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**Energy management system application program interface (EMS-API) –  
Part 457: Dynamics profile**

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## CONTENTS

FOREWORD.....	22
INTRODUCTION.....	24
1 Scope.....	25
2 Normative references .....	25
3 Terms and definitions .....	26
4 Profile specification .....	26
4.1 General.....	26
4.2 Requirements and constraints.....	26
5 Overview .....	29
6 Use cases .....	30
6.1 General.....	30
6.2 Dynamic assessment studies .....	30
7 Architecture .....	31
7.1 General.....	31
7.2 Profile architecture.....	32
8 Detailed profile specification .....	34
8.1 General.....	34
8.2 Package DynamicsProfile .....	35
8.2.1 General .....	35
8.2.2 (abstract) DynamicsProfileVersion root class .....	35
8.2.3 Package Base .....	35
8.2.4 Package Dynamics .....	64
Annex A (normative) Implementation clarifications related to the models inherited from RotatingMachineDynamics class.....	444
Annex B (informative) Examples using IEC 61970-552 serialisation .....	446
B.1 Overview.....	446
B.2 Standard models.....	446
B.3 User-defined models .....	450
Bibliography.....	457
Figure 1 – SynchronousMachineDynamics association .....	32
Figure 2 – Interconnection diagram for a synchronous machine .....	32
Figure 3 – Standard connections for a synchronous machine .....	33
Figure 4 – Profile relationships .....	34
Figure 5 – Class diagram Domain::Primitives .....	36
Figure 6 – Class diagram Domain::DataTypes .....	36
Figure 7 – Class diagram Domain::Enumerations .....	37
Figure 8 – Class diagram Core::Core .....	55
Figure 9 – Class diagram Wires::Wires .....	59
Figure 10 – StandardInterconnectionSynchronousMachine .....	65
Figure 11 – StandardInterconnectionSynchronousGeneratorCrossCompound .....	66
Figure 12 – StandardInterconnectionAsynchronousMachine .....	67
Figure 13 – StandardInterconnectionWindTurbineType1Aand1B .....	68
Figure 14 – StandardInterconnectionWindTurbineType2 .....	69

Figure 15 – StandardInterconnectionWindTurbineType3 .....	70
Figure 16 – StandardInterconnectionWindTurbineType4Aand4B .....	71
Figure 17 – StandardInterconnectionSingleLoad .....	72
Figure 18 – Class diagram StandardInterconnections:: StandardSynchronousMachineInterconnection .....	73
Figure 19 – Class diagram StandardInterconnections:: StandardAsynchronousMachineInterconnection .....	74
Figure 20 – Class diagram StandardInterconnections:: StandardWindType1and2Interconnection .....	75
Figure 21 – Class diagram StandardInterconnections:: StandardWindType3and4Interconnection .....	76
Figure 22 – Class diagram StandardInterconnections::StandardLoadInterconnection .....	77
Figure 23 – Class diagram StandardInterconnections::StandardHVDCInterconnection .....	78
Figure 24 – Class diagram StandardInterconnections:: StandardStaticVarCompensatorInterconnection .....	78
Figure 25 – SynchronousGeneratorInterconnectionAndVariables .....	81
Figure 26 – SynchronousMotorInterconnectionAndVariables .....	82
Figure 27 – Class diagram SynchronousMachineDynamics:: SynchronousMachineDynamics .....	83
Figure 28 – SynchronousMachineSaturationParameters .....	84
Figure 29 – SynchronousGeneratorMechanicalEquation .....	85
Figure 30 – SynchronousMotorMechanicalEquation .....	86
Figure 31 – SynchronousGeneratorPhasor .....	87
Figure 32 – SynchronousMotorPhasor .....	88
Figure 33 – Simplified .....	89
Figure 34 – SubtransientRoundRotor .....	93
Figure 35 – SubtransientSalientPole .....	94
Figure 36 – SubtransientTypeF .....	95
Figure 37 – SubtransientTypeJ .....	96
Figure 38 – SubtransientRoundRotorSimplified .....	97
Figure 39 – SubtransientSalientPoleSimplified .....	99
Figure 40 – SubtransientRoundRotorSimplifiedDirectAxis .....	101
Figure 41 – SubtransientSalientPoleSimplifiedDirectAxis .....	103
Figure 42 – SynchronousEquivalentCircuit .....	107
Figure 43 – AsynchronousGeneratorInterconnectionAndVariables .....	109
Figure 44 – AsynchronousMotorInterconnectionAndVariables .....	110
Figure 45 – Class diagram AsynchronousMachineDynamics:: AsynchronousMachineDynamics .....	111
Figure 46 – AsynchronousGeneratorMechanicalEquation .....	112
Figure 47 – AsynchronousMotorMechanicalEquation .....	112
Figure 48 – AsynchronousEquivalentCircuit .....	116
Figure 49 – TurbineGovernorInterconnectionAndVariables .....	118
Figure 50 – Class diagram TurbineGovernorDynamics::TurbineGovernorDynamics .....	119
Figure 51 – GovHydroIIEEE0 .....	121
Figure 52 – GovHydroIIEEE2 .....	123

Figure 53 – GovSteamIEEE1 .....	125
Figure 54 – GovCT1 .....	128
Figure 55 – GovCT2 .....	132
Figure 56 – GovGAST .....	136
Figure 57 – GovGAST1 .....	137
Figure 58 – GovGAST2 .....	140
Figure 59 – GovGAST3 .....	142
Figure 60 – GovGAST3ExhaustTemperature.....	143
Figure 61 – GovGAST4 .....	145
Figure 62 – GovGASTWD .....	147
Figure 63 – GovHydro1 .....	149
Figure 64 – GovHydro2 .....	151
Figure 65 – GovHydro3 .....	154
Figure 66 – GovHydro4 .....	157
Figure 67 – GovHydro4SimpleHydroTurbine .....	158
Figure 68 – GovHydro4FrancisPeltonTurbine.....	159
Figure 69 – GovHydro4KaplanTurbine .....	160
Figure 70 – GovHydroDD .....	163
Figure 71 – GovHydroFrancis .....	166
Figure 72 – GovHydroFrancisNonLinearGainAndEfficiency .....	167
Figure 73 – DetailedHydroModelHydraulicSystem .....	168
Figure 74 – GovHydroPelton .....	170
Figure 75 – GovHydroPeltonNonLinearGainAndEfficiency.....	171
Figure 76 – GovHydroPID .....	174
Figure 77 – GovHydroPID2 .....	177
Figure 78 – GovHydroR .....	179
Figure 79 – GovHydroWEH.....	183
Figure 80 – GovHydroWPID .....	187
Figure 81 – GovSteam0 .....	189
Figure 82 – GovSteam1 .....	191
Figure 83 – GovSteam1BacklashHysteresis .....	192
Figure 84 – GovSteam1InputSpeedDeadband.....	193
Figure 85 – GovSteam2 .....	196
Figure 86 – GovSteamBB .....	197
Figure 87 – GovSteamCC .....	199
Figure 88 – GovSteamEU .....	201
Figure 89 – GovSteamFV2.....	204
Figure 90 – GovSteamFV3.....	205
Figure 91 – GovSteamFV4.....	208
Figure 92 – GovSteamSGO.....	211
Figure 93 – Class diagram TurbineLoadControllerDynamics::TurbineLoadControllerDynamics .....	213
Figure 94 – TurbLCFB1 .....	214

