198
6.12	AnalogValue	198
6.13	(abstract) BasicIntervalSchedule.....	199
6.14	Command	199
6.15	(abstract) ConductingEquipment	200
6.16	(Description) ConformLoad	200
6.17	(abstract) ConformLoadGroup.....	200
6.18	ConformLoadSchedule.....	201
6.19	(abstract) Control.....	201
6.20	DayType	202
6.21	Discrete	202
6.22	DiscreteValue	203
6.23	(abstract) EnergyConnection.....	203
6.24	(Description) EnergyConsumer	204
6.25	(abstract) Equipment.....	204
6.26	(abstract) IdentifiedObject root class.....	204
6.27	(abstract) IOPoint	205
6.28	(abstract) Limit.....	205
6.29	(abstract) LimitSet	206
6.30	(abstract) LoadGroup.....	206
6.31	(abstract) Measurement	206
6.32	(abstract) MeasurementValue	207
6.33	MeasurementValueQuality	207

6.34	MeasurementValueSource	209
6.35	(Description) NonConformLoad	209
6.36	(abstract) NonConformLoadGroup	209
6.37	NonConformLoadSchedule	210
6.38	(abstract) PowerSystemResource	210
6.39	(abstract) Quality61850 root class.....	211
6.40	RaiseLowerCommand	212
6.41	(abstract) RegularIntervalSchedule	212
6.42	RegularTimePoint root class	213
6.43	(abstract) RegulatingControl	213
6.44	RegulationSchedule	214
6.45	Season	215
6.46	(abstract) SeasonDayTypeSchedule	215
6.47	SetPoint.....	216
6.48	(Description) StationSupply.....	216
6.49	StringMeasurement.....	217
6.50	StringMeasurementValue	217
6.51	(abstract) Switch	218
6.52	SwitchSchedule	218
6.53	(abstract) TapChanger	219
6.54	TapSchedule.....	219
6.55	(abstract) Terminal.....	220
6.56	ValueAliasSet	220
6.57	ValueToAlias	220
6.58	PhaseCode enumeration.....	221
6.59	Source enumeration.....	222
6.60	UnitMultiplier enumeration	222
6.61	UnitSymbol enumeration	223
6.62	Validity enumeration	228
6.63	ActivePower datatype	229
6.64	PerCent datatype	229
6.65	Seconds datatype	229
6.66	ReactivePower datatype	229
6.67	Boolean primitive	229
6.68	Date primitive.....	229
6.69	DateTime primitive	230
6.70	Float primitive	230
6.71	Integer primitive	230
6.72	MonthDay primitive	230
6.73	String primitive.....	230
6.74	(abstract) OperationProfileVersion root class	230
7	Package ShortCircuitProfile	231
7.1	General.....	231
7.2	(abstract) ACDCTerminal	232
7.3	(Description) ACLineSegment	232
7.4	(Description) AsynchronousMachine	233
7.5	(Description) BusbarSection.....	234
7.6	(abstract) ConductingEquipment	234
7.7	(abstract) Conductor	234

7.8	(abstract) Connector	234
7.9	(abstract) EarthFaultCompensator	234
7.10	(abstract) EnergyConnection	235
7.11	(Description) EnergySource	235
7.12	(abstract) Equipment	235
7.13	(Description) EquivalentBranch	235
7.14	(abstract) EquivalentEquipment	237
7.15	(Description) EquivalentInjection	237
7.16	(Description) ExternalNetworkInjection	238
7.17	(Description) GroundingImpedance	238
7.18	(abstract) IdentifiedObject root class	239
7.19	(Description) LinearShuntCompensator	239
7.20	MutualCoupling	239
7.21	(Description) NonlinearShuntCompensatorPoint root class	240
7.22	(Description) PetersenCoil	240
7.23	(abstract) PowerSystemResource	241
7.24	(Description) PowerTransformer	241
7.25	(Description) PowerTransformerEnd	242
7.26	(abstract) RegulatingCondEq	243
7.27	(abstract) RotatingMachine	243
7.28	(Description) SeriesCompensator	243
7.29	(abstract) ShuntCompensator	244
7.30	(Description) SynchronousMachine	244
7.31	(abstract) Terminal	245
7.32	(abstract) TransformerEnd	245
7.33	PetersenCoilModeKind enumeration	246
7.34	ShortCircuitRotorKind enumeration	246
7.35	UnitMultiplier enumeration	246
7.36	UnitSymbol enumeration	247
7.37	ActivePower datatype	252
7.38	AngleDegrees datatype	252
7.39	Conductance datatype	253
7.40	CurrentFlow datatype	253
7.41	Length datatype	253
7.42	PerCent datatype	253
7.43	PU datatype	253
7.44	Reactance datatype	254
7.45	Resistance datatype	254
7.46	Susceptance datatype	254
7.47	Temperature datatype	254
7.48	Voltage datatype	254
7.49	Boolean primitive	255
7.50	Date primitive	255
7.51	Float primitive	255
7.52	Integer primitive	255
7.53	String primitive	255
7.54	(abstract) ShortCircuitProfileVersion root class	255
8	Package SteadyStateHypothesisProfile	256
8.1	General	256

8.2	(abstract) ACDCConverter	261
8.3	(Description) ACDCConverterDCTerminal	261
8.4	(abstract) ACDCTerminal	261
8.5	(Description) ActivePowerLimit	262
8.6	(Description) ApparentPowerLimit	262
8.7	(Description) AsynchronousMachine	262
8.8	(Description) BatteryUnit	263
8.9	(Description) Breaker	263
8.10	(abstract) ConductingEquipment	263
8.11	(Description) ConformLoad	263
8.12	(Description) ControlArea	264
8.13	(Description) CsConverter	264
8.14	(Description) CurrentLimit	265
8.15	(abstract) DCBaseTerminal	265
8.16	(Description) DCTerminal	266
8.17	(Description) Disconnecter	266
8.18	(Description) DisconnectingCircuitBreaker	266
8.19	(abstract) EnergyConnection	266
8.20	(Description) EnergyConsumer	267
8.21	(Description) EnergySource	267
8.22	Equipment	268
8.23	(abstract) EquivalentEquipment	268
8.24	(Description) EquivalentInjection	268
8.25	(Description) ExternalNetworkInjection	269
8.26	(Description) Fuse	269
8.27	(Description) GeneratingUnit	269
8.28	(Description) GroundDisconnecter	270
8.29	(Description) HydroGeneratingUnit	270
8.30	(abstract) IdentifiedObject root class	270
8.31	(Description) Jumper	271
8.32	(Description) LinearShuntCompensator	271
8.33	(Description) LoadBreakSwitch	271
8.34	(Description) NonConformLoad	271
8.35	(Description) NonlinearShuntCompensator	272
8.36	(Description) NuclearGeneratingUnit	272
8.37	(abstract) OperationalLimit	272
8.38	(abstract) PhaseTapChanger	273
8.39	(Description) PhaseTapChangerAsymmetrical	273
8.40	(Description) PhaseTapChangerLinear	273
8.41	(abstract) PhaseTapChangerNonLinear	273
8.42	(Description) PhaseTapChangerSymmetrical	274
8.43	(Description) PhaseTapChangerTabular	274
8.44	(Description) PowerElectronicsConnection	274
8.45	(abstract) PowerElectronicsUnit	275
8.46	(abstract) PowerSystemResource	275
8.47	(abstract) ProtectedSwitch	275
8.48	(Description) RatioTapChanger	275
8.49	(abstract,Description) RegulatingCondEq	276
8.50	(Description) RegulatingControl	

8.51	(abstract) RotatingMachine	277
8.52	(abstract) ShuntCompensator	277
8.53	(Description) SolarGeneratingUnit.....	278
8.54	(Description) StaticVarCompensator	278
8.55	(Description) StationSupply.....	279
8.56	(Description) Switch	279
8.57	(Description) SynchronousMachine	279
8.58	(abstract) TapChanger	280
8.59	(Description) TapChangerControl.....	280
8.60	(Description) Terminal.....	281
8.61	(Description) ThermalGeneratingUnit	281
8.62	(Description) VoltageLimit	281
8.63	(Description) VsConverter	281
8.64	(Description) WindGeneratingUnit.....	282
8.65	AsynchronousMachineKind enumeration	282
8.66	BatteryStateKind enumeration.....	282
8.67	CsOperatingModeKind enumeration	283
8.68	CsPpccControlKind enumeration.....	283
8.69	SynchronousMachineOperatingMode enumeration.....	283
8.70	UnitMultiplier enumeration	283
8.71	UnitSymbol enumeration	284
8.72	VsPpccControlKind enumeration.....	289
8.73	VsQpccControlKind enumeration.....	290
8.74	ActivePower datatype	290
8.75	AngleDegrees datatype.....	291
8.76	AngleRadians datatype	291
8.77	ApparentPower datatype	291
8.78	CurrentFlow datatype.....	291
8.79	PerCent datatype	292
8.80	PU datatype	292
8.81	ReactivePower datatype	292
8.82	RealEnergy datatype.....	292
8.83	Resistance datatype	292
8.84	Voltage datatype	293
8.85	Boolean primitive	293
8.86	Date primitive.....	293
8.87	Float primitive	293
8.88	Integer primitive	293
8.89	String primitive.....	293
8.90	(abstract) SteadyStateHypothesisProfileVersion root class	293
9	Package TopologyProfile	294
9.1	General.....	294
9.2	(Description) ACDCCConverterDCTerminal	295
9.3	(abstract) ACDCTerminal	295
9.4	(abstract) BaseVoltage root class	296
9.5	(European,Description) BoundaryPoint	296
9.6	(Description) ConnectivityNode root class.....	296
9.7	(abstract) ConnectivityNodeContainer root class	296
9.8	(abstract) DCBaseTerminal	296

9.9	(abstract) DCEquipmentContainer root class.....	297
9.10	(Description) DCNode	297
9.11	(Description) DCTerminal.....	298
9.12	DCTopologicalNode	298
9.13	(abstract) IdentifiedObject root class.....	298
9.14	(Description) Terminal.....	299
9.15	TopologicalNode	299
9.16	(abstract) ReportingGroup	300
9.17	Date primitive.....	300
9.18	String primitive.....	300
9.19	(abstract) TopologyProfileVersion root class	300
10	Package StateVariablesProfile.....	301
10.1	General.....	301
10.2	(abstract) ACDCConverter	303
10.3	(abstract) ACDCTerminal	304
10.4	(Description) CsConverter.....	304
10.5	(abstract) ConductingEquipment root class	305
10.6	DCTopologicalIsland	305
10.7	(abstract) DCTopologicalNode	305
10.8	(abstract) IdentifiedObject root class.....	306
10.9	(abstract) ShuntCompensator root class	306
10.10	SvInjection root class.....	306
10.11	SvPowerFlow root class	306
10.12	SvShuntCompensatorSections root class	307
10.13	SvStatus root class	307
10.14	SvSwitch root class.....	308
10.15	SvTapStep root class.....	308
10.16	SvVoltage root class	308
10.17	(abstract) Switch	309
10.18	(abstract) TapChanger root class	309
10.19	(abstract) Terminal.....	309
10.20	TopologicalIsland.....	309
10.21	(abstract) TopologicalNode root class	310
10.22	(Description) VsConverter	310
10.23	UnitMultiplier enumeration	310
10.24	UnitSymbol enumeration	311
10.25	ActivePower datatype	316
10.26	AngleDegrees datatype.....	316
10.27	CurrentFlow datatype.....	317
10.28	ReactivePower datatype	317
10.29	Voltage datatype	317
10.30	Boolean primitive	317
10.31	Date primitive.....	317
10.32	Float primitive	317
10.33	String primitive.....	317
10.34	(abstract) StateVariablesProfileVersion root class.....	318
11	Package DiagramLayoutProfile.....	318
11.1	General.....	318
11.2	Diagram	320

11.3	DiagramObject.....	321
11.4	DiagramObjectGluePoint root class.....	322
11.5	DiagramObjectPoint root class.....	322
11.6	DiagramObjectStyle.....	322
11.7	DiagramStyle.....	323
11.8	(abstract) IdentifiedObject root class.....	323
11.9	TextDiagramObject.....	323
11.10	VisibilityLayer.....	324
11.11	OrientationKind enumeration.....	325
11.12	UnitMultiplier enumeration.....	325
11.13	UnitSymbol enumeration.....	326
11.14	AngleDegrees datatype.....	331
11.15	Boolean primitive.....	331
11.16	Date primitive.....	331
11.17	Float primitive.....	331
11.18	Integer primitive.....	331
11.19	String primitive.....	331
11.20	(abstract) DiagramLayoutProfileVersion root class.....	331
12	Package GeographicalLocationProfile.....	332
12.1	General.....	332
12.2	(European,Description) BoundaryPoint.....	334
12.3	(abstract) IdentifiedObject root class.....	334
12.4	ServiceLocation.....	334
12.5	(abstract) WorkLocation.....	335
12.6	CoordinateSystem.....	335
12.7	Location.....	336
12.8	PositionPoint root class.....	336
12.9	(abstract) PowerSystemResource.....	337
12.10	StreetAddress compound.....	337
12.11	TownDetail compound.....	337
12.12	Status compound.....	337
12.13	StreetDetail compound.....	338
12.14	DateTime primitive.....	338
12.15	Boolean primitive.....	339
12.16	Integer primitive.....	339
12.17	String primitive.....	339
12.18	Date primitive.....	339
12.19	(abstract) GeographicalLocationProfileVersion root class.....	339
13	Package DynamicsProfile.....	340
13.1	General.....	340
13.2	(abstract) DynamicsProfileVersion root class.....	340
13.3	Package Base.....	340
13.3.1	General.....	340
13.3.2	Package Domain.....	341
13.3.3	Package Core.....	357
13.3.4	Package Wires.....	360
13.3.5	Package DC.....	364
13.4	Package Dynamics.....	365
13.4.1	General.....	365