Figure 95 – MechanicalLoadInterconnectionAndVariables.....	216
Figure 96 – MechanicalLoadEquations.....	217
Figure 97 – Class diagram MechanicalLoadDynamics::MechanicalLoadDynamics .....	218
Figure 98 – ExcitationSystemInterconnectionAndVariables .....	220
Figure 99 – Class diagram ExcitationSystemDynamics::ExcitationSystemDynamics .....	221
Figure 100 – ExcAC1A.....	247
Figure 101 – ExcAC2A.....	249
Figure 102 – ExcAC3A.....	252
Figure 103 – ExcAC4A.....	254
Figure 104 – ExcAC5A.....	255
Figure 105 – ExcAC6A.....	257
Figure 106 – ExcAC8B.....	259
Figure 107 – ExcANS.....	262
Figure 108 – ExcAVR1.....	263
Figure 109 – ExcAVR2.....	265
Figure 110 – ExcAVR3.....	266
Figure 111 – ExcAVR4.....	267
Figure 112 – ExcAVR5.....	269
Figure 113 – ExcAVR7.....	270
Figure 114 – ExcBBC.....	272
Figure 115 – ExcCZ .....	274
Figure 116 – ExcDC1A .....	275
Figure 117 – ExcDC2A .....	277
Figure 118 – ExcDC3A .....	279
Figure 119 – ExcDC3A1.....	281
Figure 120 – ExcELIN1 .....	283
Figure 121 – ExcELIN2.....	285
Figure 122 – ExcHU.....	287
Figure 123 – ExcNI .....	288
Figure 124 – ExcOEX3T .....	290
Figure 125 – ExcPIC .....	292
Figure 126 – ExcREXS .....	294
Figure 127 – ExcRQB .....	297
Figure 128 – ExcSCRX .....	299
Figure 129 – ExcSEXS .....	300
Figure 130 – ExcSK.....	302
Figure 131 – ExcST1A.....	304
Figure 132 – ExcST2A.....	306
Figure 133 – ExcST3A.....	308
Figure 134 – ExcST4B.....	310
Figure 135 – ExcST6B.....	312
Figure 136 – ExcST7B.....	314

Figure 137 – Class diagram OverexcitationLimiterDynamics:: OverexcitationLimiterDynamics .....	316
Figure 138 – OverexcLim2 .....	318
Figure 139 – OverexcLimX1 .....	319
Figure 140 – OverexcLimX1TimeCharacteristic .....	320
Figure 141 – OverexcLimX2 .....	321
Figure 142 – OverexcLimX2TimeCharacteristic .....	322
Figure 143 – Class diagram UnderexcitationLimiterDynamics::UnderexcitationLimiterDynamics .....	324
Figure 144 – UnderexcLim2Simplified .....	328
Figure 145 – UnderexcLimX1 .....	330
Figure 146 – UnderexcLimX2 .....	331
Figure 147 – PowerSystemStabilizerInterconnectionAndVariables .....	332
Figure 148 – Class diagram PowerSystemStabilizerDynamics:: PowerSystemStabilizerDynamics .....	333
Figure 149 – Pss1 .....	341
Figure 150 – Pss1A .....	343
Figure 151 – Pss2B .....	344
Figure 152 – Pss2ST .....	346
Figure 153 – Pss5 .....	348
Figure 154 – PssELIN2 .....	350
Figure 155 – PssPTIST1 .....	351
Figure 156 – PssPTIST3 .....	352
Figure 157 – PssRQB .....	355
Figure 158 – PssSB4 .....	356
Figure 159 – PssSH .....	357
Figure 160 – PssSK .....	359
Figure 161 – PssSTAB2A .....	360
Figure 162 – PssWECC .....	361
Figure 163 – DiscontinuousExcitationControlInterconnectionAndVariables .....	363
Figure 164 – Class diagram DiscontinuousExcitationControlDynamics:: DiscontinuousExcitationControlDynamics .....	364
Figure 165 – Class diagram PFVArControllerType1Dynamics:: PFVArControllerType1Dynamics .....	368
Figure 166 – Class diagram VoltageAdjusterDynamics::VoltageAdjusterDynamics .....	371
Figure 167 – Class diagram PFVArControllerType2Dynamics:: PFVArControllerType2Dynamics .....	373
Figure 168 – PFVArType2Common1 .....	376
Figure 169 – VoltageCompensatorInterconnectionAndVariables .....	377
Figure 170 – Class diagram VoltageCompensatorDynamics:: VoltageCompensatorDynamics .....	378
Figure 171 – Class diagram WindDynamics::WindDynamicsType1or2 .....	382
Figure 172 – Class diagram WindDynamics::WindDynamicsType3 .....	383
Figure 173 – Class diagram WindDynamics::WindDynamicsType4 .....	384
Figure 174 – Class diagram WindDynamics::WindDynamicsPlant .....	385