13.4.2	Package StandardInterconnections.....	365
13.4.3	Package StandardModels	379
13.4.4	Package UserDefinedModels	692
14	(deprecated) Package EquipmentBoundaryProfile	707
14.1	General.....	707
14.2	(abstract) ACDCTerminal	709
14.3	BaseVoltage	709
14.4	Bay	710
14.5	(European) BoundaryPoint	710
14.6	(abstract) ConductingEquipment	712
14.7	ConnectivityNode.....	712
14.8	(abstract) ConnectivityNodeContainer.....	712
14.9	(abstract) Connector	713
14.10	EnergySchedulingType	713
14.11	(abstract) Equipment.....	713
14.12	(abstract) EquipmentContainer.....	714
14.13	GeographicalRegion	714
14.14	(abstract) IdentifiedObject root class.....	714
14.15	Junction	715
14.16	Line	715
14.17	(abstract) PowerSystemResource	716
14.18	SubGeographicalRegion	716
14.19	Substation	717
14.20	Terminal	717
14.21	VoltageLevel.....	718
14.22	UnitMultiplier enumeration	718
14.23	UnitSymbol enumeration	719
14.24	Voltage datatype.....	724
14.25	Boolean primitive	725
14.26	Date primitive.....	725
14.27	Float primitive	725
14.28	String primitive.....	725
14.29	(abstract) EquipmentBoundaryProfileVersion root class	725
15	(deprecated) Package TopologyBoundaryProfile	726
15.1	General.....	726
15.2	(abstract) BaseVoltage	727
15.3	(European,Description) BoundaryPoint	727
15.4	(Description) ConnectivityNode root class.....	727
15.5	(abstract) ConnectivityNodeContainer root class.....	728
15.6	(abstract) IdentifiedObject root class.....	728
15.7	(Description) Terminal root class.....	728
15.8	TopologicalNode	729
15.9	Boolean primitive	729
15.10	Date primitive.....	729
15.11	String primitive.....	729
15.12	(abstract) TopologyBoundaryProfileVersion root class	729
16	Profile constraints.....	730
Annex A	(Informative) Summary of changes applied to this Edition	742

A.1	General.....	742
A.2	Overview of changes.....	742
A.3	General changes.....	743
A.4	Specific changes.....	747
A.4.1	Boundary Equipment profile.....	747
A.4.2	Boundary Topology profile	751
A.4.3	Equipment profiles: Core Equipment, Operation and ShortCircuit	752
A.4.4	Topology profile	769
A.4.5	Steady State Hypothesis profile	772
A.4.6	State Variables profile	777
A.4.7	Diagram Layout profile.....	780
A.4.8	Geographical Location profile	781
Figure 1	– Class diagram CoreEquipmentProfile::CoreEquipmentProfile	59
Figure 2	– Class diagram CoreEquipmentProfile::ACDCConverter	60
Figure 3	– Class diagram CoreEquipmentProfile::ACDCTerminal	61
Figure 4	– Class diagram CoreEquipmentProfile::Containment	62
Figure 5	– Class diagram CoreEquipmentProfile::ControlArea	63
Figure 6	– Class diagram CoreEquipmentProfile::PowerElectronics	64
Figure 7	– Class diagram CoreEquipmentProfile::PowerPlant	64
Figure 8	– Class diagram CoreEquipmentProfile::Production	65
Figure 9	– Class diagram CoreEquipmentProfile::ShuntCompensator	66
Figure 10	– Class diagram CoreEquipmentProfile::DCContainment.....	67
Figure 11	– Class diagram CoreEquipmentProfile::ACDCConnectivityModel	68
Figure 12	– Class diagram CoreEquipmentProfile::DCLineModel	68
Figure 13	– Class diagram CoreEquipmentProfile::DCEquipment.....	69
Figure 14	– Class diagram CoreEquipmentProfile::CutsAndJumpers.....	69
Figure 15	– Class diagram CoreEquipmentProfile::Equivalents	70
Figure 16	– Class diagram CoreEquipmentProfile::LoadModel	71
Figure 17	– Class diagram CoreEquipmentProfile::OperationalLimits	72
Figure 18	– Class diagram CoreEquipmentProfile::Wires	73
Figure 19	– Class diagram CoreEquipmentProfile::TapChanger	74
Figure 20	– Class diagram CoreEquipmentProfile::Transformer	75
Figure 21	– Class diagram CoreEquipmentProfile::AuxiliaryEquipment	76
Figure 22	– Class diagram CoreEquipmentProfile::Datatypes	76
Figure 23	– Class diagram CoreEquipmentProfile::Primitives	77
Figure 24	– Class diagram CoreEquipmentProfile::Enumerations	78
Figure 25	– Class diagram OperationProfile::Schedules.....	190
Figure 26	– Class diagram OperationProfile::Control.....	191
Figure 27	– Class diagram OperationProfile::Meas	192
Figure 28	– Class diagram OperationProfile::Datatypes	193
Figure 29	– Class diagram ShortCircuitProfile::ShortCircuitProfile	231
Figure 30	– Class diagram ShortCircuitProfile::Datatypes	232
Figure 31	– Class diagram SteadyStateHypothesisProfile::SteadyStateHypothesisProfile	

Figure 32 – Class diagram SteadyStateHypothesisProfile::Core	258
Figure 33 – Class diagram SteadyStateHypothesisProfile::DC	259
Figure 34 – Class diagram SteadyStateHypothesisProfile::OperationalLimits	259
Figure 35 – Class diagram SteadyStateHypothesisProfile::Datatypes	260
Figure 36 – Class diagram TopologyProfile::TopologyProfile	294
Figure 37 – Class diagram TopologyProfile::Datatypes	295
Figure 38 – Class diagram StateVariablesProfile::StateVariablesProfile	302
Figure 39 – Class diagram StateVariablesProfile::Datatypes	303
Figure 40 – Class diagram DiagramLayoutProfile::DiagramLayoutProfile	319
Figure 41 – Class diagram DiagramLayoutProfile::Datatypes	320
Figure 42 – Class diagram GeographicalLocationProfile::GeographicalLocationProfile	333
Figure 43 – Class diagram GeographicalLocationProfile::Datatypes	333
Figure 44 – Class diagram Domain::Primitives	341
Figure 45 – Class diagram Domain::DataTypes	341
Figure 46 – Class diagram Domain::Enumerations	342
Figure 47 – Class diagram Core::Core	358
Figure 48 – Class diagram Wires::Wires	361
Figure 49 – StandardInterconnectionSynchronousMachine	366
Figure 50 – StandardInterconnectionSynchronousGeneratorCrossCompound	367
Figure 51 – StandardInterconnectionAsynchronousMachine	368
Figure 52 – StandardInterconnectionWindTurbineType1Aand1B	369
Figure 53 – StandardInterconnectionWindTurbineType2	370
Figure 54 – StandardInterconnectionWindTurbineType3	371
Figure 55 – StandardInterconnectionWindTurbineType4Aand4B	373
Figure 56 – StandardInterconnectionSingleLoad	373
Figure 57 – Class diagram StandardInterconnections::StandardSynchronousMachineInterconnection	374
Figure 58 – Class diagram StandardInterconnections::StandardAsynchronousMachineInterconnection	375
Figure 59 – Class diagram StandardInterconnections::StandardWindType1and2Interconnection	376
Figure 60 – Class diagram StandardInterconnections::StandardWindType3and4Interconnection	377
Figure 61 – Class diagram StandardInterconnections::StandardLoadInterconnection	378
Figure 62 – Class diagram StandardInterconnections::StandardHVDCInterconnection	378
Figure 63 – Class diagram StandardInterconnections::StandardStaticVarCompensatorInterconnection	379
Figure 64 – SynchronousGeneratorInterconnectionAndVariables	382
Figure 65 – SynchronousMotorInterconnectionAndVariables	383
Figure 66 – Class diagram SynchronousMachineDynamics::SynchronousMachineDynamics	384
Figure 67 – SynchronousMachineSaturationParameters	385
Figure 68 – SynchronousGeneratorMechanicalEquation	386
Figure 69 – SynchronousMotorMechanicalEquation	386
Figure 70 – SynchronousGeneratorPhasor	

Figure 71 – SynchronousMotorPhasor	388
Figure 72 – Simplified	388
Figure 73 – SubtransientRoundRotor	392
Figure 74 – SubtransientSalientPole	393
Figure 75 – SubtransientTypeF	394
Figure 76 – SubtransientTypeJ	395
Figure 77 – SubtransientRoundRotorSimplified	397
Figure 78 – SubtransientSalientPoleSimplified	399
Figure 79 – SubtransientRoundRotorSimplifiedDirectAxis	401
Figure 80 – SubtransientSalientPoleSimplifiedDirectAxis	403
Figure 81 – SynchronousEquivalentCircuit	405
Figure 82 – AsynchronousGeneratorInterconnectionAndVariables	407
Figure 83 – AsynchronousMotorInterconnectionAndVariables	408
Figure 84 – Class diagram AsynchronousMachineDynamics::AsynchronousMachineDynamics	408
Figure 85 – AsynchronousGeneratorMechanicalEquation	409
Figure 86 – AsynchronousMotorMechanicalEquation	409
Figure 87 – AsynchronousEquivalentCircuit	412
Figure 88 – TurbineGovernorInterconnectionAndVariables	413
Figure 89 – Class diagram TurbineGovernorDynamics::TurbineGovernorDynamics	414
Figure 90 – GovHydroIEEE0	416
Figure 91 – GovHydroIEEE2	417
Figure 92 – GovSteamIEEE1	419
Figure 93 – GovCT1	421
Figure 94 – GovCT2	425
Figure 95 – GovGAST	429
Figure 96 – GovGAST1	430
Figure 97 – GovGAST2	433
Figure 98 – GovGAST3	435
Figure 99 – GovGAST3ExhaustTemperature	435
Figure 100 – GovGAST4	437
Figure 101 – GovGASTWD	438
Figure 102 – GovHydro1	440
Figure 103 – GovHydro2	442
Figure 104 – GovHydro3	444
Figure 105 – GovHydro4	447
Figure 106 – GovHydro4SimpleHydroTurbine	448
Figure 107 – GovHydro4FrancisPeltonTurbine	449
Figure 108 – GovHydro4KaplanTurbine	450
Figure 109 – GovHydroDD	453
Figure 110 – GovHydroFrancis	455
Figure 111 – GovHydroFrancisNonLinearGainAndEfficiency	456
Figure 112 – DetailedHydroModelHydraulicSystem	457

Figure 113 – GovHydroPelton	459
Figure 114 – GovHydroPeltonNonLinearGainAndEfficiency	460
Figure 115 – GovHydroPID	463
Figure 116 – GovHydroPID2	465
Figure 117 – GovHydroR	468
Figure 118 – GovHydroWEH	471
Figure 119 – GovHydroWPID	475
Figure 120 – GovSteam0	476
Figure 121 – GovSteam1	478
Figure 122 – GovSteam1BacklashHysteresis	479
Figure 123 – GovSteam1InputSpeedDeadband	480
Figure 124 – GovSteam2	482
Figure 125 – GovSteamBB	484
Figure 126 – GovSteamCC	485
Figure 127 – GovSteamEU	487
Figure 128 – GovSteamFV2	489
Figure 129 – GovSteamFV3	491
Figure 130 – GovSteamFV4	493
Figure 131 – GovSteamSGO	496
Figure 132 – Class diagram TurbineLoadControllerDynamics::TurbineLoadControllerDynamics	498
Figure 133 – TurbLCFB1	499
Figure 134 – MechanicalLoadInterconnectionAndVariables	501
Figure 135 – MechanicalLoadEquations	501
Figure 136 – Class diagram MechanicalLoadDynamics::MechanicalLoadDynamics	502
Figure 137 – ExcitationSystemInterconnectionAndVariables	504
Figure 138 – Class diagram ExcitationSystemDynamics::ExcitationSystemDynamics	505
Figure 139 – ExcAC1A	529
Figure 140 – ExcAC2A	531
Figure 141 – ExcAC3A	534
Figure 142 – ExcAC4A	536
Figure 143 – ExcAC5A	537
Figure 144 – ExcAC6A	539
Figure 145 – ExcAC8B	541
Figure 146 – ExcANS	543
Figure 147 – ExcAVR1	544
Figure 148 – ExcAVR2	546
Figure 149 – ExcAVR3	547
Figure 150 – ExcAVR4	548
Figure 151 – ExcAVR5	550
Figure 152 – ExcAVR7	551
Figure 153 – ExcBBC	553
Figure 154 – ExcCZ	554

Figure 155 – ExcDC1A	556
Figure 156 – ExcDC2A	558
Figure 157 – ExcDC3A	560
Figure 158 – ExcDC3A1.....	562
Figure 159 – ExcELIN1	563
Figure 160 – ExcELIN2	565
Figure 161 – ExcHU	566
Figure 162 – ExcNI	568
Figure 163 – ExcOEX3T	569
Figure 164 – ExcPIC	571
Figure 165 – ExcREXS	573
Figure 166 – ExcRQB	576
Figure 167 – ExcSCRX	577
Figure 168 – ExcSEXS	579
Figure 169 – ExcSK	580
Figure 170 – ExcST1A	582
Figure 171 – ExcST2A	584
Figure 172 – ExcST3A	585
Figure 173 – ExcST4B	587
Figure 174 – ExcST6B	589
Figure 175 – ExcST7B	590
Figure 176 – Class diagram OverexcitationLimiterDynamics::OverexcitationLimiterDynamics	592
Figure 177 – OverexcLim2	594
Figure 178 – OverexcLimX1	595
Figure 179 – OverexcLimX1TimeCharacteristic.....	595
Figure 180 – OverexcLimX2.....	597
Figure 181 – OverexcLimX2TimeCharacteristic.....	597
Figure 182 – Class diagram UnderexcitationLimiterDynamics::UnderexcitationLimiterDynamics	599
Figure 183 – UnderexcLim2Simplified	603
Figure 184 – UnderexcLimX1	604
Figure 185 – UnderexcLimX2	605
Figure 186 – PowerSystemStabilizerInterconnectionAndVariables	607
Figure 187 – Class diagram PowerSystemStabilizerDynamics::PowerSystemStabilizerDynamics	608
Figure 188 – Pss1.....	616
Figure 189 – Pss1A	617
Figure 190 – Pss2B	619
Figure 191 – Pss2ST	621
Figure 192 – Pss5.....	622
Figure 193 – PssELIN2	624
Figure 194 – PssPTIST1	625
Figure 195 – PssPTIST3	626

Figure 196 – PssRQB	628
Figure 197 – PssSB4	629
Figure 198 – PssSH	630
Figure 199 – PssSK	632
Figure 200 – PssSTAB2A	633
Figure 201 – PssWECC	634
Figure 202 – DiscontinuousExcitationControlInterconnectionAndVariables	636
Figure 203 – Class diagram DiscontinuousExcitationControlDynamics::DiscontinuousExcitationControlDynamics	637
Figure 204 – Class diagram PFVArControllerType1Dynamics::PFVArControllerType1Dynamics	640
Figure 205 – Class diagram VoltageAdjusterDynamics::VoltageAdjusterDynamics	643
Figure 206 – Class diagram PFVArControllerType2Dynamics::PFVArControllerType2Dynamics	645
Figure 207 – PFVArType2Common1	647
Figure 208 – VoltageCompensatorInterconnectionAndVariables	649
Figure 209 – Class diagram VoltageCompensatorDynamics::VoltageCompensatorDynamics	649
Figure 210 – Class diagram WindDynamics::WindDynamicsType1or2	653
Figure 211 – Class diagram WindDynamics::WindDynamicsType3	654
Figure 212 – Class diagram WindDynamics::WindDynamicsType4	655
Figure 213 – Class diagram WindDynamics::WindDynamicsPlant	656
Figure 214 – LoadInterconnectionAndVariables	679
Figure 215 – Class diagram LoadDynamics::LoadDynamics	680
Figure 216 – LoadCompositeEquations	681
Figure 217 – LoadGenericNonLinearTypeEquations	682
Figure 218 – LoadStaticTypeEquations	685
Figure 219 – LoadMotor	687
Figure 220 – Class diagram HVDCDynamics::HVDCDynamics	689
Figure 221 – Class diagram StaticVarCompensatorDynamics::StaticVarCompensatorDynamics	691
Figure 222 – Class diagram UserDefinedModels::ProprietaryUserDefinedModels	693
Figure 223 – Class diagram EquipmentBoundaryProfile::EquipmentBoundaryProfile	708
Figure 224 – Class diagram EquipmentBoundaryProfile::Datatypes	709
Figure 225 – Class diagram TopologyBoundaryProfile::TopologyBoundaryProfile	726
Figure 226 – Class diagram TopologyBoundaryProfile::Datatypes	726
Table 1 – Attributes of CoreEquipmentProfile::ACDCConverter	78
Table 2 – Association ends of CoreEquipmentProfile::ACDCConverter with other classes	79
Table 3 – Attributes of CoreEquipmentProfile::ACDCConverterDCTerminal	80
Table 4 – Association ends of CoreEquipmentProfile::ACDCConverterDCTerminal with other classes	80
Table 5 – Attributes of CoreEquipmentProfile::ACDCTerminal	80
Table 6 – Association ends of CoreEquipmentProfile::ACDCTerminal with other classes	81

Table 7 – Attributes of CoreEquipmentProfile::ACLineSegment.....	81
Table 8 – Association ends of CoreEquipmentProfile::ACLineSegment with other classes	81
Table 9 – Attributes of CoreEquipmentProfile::ActivePowerLimit	82
Table 10 – Association ends of CoreEquipmentProfile::ActivePowerLimit with other classes	82
Table 11 – Attributes of CoreEquipmentProfile::ApparentPowerLimit	82
Table 12 – Association ends of CoreEquipmentProfile::ApparentPowerLimit with other classes	82
Table 13 – Attributes of CoreEquipmentProfile::AsynchronousMachine	83
Table 14 – Association ends of CoreEquipmentProfile::AsynchronousMachine with other classes	83
Table 15 – Attributes of CoreEquipmentProfile::AuxiliaryEquipment	83
Table 16 – Association ends of CoreEquipmentProfile::AuxiliaryEquipment with other classes	84
Table 17 – Attributes of CoreEquipmentProfile::BaseVoltage	84
Table 18 – Attributes of CoreEquipmentProfile::BatteryUnit	84
Table 19 – Association ends of CoreEquipmentProfile::BatteryUnit with other classes	84
Table 20 – Attributes of CoreEquipmentProfile::Bay	85
Table 21 – Association ends of CoreEquipmentProfile::Bay with other classes	85
Table 22 – Attributes of CoreEquipmentProfile::BoundaryPoint	85
Table 23 – Association ends of CoreEquipmentProfile::BoundaryPoint with other classes	86
Table 24 – Attributes of CoreEquipmentProfile::Breaker.....	86
Table 25 – Association ends of CoreEquipmentProfile::Breaker with other classes	87
Table 26 – Attributes of CoreEquipmentProfile::BusbarSection	87
Table 27 – Association ends of CoreEquipmentProfile::BusbarSection with other classes	87
Table 28 – Attributes of CoreEquipmentProfile::BusNameMarker	88
Table 29 – Association ends of CoreEquipmentProfile::BusNameMarker with other classes	88
Table 30 – Attributes of CoreEquipmentProfile::CAESPlant	88
Table 31 – Attributes of CoreEquipmentProfile::Clamp	88
Table 32 – Association ends of CoreEquipmentProfile::Clamp with other classes	89
Table 33 – Attributes of CoreEquipmentProfile::CogenerationPlant	89
Table 34 – Attributes of CoreEquipmentProfile::CombinedCyclePlant	89
Table 35 – Attributes of CoreEquipmentProfile::ConductingEquipment.....	90
Table 36 – Association ends of CoreEquipmentProfile::ConductingEquipment with other classes	90
Table 37 – Attributes of CoreEquipmentProfile::Conductor.....	90
Table 38 – Association ends of CoreEquipmentProfile::Conductor with other classes	91
Table 39 – Attributes of CoreEquipmentProfile::ConformLoad	91
Table 40 – Association ends of CoreEquipmentProfile::ConformLoad with other classes.....	91
Table 41 – Attributes of CoreEquipmentProfile::ConformLoadGroup	91
Table 42 – Association ends of CoreEquipmentProfile::ConformLoadGroup with other classes	92

Table 43 – Attributes of CoreEquipmentProfile::ConnectivityNode	92
Table 44 – Association ends of CoreEquipmentProfile::ConnectivityNode with other classes	92
Table 45 – Attributes of CoreEquipmentProfile::ConnectivityNodeContainer	92
Table 46 – Attributes of CoreEquipmentProfile::Connector	93
Table 47 – Association ends of CoreEquipmentProfile::Connector with other classes	93
Table 48 – Attributes of CoreEquipmentProfile::ControlArea	93
Table 49 – Association ends of CoreEquipmentProfile::ControlArea with other classes	94
Table 50 – Attributes of CoreEquipmentProfile::ControlAreaGeneratingUnit	94
Table 51 – Association ends of CoreEquipmentProfile::ControlAreaGeneratingUnit with other classes	94
Table 52 – Attributes of CoreEquipmentProfile::CsConverter	95
Table 53 – Association ends of CoreEquipmentProfile::CsConverter with other classes	96
Table 54 – Attributes of CoreEquipmentProfile::CurrentLimit	96
Table 55 – Association ends of CoreEquipmentProfile::CurrentLimit with other classes	96
Table 56 – Attributes of CoreEquipmentProfile::CurrentTransformer	96
Table 57 – Association ends of CoreEquipmentProfile::CurrentTransformer with other classes	97
Table 58 – Attributes of CoreEquipmentProfile::Curve	97
Table 59 – Attributes of CoreEquipmentProfile::CurveData	97
Table 60 – Association ends of CoreEquipmentProfile::CurveData with other classes	97
Table 61 – Attributes of CoreEquipmentProfile::Cut	98
Table 62 – Association ends of CoreEquipmentProfile::Cut with other classes	98
Table 63 – Attributes of CoreEquipmentProfile::DCBaseTerminal	98
Table 64 – Association ends of CoreEquipmentProfile::DCBaseTerminal with other classes	99
Table 65 – Attributes of CoreEquipmentProfile::DCBreaker	99
Table 66 – Association ends of CoreEquipmentProfile::DCBreaker with other classes	99
Table 67 – Attributes of CoreEquipmentProfile::DCBusbar	99
Table 68 – Association ends of CoreEquipmentProfile::DCBusbar with other classes	100
Table 69 – Attributes of CoreEquipmentProfile::DCChopper	100
Table 70 – Association ends of CoreEquipmentProfile::DCChopper with other classes	100
Table 71 – Attributes of CoreEquipmentProfile::DCConductingEquipment	100
Table 72 – Association ends of CoreEquipmentProfile::DCConductingEquipment with other classes	101
Table 73 – Attributes of CoreEquipmentProfile::DCConverterUnit	101
Table 74 – Association ends of CoreEquipmentProfile::DCConverterUnit with other classes	101
Table 75 – Attributes of CoreEquipmentProfile::DCDisconnecter	101
Table 76 – Association ends of CoreEquipmentProfile::DCDisconnecter with other classes	102
Table 77 – Attributes of CoreEquipmentProfile::DCEquipmentContainer	102
Table 78 – Attributes of CoreEquipmentProfile::DCGround	102
Table 79 – Association ends of CoreEquipmentProfile::DCGround with other classes	103
Table 80 – Attributes of CoreEquipmentProfile::DCLine	103

Table 81 – Association ends of CoreEquipmentProfile::DCLine with other classes	103
Table 82 – Attributes of CoreEquipmentProfile::DCLineSegment	103
Table 83 – Association ends of CoreEquipmentProfile::DCLineSegment with other classes	104
Table 84 – Attributes of CoreEquipmentProfile::DCNode.....	104
Table 85 – Association ends of CoreEquipmentProfile::DCNode with other classes	104
Table 86 – Attributes of CoreEquipmentProfile::DCSeriesDevice	104
Table 87 – Association ends of CoreEquipmentProfile::DCSeriesDevice with other classes	105
Table 88 – Attributes of CoreEquipmentProfile::DCShunt.....	105
Table 89 – Association ends of CoreEquipmentProfile::DCShunt with other classes	105
Table 90 – Attributes of CoreEquipmentProfile::DCSwitch.....	106
Table 91 – Association ends of CoreEquipmentProfile::DCSwitch with other classes	106
Table 92 – Attributes of CoreEquipmentProfile::DCTerminal	106
Table 93 – Association ends of CoreEquipmentProfile::DCTerminal with other classes	106
Table 94 – Attributes of CoreEquipmentProfile::Disconnecter	107
Table 95 – Association ends of CoreEquipmentProfile::Disconnecter with other classes	107
Table 96 – Attributes of CoreEquipmentProfile::DisconnectingCircuitBreaker	107
Table 97 – Association ends of CoreEquipmentProfile::DisconnectingCircuitBreaker with other classes	107
Table 98 – Attributes of CoreEquipmentProfile::EarthFaultCompensator	108
Table 99 – Association ends of CoreEquipmentProfile::EarthFaultCompensator with other classes	108
Table 100 – Attributes of CoreEquipmentProfile::EnergyArea	108
Table 101 – Attributes of CoreEquipmentProfile::EnergyConnection	109
Table 102 – Association ends of CoreEquipmentProfile::EnergyConnection with other classes	109
Table 103 – Attributes of CoreEquipmentProfile::EnergyConsumer	109
Table 104 – Association ends of CoreEquipmentProfile::EnergyConsumer with other classes	109
Table 105 – Attributes of CoreEquipmentProfile::EnergySchedulingType	110
Table 106 – Attributes of CoreEquipmentProfile::EnergySource	110
Table 107 – Association ends of CoreEquipmentProfile::EnergySource with other classes	110
Table 108 – Attributes of CoreEquipmentProfile::Equipment	111
Table 109 – Association ends of CoreEquipmentProfile::Equipment with other classes	111
Table 110 – Attributes of CoreEquipmentProfile::EquipmentContainer	111
Table 111 – Attributes of CoreEquipmentProfile::EquivalentBranch.....	112
Table 112 – Association ends of CoreEquipmentProfile::EquivalentBranch with other classes	112
Table 113 – Attributes of CoreEquipmentProfile::EquivalentEquipment	113
Table 114 – Association ends of CoreEquipmentProfile::EquivalentEquipment with other classes	113
Table 115 – Attributes of CoreEquipmentProfile::EquivalentInjection	113
Table 116 – Association ends of CoreEquipmentProfile::EquivalentInjection with other classes	114

Table 117 – Attributes of CoreEquipmentProfile::EquivalentNetwork	114
Table 118 – Attributes of CoreEquipmentProfile::EquivalentShunt	114
Table 119 – Association ends of CoreEquipmentProfile::EquivalentShunt with other classes	115
Table 120 – Attributes of CoreEquipmentProfile::ExternalNetworkInjection	115
Table 121 – Association ends of CoreEquipmentProfile::ExternalNetworkInjection with other classes	115
Table 122 – Attributes of CoreEquipmentProfile::FaultIndicator	116
Table 123 – Association ends of CoreEquipmentProfile::FaultIndicator with other classes	116
Table 124 – Attributes of CoreEquipmentProfile::FossilFuel	116
Table 125 – Association ends of CoreEquipmentProfile::FossilFuel with other classes	116
Table 126 – Attributes of CoreEquipmentProfile::Fuse	117
Table 127 – Association ends of CoreEquipmentProfile::Fuse with other classes	117
Table 128 – Attributes of CoreEquipmentProfile::GeneratingUnit	117
Table 129 – Association ends of CoreEquipmentProfile::GeneratingUnit with other classes	118
Table 130 – Attributes of CoreEquipmentProfile::GeographicalRegion	119
Table 131 – Attributes of CoreEquipmentProfile::GrossToNetActivePowerCurve	119
Table 132 – Association ends of CoreEquipmentProfile::GrossToNetActivePowerCurve with other classes	119
Table 133 – Attributes of CoreEquipmentProfile::Ground	119
Table 134 – Association ends of CoreEquipmentProfile::Ground with other classes	120
Table 135 – Attributes of CoreEquipmentProfile::GroundDisconnector	120
Table 136 – Association ends of CoreEquipmentProfile::GroundDisconnector with other classes	120
Table 137 – Attributes of CoreEquipmentProfile::GroundingImpedance	121
Table 138 – Association ends of CoreEquipmentProfile::GroundingImpedance with other classes	121
Table 139 – Attributes of CoreEquipmentProfile::HydroGeneratingUnit	121
Table 140 – Association ends of CoreEquipmentProfile::HydroGeneratingUnit with other classes	122
Table 141 – Attributes of CoreEquipmentProfile::HydroPowerPlant	122
Table 142 – Attributes of CoreEquipmentProfile::HydroPump	122
Table 143 – Association ends of CoreEquipmentProfile::HydroPump with other classes	123
Table 144 – Attributes of CoreEquipmentProfile::IdentifiedObject	123
Table 145 – Attributes of CoreEquipmentProfile::Jumper	123
Table 146 – Association ends of CoreEquipmentProfile::Jumper with other classes	124
Table 147 – Attributes of CoreEquipmentProfile::Junction	124
Table 148 – Association ends of CoreEquipmentProfile::Junction with other classes	124
Table 149 – Attributes of CoreEquipmentProfile::Line	125
Table 150 – Association ends of CoreEquipmentProfile::Line with other classes	125
Table 151 – Attributes of CoreEquipmentProfile::LinearShuntCompensator	125
Table 152 – Association ends of CoreEquipmentProfile::LinearShuntCompensator with other classes	125
Table 153 – Attributes of CoreEquipmentProfile::LoadArea	