Figure 175 – LoadInterconnectionAndVariables .....	411
Figure 176 – Class diagram LoadDynamics::LoadDynamics.....	412
Figure 177 – LoadCompositeEquations.....	413
Figure 178 – LoadGenericNonLinearTypeEquations.....	414
Figure 179 – LoadStaticTypeEquations.....	417
Figure 180 – LoadMotor.....	420
Figure 181 – Class diagram HVDCDynamics::HVDCDynamics.....	422
Figure 182 – Class diagram StaticVarCompensatorDynamics:: StaticVarCompensatorDynamics.....	425
Figure 183 – Class diagram UserDefinedModels::ProprietaryUserDefinedModels .....	427
Figure B.1 – Dynamics model header.....	446
Figure B.2 – SynchronousMachineDynamics model .....	447
Figure B.3 –TurbineGovernorDynamics model .....	448
Figure B.4 – ExcitationSystemDynamics model.....	448
Figure B.5 – PowerSystemStabilizerDynamics model.....	449
Figure B.6 – Link between the dynamics model and static model .....	451
Figure B.7 – User-defined model class for excitation systems .....	451
Figure B.8 – User-defined model for turbine governor .....	452
Figure B.9 – Block diagram of the ExcSEXS model.....	453
Figure B.10 – Example of a simplified excitation model instance described using the ExcSEXS class .....	453
Figure B.11 – Example of a simplified excitation model instance expressed using proprietary user-defined classes .....	456
Table 1 – Attributes of DynamicsProfile::DynamicsProfileVersion.....	35
Table 2 – Attributes of Domain::ActivePower .....	37
Table 3 – Attributes of Domain::AngleDegrees.....	38
Table 4 – Attributes of Domain::ApparentPower .....	38
Table 5 – Attributes of Domain::Area .....	38
Table 6 – Attributes of Domain::Frequency .....	39
Table 7 – Attributes of Domain::Length .....	39
Table 8 – Attributes of Domain::PU .....	39
Table 9 – Attributes of Domain::Seconds .....	39
Table 10 – Attributes of Domain::Temperature .....	40
Table 11 – Attributes of Domain::VolumeFlowRate.....	40
Table 12 – Literals of Domain::DroopSignalFeedbackKind .....	41
Table 13 – Literals of Domain::ExcIEEST1AUELselectorKind .....	41
Table 14 – Literals of Domain::ExcREXSFeedbackSignalKind.....	41
Table 15 – Literals of Domain::ExcST6BOELselectorKind .....	42
Table 16 – Literals of Domain::ExcST7BOELselectorKind .....	42
Table 17 – Literals of Domain::ExcST7BUELselectorKind .....	42
Table 18 – Literals of Domain::FrancisGovernorControlKind .....	43
Table 19 – Literals of Domain::GenericNonLinearLoadModelKind .....	43
Table 20 – Literals of Domain::GovHydro4ModelKind.....	43

Table 21 – Literals of Domain::IfdBaseKind.....	44
Table 22 – Literals of Domain::InputSignalKind.....	44
Table 23 – Literals of Domain::RemoteSignalKind.....	45
Table 24 – Literals of Domain::RotorKind.....	45
Table 25 – Literals of Domain::StaticLoadModelKind.....	45
Table 26 – Literals of Domain::SynchronousMachineModelKind.....	46
Table 27 – Literals of Domain::UnitMultiplier.....	47
Table 28 – Literals of Domain::UnitSymbol.....	48
Table 29 – Literals of Domain::WindLookupTableFunctionKind.....	53
Table 30 – Literals of Domain::WindPlantQcontrolModeKind.....	54
Table 31 – Literals of Domain::WindQcontrolModeKind.....	54
Table 32 – Literals of Domain::WindUVRTQcontrolModeKind.....	54
Table 33 – Attributes of Core::ACDCTerminal.....	56
Table 34 – Attributes of Core::ConductingEquipment.....	56
Table 35 – Attributes of Core::Equipment.....	56
Table 36 – Attributes of Core::IdentifiedObject.....	57
Table 37 – Attributes of Core::PowerSystemResource.....	57
Table 38 – Attributes of Core::Terminal.....	57
Table 39 – Association ends of Core::Terminal with other classes.....	58
Table 40 – Attributes of Wires::AsynchronousMachine.....	60
Table 41 – Attributes of Wires::EnergyConnection.....	60
Table 42 – Attributes of Wires::EnergyConsumer.....	60
Table 43 – Association ends of Wires::EnergyConsumer with other classes.....	60
Table 44 – Attributes of Wires::PowerElectronicsConnection.....	61
Table 45 – Attributes of Wires::RegulatingCondEq.....	61
Table 46 – Attributes of Wires::RotatingMachine.....	61
Table 47 – Attributes of Wires::StaticVarCompensator.....	62
Table 48 – Attributes of Wires::SynchronousMachine.....	62
Table 49 – Attributes of DC::ACDCCConverter.....	62
Table 50 – Attributes of DC::CsConverter.....	63
Table 51 – Attributes of DC::VsConverter.....	63
Table 52 – Attributes of StandardInterconnections::RemoteInputSignal.....	79
Table 53 – Association ends of StandardInterconnections:: RemoteInputSignal with other classes.....	79
Table 54 – Attributes of StandardModels::DynamicsFunctionBlock.....	80
Table 55 – Attributes of StandardModels::RotatingMachineDynamics.....	80
Table 56 – Attributes of SynchronousMachineDynamics:: SynchronousMachineSimplified.....	89
Table 57 – Association ends of SynchronousMachineDynamics:: SynchronousMachineSimplified with other classes.....	90
Table 58 – Attributes of SynchronousMachineDynamics:: SynchronousMachineDynamics.....	90
Table 59 – Association ends of SynchronousMachineDynamics:: SynchronousMachineDynamics with other classes.....	91
Table 60 – Attributes of SynchronousMachineDynamics::SynchronousMachineDetailed.....	91



Table 61 – Association ends of SynchronousMachineDynamics:: SynchronousMachineDetailed with other classes .....	92
Table 62 – Attributes of SynchronousMachineDynamics:: SynchronousMachineTimeConstantReactance .....	104
Table 63 – Association ends of SynchronousMachineDynamics:: SynchronousMachineTimeConstantReactance with other classes .....	105
Table 64 – Attributes of SynchronousMachineDynamics:: SynchronousMachineEquivalentCircuit .....	107
Table 65 – Association ends of SynchronousMachineDynamics:: SynchronousMachineEquivalentCircuit with other classes .....	108
Table 66 – Attributes of AsynchronousMachineDynamics:: AsynchronousMachineDynamics .....	113
Table 67 – Association ends of AsynchronousMachineDynamics:: AsynchronousMachineDynamics with other classes .....	113
Table 68 – Attributes of AsynchronousMachineDynamics:: AsynchronousMachineTimeConstantReactance .....	114
Table 69 – Association ends of AsynchronousMachineDynamics:: AsynchronousMachineTimeConstantReactance with other classes .....	115
Table 70 – Attributes of AsynchronousMachineDynamics:: AsynchronousMachineEquivalentCircuit .....	116
Table 71 – Association ends of AsynchronousMachineDynamics:: AsynchronousMachineEquivalentCircuit with other classes .....	117
Table 72 – Attributes of TurbineGovernorDynamics:: CrossCompoundTurbineGovernorDynamics .....	120
Table 73 – Association ends of TurbineGovernorDynamics:: CrossCompoundTurbineGovernorDynamics with other classes .....	120
Table 74 – Attributes of TurbineGovernorDynamics::TurbineGovernorDynamics .....	120
Table 75 – Association ends of TurbineGovernorDynamics:: TurbineGovernorDynamics with other classes .....	121
Table 76 – Attributes of TurbineGovernorDynamics::GovHydroIEEE0 .....	122
Table 77 – Association ends of TurbineGovernorDynamics:: GovHydroIEEE0 with other classes .....	122
Table 78 – Attributes of TurbineGovernorDynamics::GovHydroIEEE2 .....	123
Table 79 – Association ends of TurbineGovernorDynamics:: GovHydroIEEE2 with other classes .....	125
Table 80 – Attributes of TurbineGovernorDynamics::GovSteamIEEE1 .....	126
Table 81 – Association ends of TurbineGovernorDynamics:: GovSteamIEEE1 with other classes .....	127
Table 82 – Attributes of TurbineGovernorDynamics::GovCT1 .....	129
Table 83 – Association ends of TurbineGovernorDynamics::GovCT1 with other classes .....	131
Table 84 – Attributes of TurbineGovernorDynamics::GovCT2 .....	133
Table 85 – Association ends of TurbineGovernorDynamics::GovCT2 with other classes .....	135
Table 86 – Attributes of TurbineGovernorDynamics::GovGAST .....	136
Table 87 – Association ends of TurbineGovernorDynamics:: GovGAST with other classes .....	137
Table 88 – Attributes of TurbineGovernorDynamics::GovGAST1 .....	138
Table 89 – Association ends of TurbineGovernorDynamics:: GovGAST1 with other classes .....	139
Table 90 – Attributes of TurbineGovernorDynamics::GovGAST2 .....	140