Table 154 – Attributes of CoreEquipmentProfile::LoadBreakSwitch	126
Table 155 – Association ends of CoreEquipmentProfile::LoadBreakSwitch with other classes	126
Table 156 – Attributes of CoreEquipmentProfile::LoadGroup.....	127
Table 157 – Association ends of CoreEquipmentProfile::LoadGroup with other classes	127
Table 158 – Attributes of CoreEquipmentProfile::LoadResponseCharacteristic	127
Table 159 – Attributes of CoreEquipmentProfile::NonConformLoad.....	128
Table 160 – Association ends of CoreEquipmentProfile::NonConformLoad with other classes	129
Table 161 – Attributes of CoreEquipmentProfile::NonConformLoadGroup	129
Table 162 – Association ends of CoreEquipmentProfile::NonConformLoadGroup with other classes	129
Table 163 – Attributes of CoreEquipmentProfile::NonlinearShuntCompensator	129
Table 164 – Association ends of CoreEquipmentProfile::NonlinearShuntCompensator with other classes	130
Table 165 – Attributes of CoreEquipmentProfile::NonlinearShuntCompensatorPoint	130
Table 166 – Association ends of CoreEquipmentProfile::NonlinearShuntCompensatorPoint with other classes.....	130
Table 167 – Attributes of CoreEquipmentProfile::NuclearGeneratingUnit	131
Table 168 – Association ends of CoreEquipmentProfile::NuclearGeneratingUnit with other classes	131
Table 169 – Attributes of CoreEquipmentProfile::OperationalLimit	131
Table 170 – Association ends of CoreEquipmentProfile::OperationalLimit with other classes	132
Table 171 – Attributes of CoreEquipmentProfile::OperationalLimitSet	132
Table 172 – Association ends of CoreEquipmentProfile::OperationalLimitSet with other classes	132
Table 173 – Attributes of CoreEquipmentProfile::OperationalLimitType.....	132
Table 174 – Attributes of CoreEquipmentProfile::PetersenCoil.....	133
Table 175 – Association ends of CoreEquipmentProfile::PetersenCoil with other classes	133
Table 176 – Attributes of CoreEquipmentProfile::PhaseTapChanger.....	134
Table 177 – Association ends of CoreEquipmentProfile::PhaseTapChanger with other classes	134
Table 178 – Attributes of CoreEquipmentProfile::PhaseTapChangerAsymmetrical	134
Table 179 – Association ends of CoreEquipmentProfile::PhaseTapChangerAsymmetrical with other classes	135
Table 180 – Attributes of CoreEquipmentProfile::PhaseTapChangerLinear	135
Table 181 – Association ends of CoreEquipmentProfile::PhaseTapChangerLinear with other classes	136
Table 182 – Attributes of CoreEquipmentProfile::PhaseTapChangerNonLinear	136
Table 183 – Association ends of CoreEquipmentProfile::PhaseTapChangerNonLinear with other classes	137
Table 184 – Attributes of CoreEquipmentProfile::PhaseTapChangerSymmetrical	137
Table 185 – Association ends of CoreEquipmentProfile::PhaseTapChangerSymmetrical with other classes	137
Table 186 – Attributes of CoreEquipmentProfile::PhaseTapChangerTable	138

Table 187 – Attributes of CoreEquipmentProfile::PhaseTapChangerTablePoint	138
Table 188 – Association ends of CoreEquipmentProfile::PhaseTapChangerTablePoint with other classes	138
Table 189 – Attributes of CoreEquipmentProfile::PhaseTapChangerTabular	139
Table 190 – Association ends of CoreEquipmentProfile::PhaseTapChangerTabular with other classes	139
Table 191 – Attributes of CoreEquipmentProfile::PhotoVoltaicUnit	139
Table 192 – Association ends of CoreEquipmentProfile::PhotoVoltaicUnit with other classes	140
Table 193 – Attributes of CoreEquipmentProfile::PostLineSensor	140
Table 194 – Association ends of CoreEquipmentProfile::PostLineSensor with other classes	140
Table 195 – Attributes of CoreEquipmentProfile::PotentialTransformer	140
Table 196 – Association ends of CoreEquipmentProfile::PotentialTransformer with other classes	141
Table 197 – Attributes of CoreEquipmentProfile::PowerElectronicsConnection	141
Table 198 – Association ends of CoreEquipmentProfile::PowerElectronicsConnection with other classes	141
Table 199 – Attributes of CoreEquipmentProfile::PowerElectronicsUnit.....	142
Table 200 – Association ends of CoreEquipmentProfile::PowerElectronicsUnit with other classes	142
Table 201 – Attributes of CoreEquipmentProfile::PowerElectronicsWindUnit.....	142
Table 202 – Association ends of CoreEquipmentProfile::PowerElectronicsWindUnit with other classes	142
Table 203 – Attributes of CoreEquipmentProfile::PowerSystemResource.....	143
Table 204 – Attributes of CoreEquipmentProfile::PowerTransformer	143
Table 205 – Association ends of CoreEquipmentProfile::PowerTransformer with other classes	143
Table 206 – Attributes of CoreEquipmentProfile::PowerTransformerEnd	144
Table 207 – Association ends of CoreEquipmentProfile::PowerTransformerEnd with other classes	145
Table 208 – Attributes of CoreEquipmentProfile::ProtectedSwitch.....	145
Table 209 – Association ends of CoreEquipmentProfile::ProtectedSwitch with other classes	145
Table 210 – Attributes of CoreEquipmentProfile::RatioTapChanger.....	145
Table 211 – Association ends of CoreEquipmentProfile::RatioTapChanger with other classes	146
Table 212 – Attributes of CoreEquipmentProfile::RatioTapChangerTable	146
Table 213 – Attributes of CoreEquipmentProfile::RatioTapChangerTablePoint	146
Table 214 – Association ends of CoreEquipmentProfile::RatioTapChangerTablePoint with other classes	147
Table 215 – Attributes of CoreEquipmentProfile::ReactiveCapabilityCurve.....	147
Table 216 – Attributes of CoreEquipmentProfile::RegulatingCondEq.....	147
Table 217 – Association ends of CoreEquipmentProfile::RegulatingCondEq with other classes	148
Table 218 – Attributes of CoreEquipmentProfile::RegulatingControl	148
Table 219 – Association ends of CoreEquipmentProfile::RegulatingControl with other classes	149

Table 220 – Attributes of CoreEquipmentProfile::ReportingGroup	149
Table 221 – Attributes of CoreEquipmentProfile::RotatingMachine	149
Table 222 – Association ends of CoreEquipmentProfile::RotatingMachine with other classes	150
Table 223 – Attributes of CoreEquipmentProfile::Sensor	150
Table 224 – Association ends of CoreEquipmentProfile::Sensor with other classes	150
Table 225 – Attributes of CoreEquipmentProfile::SeriesCompensator	150
Table 226 – Association ends of CoreEquipmentProfile::SeriesCompensator with other classes	151
Table 227 – Attributes of CoreEquipmentProfile::ShuntCompensator	151
Table 228 – Association ends of CoreEquipmentProfile::ShuntCompensator with other classes	152
Table 229 – Attributes of CoreEquipmentProfile::SolarGeneratingUnit	152
Table 230 – Association ends of CoreEquipmentProfile::SolarGeneratingUnit with other classes	153
Table 231 – Attributes of CoreEquipmentProfile::SolarPowerPlant	153
Table 232 – Attributes of CoreEquipmentProfile::StaticVarCompensator	153
Table 233 – Association ends of CoreEquipmentProfile::StaticVarCompensator with other classes	154
Table 234 – Attributes of CoreEquipmentProfile::StationSupply	154
Table 235 – Association ends of CoreEquipmentProfile::StationSupply with other classes	154
Table 236 – Attributes of CoreEquipmentProfile::SubGeographicalRegion	155
Table 237 – Association ends of CoreEquipmentProfile::SubGeographicalRegion with other classes	155
Table 238 – Attributes of CoreEquipmentProfile::SubLoadArea	155
Table 239 – Association ends of CoreEquipmentProfile::SubLoadArea with other classes	155
Table 240 – Attributes of CoreEquipmentProfile::Substation	155
Table 241 – Association ends of CoreEquipmentProfile::Substation with other classes	156
Table 242 – Attributes of CoreEquipmentProfile::SurgeArrester	156
Table 243 – Association ends of CoreEquipmentProfile::SurgeArrester with other classes	156
Table 244 – Attributes of CoreEquipmentProfile::Switch	157
Table 245 – Association ends of CoreEquipmentProfile::Switch with other classes	157
Table 246 – Attributes of CoreEquipmentProfile::SynchronousMachine	157
Table 247 – Association ends of CoreEquipmentProfile::SynchronousMachine with other classes	158
Table 248 – Attributes of CoreEquipmentProfile::TapChanger	158
Table 249 – Association ends of CoreEquipmentProfile::TapChanger with other classes	159
Table 250 – Attributes of CoreEquipmentProfile::TapChangerControl	159
Table 251 – Association ends of CoreEquipmentProfile::TapChangerControl with other classes	159
Table 252 – Attributes of CoreEquipmentProfile::TapChangerTablePoint	160
Table 253 – Attributes of CoreEquipmentProfile::Terminal	160
Table 254 – Association ends of CoreEquipmentProfile::Terminal with other classes	161

Table 255 – Attributes of CoreEquipmentProfile::ThermalGeneratingUnit.....	161
Table 256 – Association ends of CoreEquipmentProfile::ThermalGeneratingUnit with other classes	162
Table 257 – Attributes of CoreEquipmentProfile::TieFlow.....	162
Table 258 – Association ends of CoreEquipmentProfile::TieFlow with other classes	162
Table 259 – Attributes of CoreEquipmentProfile::TransformerEnd	163
Table 260 – Association ends of CoreEquipmentProfile::TransformerEnd with other classes	163
Table 261 – Attributes of CoreEquipmentProfile::VoltageLevel.....	163
Table 262 – Association ends of CoreEquipmentProfile::VoltageLevel with other classes	164
Table 263 – Attributes of CoreEquipmentProfile::VoltageLimit.....	164
Table 264 – Association ends of CoreEquipmentProfile::VoltageLimit with other classes	164
Table 265 – Attributes of CoreEquipmentProfile::VsCapabilityCurve	165
Table 266 – Attributes of CoreEquipmentProfile::VsConverter	165
Table 267 – Association ends of CoreEquipmentProfile::VsConverter with other classes	166
Table 268 – Attributes of CoreEquipmentProfile::WaveTrap	166
Table 269 – Association ends of CoreEquipmentProfile::WaveTrap with other classes	166
Table 270 – Attributes of CoreEquipmentProfile::WindGeneratingUnit.....	166
Table 271 – Association ends of CoreEquipmentProfile::WindGeneratingUnit with other classes	167
Table 272 – Attributes of CoreEquipmentProfile::WindPowerPlant	167
Table 273 – Literals of CoreEquipmentProfile::ControlAreaTypeKind	167
Table 274 – Literals of CoreEquipmentProfile::Currency	168
Table 275 – Literals of CoreEquipmentProfile::CurveStyle	171
Table 276 – Literals of CoreEquipmentProfile::DCConverterOperatingModeKind	172
Table 277 – Literals of CoreEquipmentProfile::DCPolarityKind.....	172
Table 278 – Literals of CoreEquipmentProfile::FuelType	172
Table 279 – Literals of CoreEquipmentProfile::GeneratorControlSource	173
Table 280 – Literals of CoreEquipmentProfile::HydroEnergyConversionKind.....	173
Table 281 – Literals of CoreEquipmentProfile::HydroPlantStorageKind	173
Table 282 – Literals of CoreEquipmentProfile::HydroTurbineKind	173
Table 283 – Literals of CoreEquipmentProfile::LimitKind	173
Table 284 – Literals of CoreEquipmentProfile::OperationalLimitDirectionKind	175
Table 285 – Literals of CoreEquipmentProfile::PhaseCode	175
Table 286 – Literals of CoreEquipmentProfile::RegulatingControlModeKind	176
Table 287 – Literals of CoreEquipmentProfile::SynchronousMachineKind	176
Table 288 – Literals of CoreEquipmentProfile::SVCControlMode	177
Table 289 – Literals of CoreEquipmentProfile::UnitMultiplier	177
Table 290 – Literals of CoreEquipmentProfile::UnitSymbol.....	178
Table 291 – Literals of CoreEquipmentProfile::WindGenUnitKind	183
Table 292 – Literals of CoreEquipmentProfile::WindingConnection	183
Table 293 – Attributes of CoreEquipmentProfile::ActivePower	