Table 91 – Association ends of TurbineGovernorDynamics:: GovGAST2 with other classes .....	142
Table 92 – Attributes of TurbineGovernorDynamics::GovGAST3 .....	143
Table 93 – Association ends of TurbineGovernorDynamics::GovGAST3 with other classes .....	144
Table 94 – Attributes of TurbineGovernorDynamics::GovGAST4 .....	145
Table 95 – Association ends of TurbineGovernorDynamics:: GovGAST4 with other classes .....	146
Table 96 – Attributes of TurbineGovernorDynamics::GovGASTWD .....	147
Table 97 – Association ends of TurbineGovernorDynamics:: GovGASTWD with other classes .....	148
Table 98 – Attributes of TurbineGovernorDynamics::GovHydro1 .....	150
Table 99 – Association ends of TurbineGovernorDynamics:: GovHydro1 with other classes .....	150
Table 100 – Attributes of TurbineGovernorDynamics::GovHydro2 .....	151
Table 101 – Association ends of TurbineGovernorDynamics:: GovHydro2 with other classes .....	153
Table 102 – Attributes of TurbineGovernorDynamics::GovHydro3 .....	155
Table 103 – Association ends of TurbineGovernorDynamics:: GovHydro3 with other classes .....	156
Table 104 – Attributes of TurbineGovernorDynamics::GovHydro4 .....	161
Table 105 – Association ends of TurbineGovernorDynamics:: GovHydro4 with other classes .....	163
Table 106 – Attributes of TurbineGovernorDynamics::GovHydroDD .....	164
Table 107 – Association ends of TurbineGovernorDynamics:: GovHydroDD with other classes .....	165
Table 108 – Attributes of TurbineGovernorDynamics::GovHydroFrancis.....	168
Table 109 – Association ends of TurbineGovernorDynamics:: GovHydroFrancis with other classes .....	170
Table 110 – Attributes of TurbineGovernorDynamics::GovHydroPelton .....	172
Table 111 – Association ends of TurbineGovernorDynamics:: GovHydroPelton with other classes .....	173
Table 112 – Attributes of TurbineGovernorDynamics::GovHydroPID .....	175
Table 113 – Association ends of TurbineGovernorDynamics:: GovHydroPID with other classes .....	176
Table 114 – Attributes of TurbineGovernorDynamics::GovHydroPID2 .....	178
Table 115 – Association ends of TurbineGovernorDynamics:: GovHydroPID2 with other classes .....	179
Table 116 – Attributes of TurbineGovernorDynamics::GovHydroR.....	180
Table 117 – Association ends of TurbineGovernorDynamics:: GovHydroR with other classes .....	182
Table 118 – Attributes of TurbineGovernorDynamics::GovHydroWEH .....	184
Table 119 – Association ends of TurbineGovernorDynamics:: GovHydroWEH with other classes .....	187
Table 120 – Attributes of TurbineGovernorDynamics::GovHydroWPID .....	188
Table 121 – Association ends of TurbineGovernorDynamics:: GovHydroWPID with other classes .....	189
Table 122 – Attributes of TurbineGovernorDynamics::GovSteam0 .....	190

Table 123 – Association ends of TurbineGovernorDynamics:: GovSteam0 with other classes .....	190
Table 124 – Attributes of TurbineGovernorDynamics::GovSteam1 .....	193
Table 125 – Association ends of TurbineGovernorDynamics:: GovSteam1 with other classes .....	195
Table 126 – Attributes of TurbineGovernorDynamics::GovSteam2 .....	196
Table 127 – Association ends of TurbineGovernorDynamics:: GovSteam2 with other classes .....	197
Table 128 – Attributes of TurbineGovernorDynamics::GovSteamBB.....	197
Table 129 – Association ends of TurbineGovernorDynamics:: GovSteamBB with other classes .....	198
Table 130 – Attributes of TurbineGovernorDynamics::GovSteamCC .....	200
Table 131 – Association ends of TurbineGovernorDynamics:: GovSteamCC with other classes .....	200
Table 132 – Attributes of TurbineGovernorDynamics::GovSteamEU.....	202
Table 133 – Association ends of TurbineGovernorDynamics:: GovSteamEU with other classes .....	203
Table 134 – Attributes of TurbineGovernorDynamics::GovSteamFV2.....	204
Table 135 – Association ends of TurbineGovernorDynamics:: GovSteamFV2 with other classes .....	205
Table 136 – Attributes of TurbineGovernorDynamics::GovSteamFV3.....	206
Table 137 – Association ends of TurbineGovernorDynamics:: GovSteamFV3 with other classes .....	207
Table 138 – Attributes of TurbineGovernorDynamics::GovSteamFV4.....	209
Table 139 – Association ends of TurbineGovernorDynamics:: GovSteamFV4 with other classes .....	211
Table 140 – Attributes of TurbineGovernorDynamics::GovSteamSGO.....	211
Table 141 – Association ends of TurbineGovernorDynamics:: GovSteamSGO with other classes .....	212
Table 142 – Attributes of TurbineLoadControllerDynamics:: TurbineLoadControllerDynamics .....	213
Table 143 – Association ends of TurbineLoadControllerDynamics:: TurbineLoadControllerDynamics with other classes .....	214
Table 144 – Attributes of TurbineLoadControllerDynamics::TurbLCFB1 .....	215
Table 145 – Association ends of TurbineLoadControllerDynamics:: TurbLCFB1 with other classes .....	216
Table 146 – Attributes of MechanicalLoadDynamics::MechanicalLoadDynamics .....	218
Table 147 – Association ends of MechanicalLoadDynamics:: MechanicalLoadDynamics with other classes .....	219
Table 148 – Attributes of MechanicalLoadDynamics::MechLoad1 .....	219
Table 149 – Association ends of MechanicalLoadDynamics:: MechLoad1 with other classes .....	219
Table 150 – Attributes of ExcitationSystemDynamics::ExcitationSystemDynamics .....	222
Table 151 – Association ends of ExcitationSystemDynamics:: ExcitationSystemDynamics with other classes .....	222
Table 152 – Attributes of ExcitationSystemDynamics::ExcIEEEAC1A .....	222
Table 153 – Association ends of ExcitationSystemDynamics:: ExcIEEEAC1A with other classes .....	223