Table 294 – Attributes of CoreEquipmentProfile::ActivePowerPerCurrentFlow	184
Table 295 – Attributes of CoreEquipmentProfile::ActivePowerPerFrequency	184
Table 296 – Attributes of CoreEquipmentProfile::AngleDegrees	184
Table 297 – Attributes of CoreEquipmentProfile::ApparentPower	184
Table 298 – Attributes of CoreEquipmentProfile::Capacitance	185
Table 299 – Attributes of CoreEquipmentProfile::Conductance	185
Table 300 – Attributes of CoreEquipmentProfile::CurrentFlow	185
Table 301 – Attributes of CoreEquipmentProfile::Frequency	185
Table 302 – Attributes of CoreEquipmentProfile::Inductance	185
Table 303 – Attributes of CoreEquipmentProfile::Length	186
Table 304 – Attributes of CoreEquipmentProfile::Money	186
Table 305 – Attributes of CoreEquipmentProfile::PerCent	186
Table 306 – Attributes of CoreEquipmentProfile::Reactance	186
Table 307 – Attributes of CoreEquipmentProfile::ReactivePower	186
Table 308 – Attributes of CoreEquipmentProfile::RealEnergy	187
Table 309 – Attributes of CoreEquipmentProfile::Resistance	187
Table 310 – Attributes of CoreEquipmentProfile::RotationSpeed	187
Table 311 – Attributes of CoreEquipmentProfile::Seconds	187
Table 312 – Attributes of CoreEquipmentProfile::Susceptance	188
Table 313 – Attributes of CoreEquipmentProfile::Voltage	188
Table 314 – Attributes of CoreEquipmentProfile::VoltagePerReactivePower	188
Table 315 – Attributes of CoreEquipmentProfile::CoreEquipmentProfileVersion	189
Table 316 – Attributes of OperationProfile::Accumulator	193
Table 317 – Association ends of OperationProfile::Accumulator with other classes	194
Table 318 – Attributes of OperationProfile::AccumulatorLimit	194
Table 319 – Association ends of OperationProfile::AccumulatorLimit with other classes	194
Table 320 – Attributes of OperationProfile::AccumulatorLimitSet	194
Table 321 – Association ends of OperationProfile::AccumulatorLimitSet with other classes	195
Table 322 – Attributes of OperationProfile::AccumulatorReset	195
Table 323 – Association ends of OperationProfile::AccumulatorReset with other classes	195
Table 324 – Attributes of OperationProfile::AccumulatorValue	195
Table 325 – Association ends of OperationProfile::AccumulatorValue with other classes	196
Table 326 – Attributes of OperationProfile::ACDCTerminal	196
Table 327 – Attributes of OperationProfile::Analog	196
Table 328 – Association ends of OperationProfile::Analog with other classes	196
Table 329 – Attributes of OperationProfile::AnalogControl	197
Table 330 – Association ends of OperationProfile::AnalogControl with other classes	197
Table 331 – Attributes of OperationProfile::AnalogLimit	197
Table 332 – Association ends of OperationProfile::AnalogLimit with other classes	198
Table 333 – Attributes of OperationProfile::AnalogLimitSet	198
Table 334 – Association ends of OperationProfile::AnalogLimitSet with other classes	198

Table 335 – Attributes of OperationProfile::AnalogValue	198
Table 336 – Association ends of OperationProfile::AnalogValue with other classes	198
Table 337 – Attributes of OperationProfile::BasicIntervalSchedule	199
Table 338 – Attributes of OperationProfile::Command	199
Table 339 – Association ends of OperationProfile::Command with other classes	199
Table 340 – Attributes of OperationProfile::ConductingEquipment	200
Table 341 – Attributes of OperationProfile::ConformLoad	200
Table 342 – Attributes of OperationProfile::ConformLoadGroup	200
Table 343 – Attributes of OperationProfile::ConformLoadSchedule	201
Table 344 – Association ends of OperationProfile::ConformLoadSchedule with other classes	201
Table 345 – Attributes of OperationProfile::Control	201
Table 346 – Association ends of OperationProfile::Control with other classes	202
Table 347 – Attributes of OperationProfile::DayType	202
Table 348 – Attributes of OperationProfile::Discrete	202
Table 349 – Association ends of OperationProfile::Discrete with other classes	203
Table 350 – Attributes of OperationProfile::DiscreteValue	203
Table 351 – Association ends of OperationProfile::DiscreteValue with other classes	203
Table 352 – Attributes of OperationProfile::EnergyConnection	203
Table 353 – Attributes of OperationProfile::EnergyConsumer	204
Table 354 – Attributes of OperationProfile::Equipment	204
Table 355 – Attributes of OperationProfile::IdentifiedObject	205
Table 356 – Attributes of OperationProfile::IOPoint	205
Table 357 – Attributes of OperationProfile::Limit	205
Table 358 – Attributes of OperationProfile::LimitSet	206
Table 359 – Attributes of OperationProfile::LoadGroup	206
Table 360 – Attributes of OperationProfile::Measurement	207
Table 361 – Association ends of OperationProfile::Measurement with other classes	207
Table 362 – Attributes of OperationProfile::MeasurementValue	207
Table 363 – Association ends of OperationProfile::MeasurementValue with other classes	208
Table 364 – Attributes of OperationProfile::MeasurementValueQuality	208
Table 365 – Association ends of OperationProfile::MeasurementValueQuality with other classes	209
Table 366 – Attributes of OperationProfile::MeasurementValueSource	209
Table 367 – Attributes of OperationProfile::NonConformLoad	209
Table 368 – Attributes of OperationProfile::NonConformLoadGroup	209
Table 369 – Attributes of OperationProfile::NonConformLoadSchedule	210
Table 370 – Association ends of OperationProfile::NonConformLoadSchedule with other classes	210
Table 371 – Attributes of OperationProfile::PowerSystemResource	210
Table 372 – Attributes of OperationProfile::Quality61850	211
Table 373 – Attributes of OperationProfile::RaiseLowerCommand	212
Table 374 – Association ends of OperationProfile::RaiseLowerCommand with other classes	212

Table 375 – Attributes of OperationProfile::RegularIntervalSchedule	212
Table 376 – Attributes of OperationProfile::RegularTimePoint.....	213
Table 377 – Association ends of OperationProfile::RegularTimePoint with other classes	213
Table 378 – Attributes of OperationProfile::RegulatingControl.....	214
Table 379 – Association ends of OperationProfile::RegulatingControl with other classes	214
Table 380 – Attributes of OperationProfile::RegulationSchedule	214
Table 381 – Association ends of OperationProfile::RegulationSchedule with other classes	215
Table 382 – Attributes of OperationProfile::Season.....	215
Table 383 – Attributes of OperationProfile::SeasonDayTypeSchedule.....	215
Table 384 – Association ends of OperationProfile::SeasonDayTypeSchedule with other classes	216
Table 385 – Attributes of OperationProfile::SetPoint	216
Table 386 – Association ends of OperationProfile::SetPoint with other classes	216
Table 387 – Attributes of OperationProfile::StationSupply	216
Table 388 – Attributes of OperationProfile::StringMeasurement	217
Table 389 – Association ends of OperationProfile::StringMeasurement with other classes	217
Table 390 – Attributes of OperationProfile::StringMeasurementValue	217
Table 391 – Association ends of OperationProfile::StringMeasurementValue with other classes	218
Table 392 – Attributes of OperationProfile::Switch	218
Table 393 – Attributes of OperationProfile::SwitchSchedule.....	218
Table 394 – Association ends of OperationProfile::SwitchSchedule with other classes.....	219
Table 395 – Attributes of OperationProfile::TapChanger	219
Table 396 – Attributes of OperationProfile::TapSchedule	219
Table 397 – Association ends of OperationProfile::TapSchedule with other classes	219
Table 398 – Attributes of OperationProfile::Terminal	220
Table 399 – Association ends of OperationProfile::Terminal with other classes.....	220
Table 400 – Attributes of OperationProfile::ValueAliasSet.....	220
Table 401 – Attributes of OperationProfile::ValueToAlias	221
Table 402 – Association ends of OperationProfile::ValueToAlias with other classes.....	221
Table 403 – Literals of OperationProfile::PhaseCode	221
Table 404 – Literals of OperationProfile::Source	222
Table 405 – Literals of OperationProfile::UnitMultiplier.....	222
Table 406 – Literals of OperationProfile::UnitSymbol	223
Table 407 – Literals of OperationProfile::Validity.....	228
Table 408 – Attributes of OperationProfile::ActivePower	229
Table 409 – Attributes of OperationProfile::PerCent.....	229
Table 410 – Attributes of OperationProfile::Seconds	229
Table 411 – Attributes of OperationProfile::ReactivePower	229
Table 412 – Attributes of OperationProfile::OperationProfileVersion	230
Table 413 – Attributes of ShortCircuitProfile::ACDCTerminal	232
Table 414 – Attributes of ShortCircuitProfile::ACLLineSegment	233

Table 415 – Attributes of ShortCircuitProfile::AsynchronousMachine.....	233
Table 416 – Attributes of ShortCircuitProfile::BusbarSection	234
Table 417 – Attributes of ShortCircuitProfile::ConductingEquipment	234
Table 418 – Attributes of ShortCircuitProfile::Conductor	234
Table 419 – Attributes of ShortCircuitProfile::Connector	234
Table 420 – Attributes of ShortCircuitProfile::EarthFaultCompensator.....	235
Table 421 – Attributes of ShortCircuitProfile::EnergyConnection	235
Table 422 – Attributes of ShortCircuitProfile::EnergySource.....	235
Table 423 – Attributes of ShortCircuitProfile::Equipment	235
Table 424 – Attributes of ShortCircuitProfile::EquivalentBranch	236
Table 425 – Attributes of ShortCircuitProfile::EquivalentEquipment.....	237
Table 426 – Attributes of ShortCircuitProfile::EquivalentInjection	237
Table 427 – Attributes of ShortCircuitProfile::ExternalNetworkInjection	238
Table 428 – Attributes of ShortCircuitProfile::GroundingImpedance	239
Table 429 – Attributes of ShortCircuitProfile::IdentifiedObject	239
Table 430 – Attributes of ShortCircuitProfile::LinearShuntCompensator	239
Table 431 – Attributes of ShortCircuitProfile::MutualCoupling	239
Table 432 – Association ends of ShortCircuitProfile::MutualCoupling with other classes	240
Table 433 – Attributes of ShortCircuitProfile::NonlinearShuntCompensatorPoint	240
Table 434 – Attributes of ShortCircuitProfile::PetersenCoil	241
Table 435 – Attributes of ShortCircuitProfile::PowerSystemResource	241
Table 436 – Attributes of ShortCircuitProfile::PowerTransformer	241
Table 437 – Attributes of ShortCircuitProfile::PowerTransformerEnd.....	243
Table 438 – Attributes of ShortCircuitProfile::RegulatingCondEq	243
Table 439 – Attributes of ShortCircuitProfile::RotatingMachine	243
Table 440 – Attributes of ShortCircuitProfile::SeriesCompensator	244
Table 441 – Attributes of ShortCircuitProfile::ShuntCompensator	244
Table 442 – Attributes of ShortCircuitProfile::SynchronousMachine	244
Table 443 – Attributes of ShortCircuitProfile::Terminal	245
Table 444 – Attributes of ShortCircuitProfile::TransformerEnd	245
Table 445 – Literals of ShortCircuitProfile::PetersenCoilModeKind	246
Table 446 – Literals of ShortCircuitProfile::ShortCircuitRotorKind	246
Table 447 – Literals of ShortCircuitProfile::UnitMultiplier.....	246
Table 448 – Literals of ShortCircuitProfile::UnitSymbol	247
Table 449 – Attributes of ShortCircuitProfile::ActivePower	252
Table 450 – Attributes of ShortCircuitProfile::AngleDegrees.....	252
Table 451 – Attributes of ShortCircuitProfile::Conductance	253
Table 452 – Attributes of ShortCircuitProfile::CurrentFlow.....	253
Table 453 – Attributes of ShortCircuitProfile::Length	253
Table 454 – Attributes of ShortCircuitProfile::PerCent.....	253
Table 455 – Attributes of ShortCircuitProfile::PU	254
Table 456 – Attributes of ShortCircuitProfile::Reactance	254
Table 457 – Attributes of ShortCircuitProfile::Resistance	254

Table 458 – Attributes of ShortCircuitProfile::Susceptance	254
Table 459 – Attributes of ShortCircuitProfile::Temperature.....	254
Table 460 – Attributes of ShortCircuitProfile::Voltage.....	255
Table 461 – Attributes of ShortCircuitProfile::ShortCircuitProfileVersion	255
Table 462 – Attributes of SteadyStateHypothesisProfile::ACDCConverter.....	261
Table 463 – Attributes of SteadyStateHypothesisProfile::ACDCConverterDCTerminal	261
Table 464 – Attributes of SteadyStateHypothesisProfile::ACDCTerminal.....	262
Table 465 – Attributes of SteadyStateHypothesisProfile::ActivePowerLimit	262
Table 466 – Attributes of SteadyStateHypothesisProfile::ApparentPowerLimit	262
Table 467 – Attributes of SteadyStateHypothesisProfile::AsynchronousMachine	262
Table 468 – Attributes of SteadyStateHypothesisProfile::BatteryUnit	263
Table 469 – Attributes of SteadyStateHypothesisProfile::Breaker.....	263
Table 470 – Attributes of SteadyStateHypothesisProfile::ConductingEquipment.....	263
Table 471 – Attributes of SteadyStateHypothesisProfile::ConformLoad	264
Table 472 – Attributes of SteadyStateHypothesisProfile::ControlArea	264
Table 473 – Attributes of SteadyStateHypothesisProfile::CsConverter	265
Table 474 – Attributes of SteadyStateHypothesisProfile::CurrentLimit.....	265
Table 475 – Attributes of SteadyStateHypothesisProfile::DCBaseTerminal	266
Table 476 – Attributes of SteadyStateHypothesisProfile::DCTerminal	266
Table 477 – Attributes of SteadyStateHypothesisProfile::Disconnecter	266
Table 478 – Attributes of SteadyStateHypothesisProfile::DisconnectingCircuitBreaker	266
Table 479 – Attributes of SteadyStateHypothesisProfile::EnergyConnection	267
Table 480 – Attributes of SteadyStateHypothesisProfile::EnergyConsumer	267
Table 481 – Attributes of SteadyStateHypothesisProfile::EnergySource	267
Table 482 – Attributes of SteadyStateHypothesisProfile::Equipment	268
Table 483 – Attributes of SteadyStateHypothesisProfile::EquivalentEquipment	268
Table 484 – Attributes of SteadyStateHypothesisProfile::EquivalentInjection	268
Table 485 – Attributes of SteadyStateHypothesisProfile::ExternalNetworkInjection	269
Table 486 – Attributes of SteadyStateHypothesisProfile::Fuse	269
Table 487 – Attributes of SteadyStateHypothesisProfile::GeneratingUnit	270
Table 488 – Attributes of SteadyStateHypothesisProfile::GroundDisconnecter	270
Table 489 – Attributes of SteadyStateHypothesisProfile::HydroGeneratingUnit	270
Table 490 – Attributes of SteadyStateHypothesisProfile::IdentifiedObject	270
Table 491 – Attributes of SteadyStateHypothesisProfile::Jumper	271
Table 492 – Attributes of SteadyStateHypothesisProfile::LinearShuntCompensator	271
Table 493 – Attributes of SteadyStateHypothesisProfile::LoadBreakSwitch.....	271
Table 494 – Attributes of SteadyStateHypothesisProfile::NonConformLoad.....	272
Table 495 – Attributes of SteadyStateHypothesisProfile::NonlinearShuntCompensator	272
Table 496 – Attributes of SteadyStateHypothesisProfile::NuclearGeneratingUnit	272
Table 497 – Attributes of SteadyStateHypothesisProfile::OperationalLimit	272
Table 498 – Attributes of SteadyStateHypothesisProfile::PhaseTapChanger	273
Table 499 – Attributes of SteadyStateHypothesisProfile::PhaseTapChangerAsymmetrical	273