Table 154 – Attributes of ExcitationSystemDynamics::ExcIEEEAC2A .....	224
Table 155 – Association ends of ExcitationSystemDynamics:: ExcIEEEAC2A with other classes .....	225
Table 156 – Attributes of ExcitationSystemDynamics::ExcIEEEAC3A .....	225
Table 157 – Association ends of ExcitationSystemDynamics:: ExcIEEEAC3A with other classes .....	226
Table 158 – Attributes of ExcitationSystemDynamics::ExcIEEEAC4A .....	227
Table 159 – Association ends of ExcitationSystemDynamics:: ExcIEEEAC4A with other classes .....	227
Table 160 – Attributes of ExcitationSystemDynamics::ExcIEEEAC5A .....	228
Table 161 – Association ends of ExcitationSystemDynamics:: ExcIEEEAC5A with other classes .....	228
Table 162 – Attributes of ExcitationSystemDynamics::ExcIEEEAC6A .....	229
Table 163 – Association ends of ExcitationSystemDynamics:: ExcIEEEAC6A with other classes .....	230
Table 164 – Attributes of ExcitationSystemDynamics::ExcIEEEAC7B .....	230
Table 165 – Association ends of ExcitationSystemDynamics:: ExcIEEEAC7B with other classes .....	231
Table 166 – Attributes of ExcitationSystemDynamics::ExcIEEEAC8B .....	232
Table 167 – Association ends of ExcitationSystemDynamics:: ExcIEEEAC8B with other classes .....	233
Table 168 – Attributes of ExcitationSystemDynamics::ExcIEEEDC1A .....	233
Table 169 – Association ends of ExcitationSystemDynamics:: ExcIEEEDC1A with other classes .....	234
Table 170 – Attributes of ExcitationSystemDynamics::ExcIEEEDC2A .....	235
Table 171 – Association ends of ExcitationSystemDynamics:: ExcIEEEDC2A with other classes .....	236
Table 172 – Attributes of ExcitationSystemDynamics::ExcIEEEDC3A .....	236
Table 173 – Association ends of ExcitationSystemDynamics:: ExcIEEEDC3A with other classes .....	237
Table 174 – Attributes of ExcitationSystemDynamics::ExcIEEEDC4B .....	237
Table 175 – Association ends of ExcitationSystemDynamics:: ExcIEEEDC4B with other classes .....	238
Table 176 – Attributes of ExcitationSystemDynamics::ExcIEEEST1A.....	239
Table 177 – Association ends of ExcitationSystemDynamics:: ExcIEEEST1A with other classes .....	240
Table 178 – Attributes of ExcitationSystemDynamics::ExcIEEEST2A.....	240
Table 179 – Association ends of ExcitationSystemDynamics:: ExcIEEEST2A with other classes .....	241
Table 180 – Attributes of ExcitationSystemDynamics::ExcIEEEST3A.....	241
Table 181 – Association ends of ExcitationSystemDynamics:: ExcIEEEST3A with other classes .....	242
Table 182 – Attributes of ExcitationSystemDynamics::ExcIEEEST4B.....	243
Table 183 – Association ends of ExcitationSystemDynamics:: ExcIEEEST4B with other classes .....	243
Table 184 – Attributes of ExcitationSystemDynamics::ExcIEEEST5B.....	244
Table 185 – Association ends of ExcitationSystemDynamics:: ExcIEEEST5B with other classes .....	245

Table 186 – Attributes of ExcitationSystemDynamics::ExcIEEEEST6B.....	245
Table 187 – Association ends of ExcitationSystemDynamics:: ExcIEEEEST6B with other classes .....	246
Table 188 – Attributes of ExcitationSystemDynamics::ExcIEEEEST7B.....	246
Table 189 – Association ends of ExcitationSystemDynamics:: ExcIEEEEST7B with other classes .....	247
Table 190 – Attributes of ExcitationSystemDynamics::ExcAC1A .....	248
Table 191 – Association ends of ExcitationSystemDynamics:: ExcAC1A with other classes .....	249
Table 192 – Attributes of ExcitationSystemDynamics::ExcAC2A .....	250
Table 193 – Association ends of ExcitationSystemDynamics:: ExcAC2A with other classes .....	251
Table 194 – Attributes of ExcitationSystemDynamics::ExcAC3A .....	252
Table 195 – Association ends of ExcitationSystemDynamics:: ExcAC3A with other classes .....	254
Table 196 – Attributes of ExcitationSystemDynamics::ExcAC4A .....	254
Table 197 – Association ends of ExcitationSystemDynamics:: ExcAC4A with other classes .....	255
Table 198 – Attributes of ExcitationSystemDynamics::ExcAC5A .....	256
Table 199 – Association ends of ExcitationSystemDynamics:: ExcAC5A with other classes .....	257
Table 200 – Attributes of ExcitationSystemDynamics::ExcAC6A .....	258
Table 201 – Association ends of ExcitationSystemDynamics:: ExcAC6A with other classes .....	259
Table 202 – Attributes of ExcitationSystemDynamics::ExcAC8B .....	260
Table 203 – Association ends of ExcitationSystemDynamics:: ExcAC8B with other classes .....	261
Table 204 – Attributes of ExcitationSystemDynamics::ExcANS .....	262
Table 205 – Association ends of ExcitationSystemDynamics::ExcANS with other classes .....	263
Table 206 – Attributes of ExcitationSystemDynamics::ExcAVR1 .....	264
Table 207 – Association ends of ExcitationSystemDynamics:: ExcAVR1 with other classes .....	264
Table 208 – Attributes of ExcitationSystemDynamics::ExcAVR2 .....	265
Table 209 – Association ends of ExcitationSystemDynamics:: ExcAVR2 with other classes .....	266
Table 210 – Attributes of ExcitationSystemDynamics::ExcAVR3 .....	266
Table 211 – Association ends of ExcitationSystemDynamics:: ExcAVR3 with other classes .....	267
Table 212 – Attributes of ExcitationSystemDynamics::ExcAVR4 .....	268
Table 213 – Association ends of ExcitationSystemDynamics:: ExcAVR4 with other classes .....	268
Table 214 – Attributes of ExcitationSystemDynamics::ExcAVR5 .....	269
Table 215 – Association ends of ExcitationSystemDynamics:: ExcAVR5 with other classes .....	270
Table 216 – Attributes of ExcitationSystemDynamics::ExcAVR7 .....	270
Table 217 – Association ends of ExcitationSystemDynamics:: ExcAVR7 with other classes .....	271