Table 500 – Attributes of SteadyStateHypothesisProfile::PhaseTapChangerLinear	273
Table 501 – Attributes of SteadyStateHypothesisProfile::PhaseTapChangerNonLinear	274
Table 502 – Attributes of SteadyStateHypothesisProfile::PhaseTapChangerSymmetrical	274
Table 503 – Attributes of SteadyStateHypothesisProfile::PhaseTapChangerTabular	274
Table 504 – Attributes of SteadyStateHypothesisProfile::PowerElectronicsConnection	274
Table 505 – Attributes of SteadyStateHypothesisProfile::PowerElectronicsUnit	275
Table 506 – Attributes of SteadyStateHypothesisProfile::PowerSystemResource	275
Table 507 – Attributes of SteadyStateHypothesisProfile::ProtectedSwitch	275
Table 508 – Attributes of SteadyStateHypothesisProfile::RatioTapChanger	275
Table 509 – Attributes of SteadyStateHypothesisProfile::RegulatingCondEq	276
Table 510 – Attributes of SteadyStateHypothesisProfile::RegulatingControl	276
Table 511 – Attributes of SteadyStateHypothesisProfile::RotatingMachine	277
Table 512 – Attributes of SteadyStateHypothesisProfile::ShuntCompensator	277
Table 513 – Attributes of SteadyStateHypothesisProfile::SolarGeneratingUnit	278
Table 514 – Attributes of SteadyStateHypothesisProfile::StaticVarCompensator	278
Table 515 – Attributes of SteadyStateHypothesisProfile::StationSupply	279
Table 516 – Attributes of SteadyStateHypothesisProfile::Switch	279
Table 517 – Attributes of SteadyStateHypothesisProfile::SynchronousMachine	279
Table 518 – Attributes of SteadyStateHypothesisProfile::TapChanger	280
Table 519 – Attributes of SteadyStateHypothesisProfile::TapChangerControl	280
Table 520 – Attributes of SteadyStateHypothesisProfile::Terminal	281
Table 521 – Attributes of SteadyStateHypothesisProfile::ThermalGeneratingUnit	281
Table 522 – Attributes of SteadyStateHypothesisProfile::VoltageLimit	281
Table 523 – Attributes of SteadyStateHypothesisProfile::VsConverter	281
Table 524 – Attributes of SteadyStateHypothesisProfile::WindGeneratingUnit	282
Table 525 – Literals of SteadyStateHypothesisProfile::AsynchronousMachineKind	282
Table 526 – Literals of SteadyStateHypothesisProfile::BatteryStateKind	283
Table 527 – Literals of SteadyStateHypothesisProfile::CsOperatingModeKind	283
Table 528 – Literals of SteadyStateHypothesisProfile::CsPpccControlKind	283
Table 529 – Literals of SteadyStateHypothesisProfile::SynchronousMachineOperatingMode	283
Table 530 – Literals of SteadyStateHypothesisProfile::UnitMultiplier	284
Table 531 – Literals of SteadyStateHypothesisProfile::UnitSymbol	285
Table 532 – Literals of SteadyStateHypothesisProfile::VsPpccControlKind	290
Table 533 – Literals of SteadyStateHypothesisProfile::VsQpccControlKind	290
Table 534 – Attributes of SteadyStateHypothesisProfile::ActivePower	291
Table 535 – Attributes of SteadyStateHypothesisProfile::AngleDegrees	291
Table 536 – Attributes of SteadyStateHypothesisProfile::AngleRadians	291
Table 537 – Attributes of SteadyStateHypothesisProfile::ApparentPower	291
Table 538 – Attributes of SteadyStateHypothesisProfile::CurrentFlow	291
Table 539 – Attributes of SteadyStateHypothesisProfile::PerCent	292
Table 540 – Attributes of SteadyStateHypothesisProfile::PU	292
Table 541 – Attributes of SteadyStateHypothesisProfile::ReactivePower	292

Table 542 – Attributes of SteadyStateHypothesisProfile::RealEnergy	292
Table 543 – Attributes of SteadyStateHypothesisProfile::Resistance	292
Table 544 – Attributes of SteadyStateHypothesisProfile::Voltage	293
Table 545 – Attributes of SteadyStateHypothesisProfile::SteadyStateHypothesisProfileVersion	293
Table 546 – Attributes of TopologyProfile::ACDCCConverterDCTerminal	295
Table 547 – Association ends of TopologyProfile::ACDCCConverterDCTerminal with other classes	295
Table 548 – Attributes of TopologyProfile::ACDCTerminal	296
Table 549 – Attributes of TopologyProfile::BoundaryPoint	296
Table 550 – Association ends of TopologyProfile::BoundaryPoint with other classes	296
Table 551 – Association ends of TopologyProfile::ConnectivityNode with other classes	296
Table 552 – Attributes of TopologyProfile::DCBaseTerminal	297
Table 553 – Association ends of TopologyProfile::DCBaseTerminal with other classes	297
Table 554 – Attributes of TopologyProfile::DCNode	297
Table 555 – Association ends of TopologyProfile::DCNode with other classes	297
Table 556 – Attributes of TopologyProfile::DCTerminal	298
Table 557 – Association ends of TopologyProfile::DCTerminal with other classes	298
Table 558 – Attributes of TopologyProfile::DCTopologicalNode	298
Table 559 – Association ends of TopologyProfile::DCTopologicalNode with other classes	298
Table 560 – Attributes of TopologyProfile::IdentifiedObject	298
Table 561 – Attributes of TopologyProfile::Terminal	299
Table 562 – Association ends of TopologyProfile::Terminal with other classes	299
Table 563 – Attributes of TopologyProfile::TopologicalNode	300
Table 564 – Association ends of TopologyProfile::TopologicalNode with other classes	300
Table 565 – Attributes of TopologyProfile::ReportingGroup	300
Table 566 – Attributes of TopologyProfile::TopologyProfileVersion	301
Table 567 – Attributes of StateVariablesProfile::ACDCCConverter	304
Table 568 – Attributes of StateVariablesProfile::ACDCTerminal	304
Table 569 – Attributes of StateVariablesProfile::CsConverter	305
Table 570 – Attributes of StateVariablesProfile::DCTopologicalIsland	305
Table 571 – Association ends of StateVariablesProfile::DCTopologicalIsland with other classes	305
Table 572 – Attributes of StateVariablesProfile::DCTopologicalNode	305
Table 573 – Attributes of StateVariablesProfile::IdentifiedObject	306
Table 574 – Attributes of StateVariablesProfile::SvInjection	306
Table 575 – Association ends of StateVariablesProfile::SvInjection with other classes	306
Table 576 – Attributes of StateVariablesProfile::SvPowerFlow	307
Table 577 – Association ends of StateVariablesProfile::SvPowerFlow with other classes	307
Table 578 – Attributes of StateVariablesProfile::SvShuntCompensatorSections	307
Table 579 – Association ends of StateVariablesProfile::SvShuntCompensatorSections with other classes	307
Table 580 – Attributes of StateVariablesProfile::SvStatus	

Table 581 – Association ends of StateVariablesProfile::SvStatus with other classes	308
Table 582 – Attributes of StateVariablesProfile::SvSwitch	308
Table 583 – Association ends of StateVariablesProfile::SvSwitch with other classes	308
Table 584 – Attributes of StateVariablesProfile::SvTapStep	308
Table 585 – Association ends of StateVariablesProfile::SvTapStep with other classes	308
Table 586 – Attributes of StateVariablesProfile::SvVoltage	308
Table 587 – Association ends of StateVariablesProfile::SvVoltage with other classes	309
Table 588 – Attributes of StateVariablesProfile::Terminal	309
Table 589 – Attributes of StateVariablesProfile::TopologicalIsland	309
Table 590 – Association ends of StateVariablesProfile::TopologicalIsland with other classes	309
Table 591 – Attributes of StateVariablesProfile::VsConverter	310
Table 592 – Literals of StateVariablesProfile::UnitMultiplier	310
Table 593 – Literals of StateVariablesProfile::UnitSymbol	311
Table 594 – Attributes of StateVariablesProfile::ActivePower	316
Table 595 – Attributes of StateVariablesProfile::AngleDegrees	317
Table 596 – Attributes of StateVariablesProfile::CurrentFlow	317
Table 597 – Attributes of StateVariablesProfile::ReactivePower	317
Table 598 – Attributes of StateVariablesProfile::Voltage	317
Table 599 – Attributes of StateVariablesProfile::StateVariablesProfileVersion	318
Table 600 – Attributes of DiagramLayoutProfile::Diagram	320
Table 601 – Association ends of DiagramLayoutProfile::Diagram with other classes	321
Table 602 – Attributes of DiagramLayoutProfile::DiagramObject	321
Table 603 – Association ends of DiagramLayoutProfile::DiagramObject with other classes	322
Table 604 – Attributes of DiagramLayoutProfile::DiagramObjectPoint	322
Table 605 – Association ends of DiagramLayoutProfile::DiagramObjectPoint with other classes	322
Table 606 – Attributes of DiagramLayoutProfile::DiagramObjectStyle	323
Table 607 – Attributes of DiagramLayoutProfile::DiagramStyle	323
Table 608 – Attributes of DiagramLayoutProfile::IdentifiedObject	323
Table 609 – Attributes of DiagramLayoutProfile::TextDiagramObject	324
Table 610 – Association ends of DiagramLayoutProfile::TextDiagramObject with other classes	324
Table 611 – Attributes of DiagramLayoutProfile::VisibilityLayer	324
Table 612 – Association ends of DiagramLayoutProfile::VisibilityLayer with other classes	324
Table 613 – Literals of DiagramLayoutProfile::OrientationKind	325
Table 614 – Literals of DiagramLayoutProfile::UnitMultiplier	325
Table 615 – Literals of DiagramLayoutProfile::UnitSymbol	326
Table 616 – Attributes of DiagramLayoutProfile::AngleDegrees	331
Table 617 – Attributes of DiagramLayoutProfile::DiagramLayoutProfileVersion	332
Table 618 – Attributes of GeographicalLocationProfile::BoundaryPoint	334
Table 619 – Association ends of GeographicalLocationProfile::BoundaryPoint with other classes	

Table 620 – Attributes of GeographicalLocationProfile::IdentifiedObject.....	334
Table 621 – Attributes of GeographicalLocationProfile::ServiceLocation	334
Table 622 – Association ends of GeographicalLocationProfile::ServiceLocation with other classes	335
Table 623 – Attributes of GeographicalLocationProfile::WorkLocation	335
Table 624 – Association ends of GeographicalLocationProfile::WorkLocation with other classes	335
Table 625 – Attributes of GeographicalLocationProfile::CoordinateSystem	335
Table 626 – Attributes of GeographicalLocationProfile::Location	336
Table 627 – Association ends of GeographicalLocationProfile::Location with other classes	336
Table 628 – Attributes of GeographicalLocationProfile::PositionPoint.....	336
Table 629 – Association ends of GeographicalLocationProfile::PositionPoint with other classes	337
Table 630 – Attributes of GeographicalLocationProfile::PowerSystemResource	337
Table 631 – Attributes of GeographicalLocationProfile::StreetAddress	337
Table 632 – Attributes of GeographicalLocationProfile::TownDetail.....	337
Table 633 – Attributes of GeographicalLocationProfile::Status	338
Table 634 – Attributes of GeographicalLocationProfile::StreetDetail.....	338
Table 635 – Attributes of GeographicalLocationProfile::GeographicalLocationProfileVersion.....	339
Table 636 – Attributes of DynamicsProfile::DynamicsProfileVersion.....	340
Table 637 – Attributes of Domain::ActivePower.....	342
Table 638 – Attributes of Domain::AngleDegrees	343
Table 639 – Attributes of Domain::ApparentPower	343
Table 640 – Attributes of Domain::Area.....	343
Table 641 – Attributes of Domain::Frequency.....	343
Table 642 – Attributes of Domain::Length	343
Table 643 – Attributes of Domain::PU	344
Table 644 – Attributes of Domain::Seconds	344
Table 645 – Attributes of Domain::Temperature	344
Table 646 – Attributes of Domain::VolumeFlowRate.....	344
Table 647 – Literals of Domain::DroopSignalFeedbackKind	345
Table 648 – Literals of Domain::ExcIEEEEST1AUELselectorKind	345
Table 649 – Literals of Domain::ExcREXSFeedbackSignalKind.....	345
Table 650 – Literals of Domain::ExcST6BOELselectorKind	346
Table 651 – Literals of Domain::ExcST7BOELselectorKind	346
Table 652 – Literals of Domain::ExcST7BUELselectorKind	346
Table 653 – Literals of Domain::FrancisGovernorControlKind	347
Table 654 – Literals of Domain::GenericNonLinearLoadModelKind	347
Table 655 – Literals of Domain::GovHydro4ModelKind.....	347
Table 656 – Literals of Domain::IfdBaseKind.....	347
Table 657 – Literals of Domain::InputSignalKind	347
Table 658 – Literals of Domain::RemoteSignalKind.....	348
Table 659 – Literals of Domain::RotorKind	348