Table 218 – Attributes of ExcitationSystemDynamics::ExcBBC .....	272
Table 219 – Association ends of ExcitationSystemDynamics:: ExcBBC with other classes .....	273
Table 220 – Attributes of ExcitationSystemDynamics::ExcCZ.....	274
Table 221 – Association ends of ExcitationSystemDynamics::ExcCZ with other classes .....	275
Table 222 – Attributes of ExcitationSystemDynamics::ExcDC1A .....	276
Table 223 – Association ends of ExcitationSystemDynamics:: ExcDC1A with other classes .....	277
Table 224 – Attributes of ExcitationSystemDynamics::ExcDC2A .....	278
Table 225 – Association ends of ExcitationSystemDynamics:: ExcDC2A with other classes .....	279
Table 226 – Attributes of ExcitationSystemDynamics::ExcDC3A .....	280
Table 227 – Association ends of ExcitationSystemDynamics:: ExcDC3A with other classes .....	281
Table 228 – Attributes of ExcitationSystemDynamics::ExcDC3A1 .....	282
Table 229 – Association ends of ExcitationSystemDynamics:: ExcDC3A1 with other classes .....	282
Table 230 – Attributes of ExcitationSystemDynamics::ExcELIN1.....	283
Table 231 – Association ends of ExcitationSystemDynamics:: ExcELIN1 with other classes .....	284
Table 232 – Attributes of ExcitationSystemDynamics::ExcELIN2.....	285
Table 233 – Association ends of ExcitationSystemDynamics:: ExcELIN2 with other classes .....	286
Table 234 – Attributes of ExcitationSystemDynamics::ExcHU .....	287
Table 235 – Association ends of ExcitationSystemDynamics::ExcHU with other classes .....	288
Table 236 – Attributes of ExcitationSystemDynamics::ExcNI.....	289
Table 237 – Association ends of ExcitationSystemDynamics::ExcNI with other classes .....	289
Table 238 – Attributes of ExcitationSystemDynamics::ExcOEX3T .....	290
Table 239 – Association ends of ExcitationSystemDynamics:: ExcOEX3T with other classes .....	291
Table 240 – Attributes of ExcitationSystemDynamics::ExcPIC .....	292
Table 241 – Association ends of ExcitationSystemDynamics::ExcPIC with other classes .....	293
Table 242 – Attributes of ExcitationSystemDynamics::ExcREXS .....	295
Table 243 – Association ends of ExcitationSystemDynamics:: ExcREXS with other classes .....	297
Table 244 – Attributes of ExcitationSystemDynamics::ExcRQB.....	297
Table 245 – Association ends of ExcitationSystemDynamics:: ExcRQB with other classes .....	298
Table 246 – Attributes of ExcitationSystemDynamics::ExcSCRX.....	299
Table 247 – Association ends of ExcitationSystemDynamics:: ExcSCRX with other classes .....	300
Table 248 – Attributes of ExcitationSystemDynamics::ExcSEXS .....	301
Table 249 – Association ends of ExcitationSystemDynamics:: ExcSEXS with other classes .....	301
Table 250 – Attributes of ExcitationSystemDynamics::ExcSK.....	302
Table 251 – Association ends of ExcitationSystemDynamics::ExcSK with other classes .....	304

Table 252 – Attributes of ExcitationSystemDynamics::ExcST1A.....	305
Table 253 – Association ends of ExcitationSystemDynamics:: ExcST1A with other classes .....	306
Table 254 – Attributes of ExcitationSystemDynamics::ExcST2A.....	307
Table 255 – Association ends of ExcitationSystemDynamics:: ExcST2A with other classes .....	307
Table 256 – Attributes of ExcitationSystemDynamics::ExcST3A.....	308
Table 257 – Association ends of ExcitationSystemDynamics:: ExcST3A with other classes .....	309
Table 258 – Attributes of ExcitationSystemDynamics::ExcST4B.....	310
Table 259 – Association ends of ExcitationSystemDynamics:: ExcST4B with other classes .....	311
Table 260 – Attributes of ExcitationSystemDynamics::ExcST6B.....	312
Table 261 – Association ends of ExcitationSystemDynamics:: ExcST6B with other classes .....	313
Table 262 – Attributes of ExcitationSystemDynamics::ExcST7B.....	314
Table 263 – Association ends of ExcitationSystemDynamics:: ExcST7B with other classes .....	315
Table 264 – Attributes of OverexcitationLimiterDynamics:: OverexcitationLimiterDynamics .....	316
Table 265 – Association ends of OverexcitationLimiterDynamics:: OverexcitationLimiterDynamics with other classes .....	317
Table 266 – Attributes of OverexcitationLimiterDynamics::OverexcLimIEEE.....	317
Table 267 – Association ends of OverexcitationLimiterDynamics:: OverexcLimIEEE with other classes .....	317
Table 268 – Attributes of OverexcitationLimiterDynamics::OverexcLim2 .....	318
Table 269 – Association ends of OverexcitationLimiterDynamics:: OverexcLim2 with other classes .....	319
Table 270 – Attributes of OverexcitationLimiterDynamics::OverexcLimX1 .....	320
Table 271 – Association ends of OverexcitationLimiterDynamics:: OverexcLimX1 with other classes .....	321
Table 272 – Attributes of OverexcitationLimiterDynamics::OverexcLimX2 .....	322
Table 273 – Association ends of OverexcitationLimiterDynamics:: OverexcLimX2 with other classes .....	323
Table 274 – Attributes of UnderexcitationLimiterDynamics:: UnderexcitationLimiterDynamics .....	324
Table 275 – Association ends of UnderexcitationLimiterDynamics:: UnderexcitationLimiterDynamics with other classes .....	325
Table 276 – Attributes of UnderexcitationLimiterDynamics::UnderexcLimIEEE1 .....	325
Table 277 – Association ends of UnderexcitationLimiterDynamics:: UnderexcLimIEEE1 with other classes .....	326
Table 278 – Attributes of UnderexcitationLimiterDynamics::UnderexcLimIEEE2.....	326
Table 279 – Association ends of UnderexcitationLimiterDynamics:: UnderexcLimIEEE2 with other classes .....	327
Table 280 – Attributes of UnderexcitationLimiterDynamics::UnderexcLim2Simplified .....	329
Table 281 – Association ends of UnderexcitationLimiterDynamics:: UnderexcLim2Simplified with other classes.....	329
Table 282 – Attributes of UnderexcitationLimiterDynamics::UnderexcLimX1 .....	330

Table 283 – Association ends of UnderexcitationLimiterDynamics:: UnderexcLimX1 with other classes .....	331
Table 284 – Attributes of UnderexcitationLimiterDynamics::UnderexcLimX2 .....	331
Table 285 – Association ends of UnderexcitationLimiterDynamics:: UnderexcLimX2 with other classes .....	332
Table 286 – Attributes of PowerSystemStabilizerDynamics:: PowerSystemStabilizerDynamics .....	334
Table 287 – Association ends of PowerSystemStabilizerDynamics:: PowerSystemStabilizerDynamics with other classes .....	334
Table 288 – Attributes of PowerSystemStabilizerDynamics::PssIEEE1A .....	334
Table 289 – Association ends of PowerSystemStabilizerDynamics:: PssIEEE1A with other classes .....	335
Table 290 – Attributes of PowerSystemStabilizerDynamics::PssIEEE2B .....	335
Table 291 – Association ends of PowerSystemStabilizerDynamics:: PssIEEE2B with other classes .....	336
Table 292 – Attributes of PowerSystemStabilizerDynamics::PssIEEE3B .....	337
Table 293 – Association ends of PowerSystemStabilizerDynamics:: PssIEEE3B with other classes .....	338
Table 294 – Attributes of PowerSystemStabilizerDynamics::PssIEEE4B .....	338
Table 295 – Association ends of PowerSystemStabilizerDynamics:: PssIEEE4B with other classes .....	341
Table 296 – Attributes of PowerSystemStabilizerDynamics::Pss1 .....	342
Table 297 – Association ends of PowerSystemStabilizerDynamics:: Pss1 with other classes .....	342
Table 298 – Attributes of PowerSystemStabilizerDynamics::Pss1A .....	343
Table 299 – Association ends of PowerSystemStabilizerDynamics:: Pss1A with other classes .....	344
Table 300 – Attributes of PowerSystemStabilizerDynamics::Pss2B .....	345
Table 301 – Association ends of PowerSystemStabilizerDynamics:: Pss2B with other classes .....	346
Table 302 – Attributes of PowerSystemStabilizerDynamics::Pss2ST .....	347
Table 303 – Association ends of PowerSystemStabilizerDynamics:: Pss2ST with other classes .....	347
Table 304 – Attributes of PowerSystemStabilizerDynamics::Pss5 .....	348
Table 305 – Association ends of PowerSystemStabilizerDynamics:: Pss5 with other classes .....	349
Table 306 – Attributes of PowerSystemStabilizerDynamics::PssELIN2.....	350
Table 307 – Association ends of PowerSystemStabilizerDynamics:: PssELIN2 with other classes .....	351
Table 308 – Attributes of PowerSystemStabilizerDynamics::PssPTIST1.....	351
Table 309 – Association ends of PowerSystemStabilizerDynamics:: PssPTIST1 with other classes .....	352
Table 310 – Attributes of PowerSystemStabilizerDynamics::PssPTIST3.....	353
Table 311 – Association ends of PowerSystemStabilizerDynamics:: PssPTIST3 with other classes .....	354
Table 312 – Attributes of PowerSystemStabilizerDynamics::PssRQB.....	355
Table 313 – Association ends of PowerSystemStabilizerDynamics:: PssRQB with other classes .....	356



Table 314 – Attributes of PowerSystemStabilizerDynamics::PssSB4 .....	356
Table 315 – Association ends of PowerSystemStabilizerDynamics:: PssSB4 with other classes .....	357
Table 316 – Attributes of PowerSystemStabilizerDynamics::PssSH .....	358
Table 317 – Association ends of PowerSystemStabilizerDynamics:: PssSH with other classes .....	358
Table 318 – Attributes of PowerSystemStabilizerDynamics::PssSK.....	359
Table 319 – Association ends of PowerSystemStabilizerDynamics:: PssSK with other classes .....	360
Table 320 – Attributes of PowerSystemStabilizerDynamics::PssSTAB2A .....	361
Table 321 – Association ends of PowerSystemStabilizerDynamics:: PssSTAB2A with other classes .....	361
Table 322 – Attributes of PowerSystemStabilizerDynamics::PssWECC .....	362
Table 323 – Association ends of PowerSystemStabilizerDynamics:: PssWECC with other classes .....	363
Table 324 – Attributes of DiscontinuousExcitationControlDynamics:: DiscontinuousExcitationControlDynamics.....	364
Table 325 – Association ends of DiscontinuousExcitationControlDynamics:: DiscontinuousExcitationControlDynamics with other classes .....	365
Table 326 – Attributes of DiscontinuousExcitationControlDynamics:: DiscExcContIEEEDEC1A .....	365
Table 327 – Association ends of DiscontinuousExcitationControlDynamics:: DiscExcContIEEEDEC1A with other classes .....	366
Table 328 – Attributes of DiscontinuousExcitationControlDynamics:: DiscExcContIEEEDEC2A .....	366
Table 329 – Association ends of DiscontinuousExcitationControlDynamics:: DiscExcContIEEEDEC2A with other classes .....	367
Table 330 – Attributes of DiscontinuousExcitationControlDynamics:: DiscExcContIEEEDEC3A .....	367
Table 331 – Association ends of DiscontinuousExcitationControlDynamics:: DiscExcContIEEEDEC3A with other classes .....	367
Table 332 – Attributes of PFVArControllerType1Dynamics:: PFVArControllerType1Dynamics .....	368
Table 333 – Association ends of PFVArControllerType1Dynamics:: PFVArControllerType1Dynamics with other classes .....	368
Table 334 – Attributes of PFVArControllerType1Dynamics:: PFVArType1IEEEPFController .....	369
Table 335 – Association ends of PFVArControllerType1Dynamics:: PFVArType1IEEEPFController with other classes .....	369
Table 336 – Attributes of PFVArControllerType1Dynamics:: PFVArType1IEEEVArController .....	370
Table 337 – Association ends of PFVArControllerType1Dynamics:: PFVArType1IEEEVArController with other classes.....	370
Table 338 – Attributes of VoltageAdjusterDynamics::VoltageAdjusterDynamics .....	371
Table 339 – Association ends of VoltageAdjusterDynamics:: VoltageAdjusterDynamics with other classes .....	372
Table 340 – Attributes of VoltageAdjusterDynamics::VAdjIEEE .....	372
Table 341 – Association ends of VoltageAdjusterDynamics:: VAdjIEEE with other classes .....	372