Table 660 – Literals of Domain::StaticLoadModelKind	349
Table 661 – Literals of Domain::SynchronousMachineModelKind	349
Table 662 – Literals of Domain::UnitMultiplier	350
Table 663 – Literals of Domain::UnitSymbol	351
Table 664 – Literals of Domain::WindLookupTableFunctionKind	355
Table 665 – Literals of Domain::WindPlantQcontrolModeKind	357
Table 666 – Literals of Domain::WindQcontrolModeKind	357
Table 667 – Literals of Domain::WindUVRTQcontrolModeKind	357
Table 668 – Attributes of Core::ACDCTerminal	358
Table 669 – Attributes of Core::ConductingEquipment	359
Table 670 – Attributes of Core::Equipment	359
Table 671 – Attributes of Core::IdentifiedObject	359
Table 672 – Attributes of Core::PowerSystemResource	360
Table 673 – Attributes of Core::Terminal	360
Table 674 – Association ends of Core::Terminal with other classes	360
Table 675 – Attributes of Wires::AsynchronousMachine	361
Table 676 – Attributes of Wires::EnergyConnection	362
Table 677 – Attributes of Wires::EnergyConsumer	362
Table 678 – Association ends of Wires::EnergyConsumer with other classes	362
Table 679 – Attributes of Wires::PowerElectronicsConnection	362
Table 680 – Attributes of Wires::RegulatingCondEq	363
Table 681 – Attributes of Wires::RotatingMachine	363
Table 682 – Attributes of Wires::StaticVarCompensator	363
Table 683 – Attributes of Wires::SynchronousMachine	363
Table 684 – Attributes of DC::ACDCCConverter	364
Table 685 – Attributes of DC::CsConverter	364
Table 686 – Attributes of DC::VsConverter	365
Table 687 – Attributes of StandardInterconnections::RemoteInputSignal	379
Table 688 – Association ends of StandardInterconnections::RemoteInputSignal with other classes	379
Table 689 – Attributes of StandardModels::DynamicsFunctionBlock	380
Table 690 – Attributes of StandardModels::RotatingMachineDynamics	380
Table 691 – Attributes of SynchronousMachineDynamics::SynchronousMachineSimplified	389
Table 692 – Association ends of SynchronousMachineDynamics::SynchronousMachineSimplified with other classes	389
Table 693 – Attributes of SynchronousMachineDynamics::SynchronousMachineDynamics	390
Table 694 – Association ends of SynchronousMachineDynamics::SynchronousMachineDynamics with other classes	390
Table 695 – Attributes of SynchronousMachineDynamics::SynchronousMachineDetailed	390
Table 696 – Association ends of SynchronousMachineDynamics::SynchronousMachineDetailed with other classes	391
Table 697 – Attributes of SynchronousMachineDynamics::SynchronousMachineTimeConstantReactance	403

Table 698 – Association ends of SynchronousMachineDynamics::SynchronousMachineTimeConstantReactance with other classes	404
Table 699 – Attributes of SynchronousMachineDynamics::SynchronousMachineEquivalentCircuit	406
Table 700 – Association ends of SynchronousMachineDynamics::SynchronousMachineEquivalentCircuit with other classes	406
Table 701 – Attributes of AsynchronousMachineDynamics::AsynchronousMachineDynamics	410
Table 702 – Association ends of AsynchronousMachineDynamics::AsynchronousMachineDynamics with other classes	410
Table 703 – Attributes of AsynchronousMachineDynamics::AsynchronousMachineTimeConstantReactance	411
Table 704 – Association ends of AsynchronousMachineDynamics::AsynchronousMachineTimeConstantReactance with other classes	411
Table 705 – Attributes of AsynchronousMachineDynamics::AsynchronousMachineEquivalentCircuit.....	412
Table 706 – Association ends of AsynchronousMachineDynamics::AsynchronousMachineEquivalentCircuit with other classes	413
Table 707 – Attributes of TurbineGovernorDynamics::CrossCompoundTurbineGovernorDynamics.....	415
Table 708 – Association ends of TurbineGovernorDynamics::CrossCompoundTurbineGovernorDynamics with other classes	415
Table 709 – Attributes of TurbineGovernorDynamics::TurbineGovernorDynamics	415
Table 710 – Association ends of TurbineGovernorDynamics::TurbineGovernorDynamics with other classes.....	415
Table 711 – Attributes of TurbineGovernorDynamics::GovHydroIEEE0	416
Table 712 – Association ends of TurbineGovernorDynamics::GovHydroIEEE0 with other classes	416
Table 713 – Attributes of TurbineGovernorDynamics::GovHydroIEEE2	417
Table 714 – Association ends of TurbineGovernorDynamics::GovHydroIEEE2 with other classes	418
Table 715 – Attributes of TurbineGovernorDynamics::GovSteamIEEE1.....	419
Table 716 – Association ends of TurbineGovernorDynamics::GovSteamIEEE1 with other classes	420
Table 717 – Attributes of TurbineGovernorDynamics::GovCT1.....	422
Table 718 – Association ends of TurbineGovernorDynamics::GovCT1 with other classes	424
Table 719 – Attributes of TurbineGovernorDynamics::GovCT2.....	426
Table 720 – Association ends of TurbineGovernorDynamics::GovCT2 with other classes	428
Table 721 – Attributes of TurbineGovernorDynamics::GovGAST	429
Table 722 – Association ends of TurbineGovernorDynamics::GovGAST with other classes	430
Table 723 – Attributes of TurbineGovernorDynamics::GovGAST1	431

Table 724 – Association ends of TurbineGovernorDynamics::GovGAST1 with other classes	432
Table 725 – Attributes of TurbineGovernorDynamics::GovGAST2	433
Table 726 – Association ends of TurbineGovernorDynamics::GovGAST2 with other classes	434
Table 727 – Attributes of TurbineGovernorDynamics::GovGAST3	435
Table 728 – Association ends of TurbineGovernorDynamics::GovGAST3 with other classes	436
Table 729 – Attributes of TurbineGovernorDynamics::GovGAST4	437
Table 730 – Association ends of TurbineGovernorDynamics::GovGAST4 with other classes	438
Table 731 – Attributes of TurbineGovernorDynamics::GovGASTWD	439
Table 732 – Association ends of TurbineGovernorDynamics::GovGASTWD with other classes	440
Table 733 – Attributes of TurbineGovernorDynamics::GovHydro1	441
Table 734 – Association ends of TurbineGovernorDynamics::GovHydro1 with other classes	441
Table 735 – Attributes of TurbineGovernorDynamics::GovHydro2	442
Table 736 – Association ends of TurbineGovernorDynamics::GovHydro2 with other classes	443
Table 737 – Attributes of TurbineGovernorDynamics::GovHydro3	445
Table 738 – Association ends of TurbineGovernorDynamics::GovHydro3 with other classes	446
Table 739 – Attributes of TurbineGovernorDynamics::GovHydro4	450
Table 740 – Association ends of TurbineGovernorDynamics::GovHydro4 with other classes	452
Table 741 – Attributes of TurbineGovernorDynamics::GovHydroDD	453
Table 742 – Association ends of TurbineGovernorDynamics::GovHydroDD with other classes	455
Table 743 – Attributes of TurbineGovernorDynamics::GovHydroFrancis.....	457
Table 744 – Association ends of TurbineGovernorDynamics::GovHydroFrancis with other classes	459
Table 745 – Attributes of TurbineGovernorDynamics::GovHydroPelton	460
Table 746 – Association ends of TurbineGovernorDynamics::GovHydroPelton with other classes	462
Table 747 – Attributes of TurbineGovernorDynamics::GovHydroPID	463
Table 748 – Association ends of TurbineGovernorDynamics::GovHydroPID with other classes	465
Table 749 – Attributes of TurbineGovernorDynamics::GovHydroPID2	466
Table 750 – Association ends of TurbineGovernorDynamics::GovHydroPID2 with other classes	467
Table 751 – Attributes of TurbineGovernorDynamics::GovHydroR.....	468
Table 752 – Association ends of TurbineGovernorDynamics::GovHydroR with other classes	470
Table 753 – Attributes of TurbineGovernorDynamics::GovHydroWEH	471
Table 754 – Association ends of TurbineGovernorDynamics::GovHydroWEH with other classes	474
Table 755 – Attributes of TurbineGovernorDynamics::GovHydroWPID	474

Table 756 – Association ends of TurbineGovernorDynamics::GovHydroWPID with other classes	476
Table 757 – Attributes of TurbineGovernorDynamics::GovSteam0	477
Table 758 – Association ends of TurbineGovernorDynamics::GovSteam0 with other classes	477
Table 759 – Attributes of TurbineGovernorDynamics::GovSteam1	480
Table 760 – Association ends of TurbineGovernorDynamics::GovSteam1 with other classes	482
Table 761 – Attributes of TurbineGovernorDynamics::GovSteam2	483
Table 762 – Association ends of TurbineGovernorDynamics::GovSteam2 with other classes	483
Table 763 – Attributes of TurbineGovernorDynamics::GovSteamBB	484
Table 764 – Association ends of TurbineGovernorDynamics::GovSteamBB with other classes	485
Table 765 – Attributes of TurbineGovernorDynamics::GovSteamCC	486
Table 766 – Association ends of TurbineGovernorDynamics::GovSteamCC with other classes	486
Table 767 – Attributes of TurbineGovernorDynamics::GovSteamEU	487
Table 768 – Association ends of TurbineGovernorDynamics::GovSteamEU with other classes	489
Table 769 – Attributes of TurbineGovernorDynamics::GovSteamFV2	490
Table 770 – Association ends of TurbineGovernorDynamics::GovSteamFV2 with other classes	490
Table 771 – Attributes of TurbineGovernorDynamics::GovSteamFV3	491
Table 772 – Association ends of TurbineGovernorDynamics::GovSteamFV3 with other classes	493
Table 773 – Attributes of TurbineGovernorDynamics::GovSteamFV4	494
Table 774 – Association ends of TurbineGovernorDynamics::GovSteamFV4 with other classes	496
Table 775 – Attributes of TurbineGovernorDynamics::GovSteamSGO	496
Table 776 – Association ends of TurbineGovernorDynamics::GovSteamSGO with other classes	497
Table 777 – Attributes of TurbineLoadControllerDynamics::TurbineLoadControllerDynamics	498
Table 778 – Association ends of TurbineLoadControllerDynamics::TurbineLoadControllerDynamics with other classes	498
Table 779 – Attributes of TurbineLoadControllerDynamics::TurbLCFB1	500
Table 780 – Association ends of TurbineLoadControllerDynamics::TurbLCFB1 with other classes	500
Table 781 – Attributes of MechanicalLoadDynamics::MechanicalLoadDynamics	502
Table 782 – Association ends of MechanicalLoadDynamics::MechanicalLoadDynamics with other classes	502
Table 783 – Attributes of MechanicalLoadDynamics::MechLoad1	503
Table 784 – Association ends of MechanicalLoadDynamics::MechLoad1 with other classes	503
Table 785 – Attributes of ExcitationSystemDynamics::ExcitationSystemDynamics	505
Table 786 – Association ends of ExcitationSystemDynamics::ExcitationSystemDynamics with other classes	506

Table 787 – Attributes of ExcitationSystemDynamics::ExcIEEEAC1A	506
Table 788 – Association ends of ExcitationSystemDynamics::ExcIEEEAC1A with other classes	507
Table 789 – Attributes of ExcitationSystemDynamics::ExcIEEEAC2A	507
Table 790 – Association ends of ExcitationSystemDynamics::ExcIEEEAC2A with other classes	508
Table 791 – Attributes of ExcitationSystemDynamics::ExcIEEEAC3A	509
Table 792 – Association ends of ExcitationSystemDynamics::ExcIEEEAC3A with other classes	510
Table 793 – Attributes of ExcitationSystemDynamics::ExcIEEEAC4A	510
Table 794 – Association ends of ExcitationSystemDynamics::ExcIEEEAC4A with other classes	511
Table 795 – Attributes of ExcitationSystemDynamics::ExcIEEEAC5A	511
Table 796 – Association ends of ExcitationSystemDynamics::ExcIEEEAC5A with other classes	512
Table 797 – Attributes of ExcitationSystemDynamics::ExcIEEEAC6A	512
Table 798 – Association ends of ExcitationSystemDynamics::ExcIEEEAC6A with other classes	513
Table 799 – Attributes of ExcitationSystemDynamics::ExcIEEEAC7B	513
Table 800 – Association ends of ExcitationSystemDynamics::ExcIEEEAC7B with other classes	515
Table 801 – Attributes of ExcitationSystemDynamics::ExcIEEEAC8B	515
Table 802 – Association ends of ExcitationSystemDynamics::ExcIEEEAC8B with other classes	516
Table 803 – Attributes of ExcitationSystemDynamics::ExcIEEEDC1A	516
Table 804 – Association ends of ExcitationSystemDynamics::ExcIEEEDC1A with other classes	517
Table 805 – Attributes of ExcitationSystemDynamics::ExcIEEEDC2A	518
Table 806 – Association ends of ExcitationSystemDynamics::ExcIEEEDC2A with other classes	518
Table 807 – Attributes of ExcitationSystemDynamics::ExcIEEEDC3A	519
Table 808 – Association ends of ExcitationSystemDynamics::ExcIEEEDC3A with other classes	520
Table 809 – Attributes of ExcitationSystemDynamics::ExcIEEEDC4B	520
Table 810 – Association ends of ExcitationSystemDynamics::ExcIEEEDC4B with other classes	521
Table 811 – Attributes of ExcitationSystemDynamics::ExcIEEEST1A	521
Table 812 – Association ends of ExcitationSystemDynamics::ExcIEEEST1A with other classes	522
Table 813 – Attributes of ExcitationSystemDynamics::ExcIEEEST2A	522
Table 814 – Association ends of ExcitationSystemDynamics::ExcIEEEST2A with other classes	523
Table 815 – Attributes of ExcitationSystemDynamics::ExcIEEEST3A	524
Table 816 – Association ends of ExcitationSystemDynamics::ExcIEEEST3A with other classes	525
Table 817 – Attributes of ExcitationSystemDynamics::ExcIEEEST4B	525
Table 818 – Association ends of ExcitationSystemDynamics::ExcIEEEST4B with other classes	

Table 819 – Attributes of ExcitationSystemDynamics::ExcIEEEEST5B	526
Table 820 – Association ends of ExcitationSystemDynamics::ExcIEEEEST5B with other classes	527
Table 821 – Attributes of ExcitationSystemDynamics::ExcIEEEEST6B	527
Table 822 – Association ends of ExcitationSystemDynamics::ExcIEEEEST6B with other classes	528
Table 823 – Attributes of ExcitationSystemDynamics::ExcIEEEEST7B	528
Table 824 – Association ends of ExcitationSystemDynamics::ExcIEEEEST7B with other classes	529
Table 825 – Attributes of ExcitationSystemDynamics::ExcAC1A	530
Table 826 – Association ends of ExcitationSystemDynamics::ExcAC1A with other classes	531
Table 827 – Attributes of ExcitationSystemDynamics::ExcAC2A	532
Table 828 – Association ends of ExcitationSystemDynamics::ExcAC2A with other classes	533
Table 829 – Attributes of ExcitationSystemDynamics::ExcAC3A	534
Table 830 – Association ends of ExcitationSystemDynamics::ExcAC3A with other classes	535
Table 831 – Attributes of ExcitationSystemDynamics::ExcAC4A	536
Table 832 – Association ends of ExcitationSystemDynamics::ExcAC4A with other classes	537
Table 833 – Attributes of ExcitationSystemDynamics::ExcAC5A	537
Table 834 – Association ends of ExcitationSystemDynamics::ExcAC5A with other classes	538
Table 835 – Attributes of ExcitationSystemDynamics::ExcAC6A	539
Table 836 – Association ends of ExcitationSystemDynamics::ExcAC6A with other classes	540
Table 837 – Attributes of ExcitationSystemDynamics::ExcAC8B	541
Table 838 – Association ends of ExcitationSystemDynamics::ExcAC8B with other classes	543
Table 839 – Attributes of ExcitationSystemDynamics::ExcANS	543
Table 840 – Association ends of ExcitationSystemDynamics::ExcANS with other classes	544
Table 841 – Attributes of ExcitationSystemDynamics::ExcAVR1	545
Table 842 – Association ends of ExcitationSystemDynamics::ExcAVR1 with other classes	545
Table 843 – Attributes of ExcitationSystemDynamics::ExcAVR2	546
Table 844 – Association ends of ExcitationSystemDynamics::ExcAVR2 with other classes	547
Table 845 – Attributes of ExcitationSystemDynamics::ExcAVR3	547
Table 846 – Association ends of ExcitationSystemDynamics::ExcAVR3 with other classes	548
Table 847 – Attributes of ExcitationSystemDynamics::ExcAVR4	548
Table 848 – Association ends of ExcitationSystemDynamics::ExcAVR4 with other classes	549
Table 849 – Attributes of ExcitationSystemDynamics::ExcAVR5	550
Table 850 – Association ends of ExcitationSystemDynamics::ExcAVR5 with other classes	

Table 851 – Attributes of ExcitationSystemDynamics::ExcAVR7	551
Table 852 – Association ends of ExcitationSystemDynamics::ExcAVR7 with other classes	552
Table 853 – Attributes of ExcitationSystemDynamics::ExcBBC	553
Table 854 – Association ends of ExcitationSystemDynamics::ExcBBC with other classes	554
Table 855 – Attributes of ExcitationSystemDynamics::ExcCZ.....	555
Table 856 – Association ends of ExcitationSystemDynamics::ExcCZ with other classes	555
Table 857 – Attributes of ExcitationSystemDynamics::ExcDC1A	556
Table 858 – Association ends of ExcitationSystemDynamics::ExcDC1A with other classes	557
Table 859 – Attributes of ExcitationSystemDynamics::ExcDC2A	558
Table 860 – Association ends of ExcitationSystemDynamics::ExcDC2A with other classes	559
Table 861 – Attributes of ExcitationSystemDynamics::ExcDC3A	560
Table 862 – Association ends of ExcitationSystemDynamics::ExcDC3A with other classes	561
Table 863 – Attributes of ExcitationSystemDynamics::ExcDC3A1	562
Table 864 – Association ends of ExcitationSystemDynamics::ExcDC3A1 with other classes	563
Table 865 – Attributes of ExcitationSystemDynamics::ExcELIN1.....	564
Table 866 – Association ends of ExcitationSystemDynamics::ExcELIN1 with other classes	564
Table 867 – Attributes of ExcitationSystemDynamics::ExcELIN2.....	565
Table 868 – Association ends of ExcitationSystemDynamics::ExcELIN2 with other classes	566
Table 869 – Attributes of ExcitationSystemDynamics::ExcHU	567
Table 870 – Association ends of ExcitationSystemDynamics::ExcHU with other classes	567
Table 871 – Attributes of ExcitationSystemDynamics::ExcNI.....	568
Table 872 – Association ends of ExcitationSystemDynamics::ExcNI with other classes	569
Table 873 – Attributes of ExcitationSystemDynamics::ExcOEX3T	570
Table 874 – Association ends of ExcitationSystemDynamics::ExcOEX3T with other classes	570
Table 875 – Attributes of ExcitationSystemDynamics::ExcPIC	571
Table 876 – Association ends of ExcitationSystemDynamics::ExcPIC with other classes	572
Table 877 – Attributes of ExcitationSystemDynamics::ExcREXS	574
Table 878 – Association ends of ExcitationSystemDynamics::ExcREXS with other classes	576
Table 879 – Attributes of ExcitationSystemDynamics::ExcRQB	576
Table 880 – Association ends of ExcitationSystemDynamics::ExcRQB with other classes	577
Table 881 – Attributes of ExcitationSystemDynamics::ExcSCRX.....	578
Table 882 – Association ends of ExcitationSystemDynamics::ExcSCRX with other classes	578
Table 883 – Attributes of ExcitationSystemDynamics::ExcSEXS	579

Table 884 – Association ends of ExcitationSystemDynamics::ExcSEXS with other classes	580
Table 885 – Attributes of ExcitationSystemDynamics::ExcSK.....	580
Table 886 – Association ends of ExcitationSystemDynamics::ExcSK with other classes	582
Table 887 – Attributes of ExcitationSystemDynamics::ExcST1A.....	583
Table 888 – Association ends of ExcitationSystemDynamics::ExcST1A with other classes	583
Table 889 – Attributes of ExcitationSystemDynamics::ExcST2A.....	584
Table 890 – Association ends of ExcitationSystemDynamics::ExcST2A with other classes	585
Table 891 – Attributes of ExcitationSystemDynamics::ExcST3A.....	586
Table 892 – Association ends of ExcitationSystemDynamics::ExcST3A with other classes	587
Table 893 – Attributes of ExcitationSystemDynamics::ExcST4B.....	587
Table 894 – Association ends of ExcitationSystemDynamics::ExcST4B with other classes	588
Table 895 – Attributes of ExcitationSystemDynamics::ExcST6B.....	589
Table 896 – Association ends of ExcitationSystemDynamics::ExcST6B with other classes	590
Table 897 – Attributes of ExcitationSystemDynamics::ExcST7B.....	591
Table 898 – Association ends of ExcitationSystemDynamics::ExcST7B with other classes	591
Table 899 – Attributes of OverexcitationLimiterDynamics::OverexcitationLimiterDynamics	592
Table 900 – Association ends of OverexcitationLimiterDynamics::OverexcitationLimiterDynamics with other classes	593
Table 901 – Attributes of OverexcitationLimiterDynamics::OverexcLimIEEE.....	593
Table 902 – Association ends of OverexcitationLimiterDynamics::OverexcLimIEEE with other classes	593
Table 903 – Attributes of OverexcitationLimiterDynamics::OverexcLim2	594
Table 904 – Association ends of OverexcitationLimiterDynamics::OverexcLim2 with other classes	594
Table 905 – Attributes of OverexcitationLimiterDynamics::OverexcLimX1	596
Table 906 – Association ends of OverexcitationLimiterDynamics::OverexcLimX1 with other classes	596
Table 907 – Attributes of OverexcitationLimiterDynamics::OverexcLimX2	598
Table 908 – Association ends of OverexcitationLimiterDynamics::OverexcLimX2 with other classes	598
Table 909 – Attributes of UnderexcitationLimiterDynamics::UnderexcitationLimiterDynamics	599
Table 910 – Association ends of UnderexcitationLimiterDynamics::UnderexcitationLimiterDynamics with other classes	599
Table 911 – Attributes of UnderexcitationLimiterDynamics::UnderexcLimIEEE1	600
Table 912 – Association ends of UnderexcitationLimiterDynamics::UnderexcLimIEEE1 with other classes	600
Table 913 – Attributes of UnderexcitationLimiterDynamics::UnderexcLimIEEE2.....	601
Table 914 – Association ends of UnderexcitationLimiterDynamics::UnderexcLimIEEE2 with other classes	602

Table 915 – Attributes of UnderexcitationLimiterDynamics::UnderexcLim2Simplified	603
Table 916 – Association ends of UnderexcitationLimiterDynamics::UnderexcLim2Simplified with other classes	604
Table 917 – Attributes of UnderexcitationLimiterDynamics::UnderexcLimX1	605
Table 918 – Association ends of UnderexcitationLimiterDynamics::UnderexcLimX1 with other classes	605
Table 919 – Attributes of UnderexcitationLimiterDynamics::UnderexcLimX2	606
Table 920 – Association ends of UnderexcitationLimiterDynamics::UnderexcLimX2 with other classes	606
Table 921 – Attributes of PowerSystemStabilizerDynamics::PowerSystemStabilizerDynamics	608
Table 922 – Association ends of PowerSystemStabilizerDynamics::PowerSystemStabilizerDynamics with other classes	609
Table 923 – Attributes of PowerSystemStabilizerDynamics::PssIEEE1A	609
Table 924 – Association ends of PowerSystemStabilizerDynamics::PssIEEE1A with other classes	610
Table 925 – Attributes of PowerSystemStabilizerDynamics::PssIEEE2B	610
Table 926 – Association ends of PowerSystemStabilizerDynamics::PssIEEE2B with other classes	611
Table 927 – Attributes of PowerSystemStabilizerDynamics::PssIEEE3B	611
Table 928 – Association ends of PowerSystemStabilizerDynamics::PssIEEE3B with other classes	612
Table 929 – Attributes of PowerSystemStabilizerDynamics::PssIEEE4B	613
Table 930 – Association ends of PowerSystemStabilizerDynamics::PssIEEE4B with other classes	615
Table 931 – Attributes of PowerSystemStabilizerDynamics::Pss1	616
Table 932 – Association ends of PowerSystemStabilizerDynamics::Pss1 with other classes	617
Table 933 – Attributes of PowerSystemStabilizerDynamics::Pss1A	617
Table 934 – Association ends of PowerSystemStabilizerDynamics::Pss1A with other classes	618
Table 935 – Attributes of PowerSystemStabilizerDynamics::Pss2B	619
Table 936 – Association ends of PowerSystemStabilizerDynamics::Pss2B with other classes	620
Table 937 – Attributes of PowerSystemStabilizerDynamics::Pss2ST	621
Table 938 – Association ends of PowerSystemStabilizerDynamics::Pss2ST with other classes	622
Table 939 – Attributes of PowerSystemStabilizerDynamics::Pss5	622
Table 940 – Association ends of PowerSystemStabilizerDynamics::Pss5 with other classes	623
Table 941 – Attributes of PowerSystemStabilizerDynamics::PssELIN2	624
Table 942 – Association ends of PowerSystemStabilizerDynamics::PssELIN2 with other classes	624
Table 943 – Attributes of PowerSystemStabilizerDynamics::PssPTIST1	625
Table 944 – Association ends of PowerSystemStabilizerDynamics::PssPTIST1 with other classes	625
Table 945 – Attributes of PowerSystemStabilizerDynamics::PssPTIST3	626

Table 946 – Association ends of PowerSystemStabilizerDynamics::PssPTIST3 with other classes	628
Table 947 – Attributes of PowerSystemStabilizerDynamics::PssRQB	628
Table 948 – Association ends of PowerSystemStabilizerDynamics::PssRQB with other classes	629
Table 949 – Attributes of PowerSystemStabilizerDynamics::PssSB4	629
Table 950 – Association ends of PowerSystemStabilizerDynamics::PssSB4 with other classes	630
Table 951 – Attributes of PowerSystemStabilizerDynamics::PssSH	630
Table 952 – Association ends of PowerSystemStabilizerDynamics::PssSH with other classes	631
Table 953 – Attributes of PowerSystemStabilizerDynamics::PssSK	632
Table 954 – Association ends of PowerSystemStabilizerDynamics::PssSK with other classes	633
Table 955 – Attributes of PowerSystemStabilizerDynamics::PssSTAB2A	633
Table 956 – Association ends of PowerSystemStabilizerDynamics::PssSTAB2A with other classes	634
Table 957 – Attributes of PowerSystemStabilizerDynamics::PssWECC	634
Table 958 – Association ends of PowerSystemStabilizerDynamics::PssWECC with other classes	635
Table 959 – Attributes of DiscontinuousExcitationControlDynamics::DiscontinuousExcitationControlDynamics	637
Table 960 – Association ends of DiscontinuousExcitationControlDynamics::DiscontinuousExcitationControlDynamics with other classes	637
Table 961 – Attributes of DiscontinuousExcitationControlDynamics::DiscExcContIEEEDEC1A	638
Table 962 – Association ends of DiscontinuousExcitationControlDynamics::DiscExcContIEEEDEC1A with other classes	639
Table 963 – Attributes of DiscontinuousExcitationControlDynamics::DiscExcContIEEEDEC2A	639
Table 964 – Association ends of DiscontinuousExcitationControlDynamics::DiscExcContIEEEDEC2A with other classes	639
Table 965 – Attributes of DiscontinuousExcitationControlDynamics::DiscExcContIEEEDEC3A	640
Table 966 – Association ends of DiscontinuousExcitationControlDynamics::DiscExcContIEEEDEC3A with other classes	640
Table 967 – Attributes of PFVArControllerType1Dynamics::PFVArControllerType1Dynamics	641
Table 968 – Association ends of PFVArControllerType1Dynamics::PFVArControllerType1Dynamics with other classes	641
Table 969 – Attributes of PFVArControllerType1Dynamics::PFVArType1IEEEPFController	641
Table 970 – Association ends of PFVArControllerType1Dynamics::PFVArType1IEEEPFController with other classes	642
Table 971 – Attributes of PFVArControllerType1Dynamics::PFVArType1IEEEVArController	642
Table 972 – Association ends of PFVArControllerType1Dynamics::PFVArType1IEEEVArController with other classes	642
Table 973 – Attributes of VoltageAdjusterDynamics::VoltageAdjusterDynamics	643