Table 342 – Attributes of PFVArControllerType2Dynamics:: PFVArControllerType2Dynamics .....	373
Table 343 – Association ends of PFVArControllerType2Dynamics:: PFVArControllerType2Dynamics with other classes .....	374
Table 344 – Attributes of PFVArControllerType2Dynamics:: PFVArType2IEEEPFCController .....	374
Table 345 – Association ends of PFVArControllerType2Dynamics:: PFVArType2IEEEPFCController with other classes .....	374
Table 346 – Attributes of PFVArControllerType2Dynamics:: PFVArType2IEEEVArController .....	375
Table 347 – Association ends of PFVArControllerType2Dynamics:: PFVArType2IEEEVArController with other classes .....	375
Table 348 – Attributes of PFVArControllerType2Dynamics::PFVArType2Common1 .....	376
Table 349 – Association ends of PFVArControllerType2Dynamics:: PFVArType2Common1 with other classes .....	377
Table 350 – Attributes of VoltageCompensatorDynamics::VoltageCompensatorDynamics .....	378
Table 351 – Association ends of VoltageCompensatorDynamics:: VoltageCompensatorDynamics with other classes .....	379
Table 352 – Attributes of VoltageCompensatorDynamics::VCompIEEEType1 .....	379
Table 353 – Association ends of VoltageCompensatorDynamics:: VCompIEEEType1 with other classes .....	379
Table 354 – Attributes of VoltageCompensatorDynamics::VCompIEEEType2 .....	380
Table 355 – Association ends of VoltageCompensatorDynamics:: VCompIEEEType2 with other classes .....	380
Table 356 – Attributes of VoltageCompensatorDynamics::GenICompensationForGenJ .....	380
Table 357 – Association ends of VoltageCompensatorDynamics:: GenICompensationForGenJ with other classes .....	381
Table 358 – Attributes of WindDynamics::WindAeroConstIEC .....	386
Table 359 – Attributes of WindDynamics::WindAeroOneDimIEC .....	386
Table 360 – Attributes of WindDynamics::WindAeroTwoDimIEC .....	386
Table 361 – Attributes of WindDynamics::WindContCurrLimIEC .....	387
Table 362 – Attributes of WindDynamics::WindContPitchAngleIEC .....	388
Table 363 – Attributes of WindDynamics::WindContPType3IEC .....	388
Table 364 – Attributes of WindDynamics::WindContPType4aIEC .....	390
Table 365 – Attributes of WindDynamics::WindContPType4bIEC .....	390
Table 366 – Attributes of WindDynamics::WindContQIEC .....	391
Table 367 – Attributes of WindDynamics::WindContQLimIEC .....	392
Table 368 – Attributes of WindDynamics::WindContQPQULimIEC .....	392
Table 369 – Attributes of WindDynamics::WindContRotorRIEC .....	393
Table 370 – Attributes of WindDynamics::WindDynamicsLookupTable .....	393
Table 371 – Association ends of WindDynamics:: WindDynamicsLookupTable with other classes .....	394
Table 372 – Attributes of WindDynamics::WindGenTurbineType1aIEC .....	394
Table 373 – Association ends of WindDynamics:: WindGenTurbineType1aIEC with other classes .....	395
Table 374 – Attributes of WindDynamics::WindGenTurbineType1bIEC .....	395

Table 375 – Association ends of WindDynamics:: WindGenTurbineType1bIEC with other classes .....	395
Table 376 – Attributes of WindDynamics::WindGenTurbineType2IEC .....	396
Table 377 – Association ends of WindDynamics:: WindGenTurbineType2IEC with other classes .....	396
Table 378 – Attributes of WindDynamics::WindGenType3aIEC .....	396
Table 379 – Attributes of WindDynamics::WindGenType3bIEC .....	397
Table 380 – Attributes of WindDynamics::WindGenType3IEC .....	397
Table 381 – Attributes of WindDynamics::WindGenType4IEC .....	398
Table 382 – Attributes of WindDynamics::WindMechIEC .....	398
Table 383 – Attributes of WindDynamics::WindPitchContPowerIEC .....	399
Table 384 – Attributes of WindDynamics::WindPlantDynamics .....	399
Table 385 – Association ends of WindDynamics::WindPlantDynamics with other classes .....	399
Table 386 – Attributes of WindDynamics::WindPlantFreqPcontrolIEC .....	400
Table 387 – Attributes of WindDynamics::WindPlantIEC .....	401
Table 388 – Association ends of WindDynamics::WindPlantIEC with other classes .....	401
Table 389 – Attributes of WindDynamics::WindPlantReactiveControlIEC.....	401
Table 390 – Attributes of WindDynamics::WindProtectionIEC .....	403
Table 391 – Attributes of WindDynamics::WindRefFrameRotIEC.....	403
Table 392 – Attributes of WindDynamics::WindTurbineType1or2Dynamics .....	404
Table 393 – Association ends of WindDynamics:: WindTurbineType1or2Dynamics with other classes .....	404
Table 394 – Attributes of WindDynamics::WindTurbineType1or2IEC.....	404
Table 395 – Association ends of WindDynamics:: WindTurbineType1or2IEC with other classes .....	405
Table 396 – Attributes of WindDynamics::WindTurbineType3IEC .....	405
Table 397 – Association ends of WindDynamics:: WindTurbineType3IEC with other classes .....	405
Table 398 – Attributes of WindDynamics::WindTurbineType3or4Dynamics .....	406
Table 399 – Association ends of WindDynamics:: WindTurbineType3or4Dynamics with other classes .....	406
Table 400 – Attributes of WindDynamics::WindTurbineType3or4IEC.....	407
Table 401 – Association ends of WindDynamics:: WindTurbineType3or4IEC with other classes .....	407
Table 402 – Attributes of WindDynamics::WindTurbineType4aIEC .....	408
Table 403 – Association ends of WindDynamics:: WindTurbineType4aIEC with other classes .....	408
Table 404 – Attributes of WindDynamics::WindTurbineType4bIEC .....	408
Table 405 – Association ends of WindDynamics:: WindTurbineType4bIEC with other classes .....	409
Table 406 – Attributes of WindDynamics::WindTurbineType4IEC .....	409
Table 407 – Association ends of WindDynamics:: WindTurbineType4IEC with other classes .....	410
Table 408 – Attributes of LoadDynamics::LoadComposite.....	413
Table 409 – Attributes of LoadDynamics::LoadGenericNonLinear .....	415

Table 410 – Attributes of LoadDynamics::LoadDynamics .....	415
Table 411 – Attributes of LoadDynamics::LoadAggregate .....	416
Table 412 – Attributes of LoadDynamics::LoadStatic .....	418
Table 413 – Association ends of LoadDynamics::LoadStatic with other classes .....	419
Table 414 – Attributes of LoadDynamics::LoadMotor .....	421
Table 415 – Association ends of LoadDynamics::LoadMotor with other classes .....	421
Table 416 – Attributes of HVDCDynamics::CSCDynamics .....	423
Table 417 – Association ends of HVDCDynamics::CSCDynamics with other classes .....	423
Table 418 – Attributes of HVDCDynamics::HVDCDynamics .....	423
Table 419 – Attributes of HVDCDynamics::VSCDynamics .....	424
Table 420 – Association ends of HVDCDynamics::VSCDynamics with other classes .....	424
Table 421 – Attributes of StaticVarCompensatorDynamics:: StaticVarCompensatorDynamics .....	426
Table 422 – Association ends of StaticVarCompensatorDynamics:: StaticVarCompensatorDynamics with other classes .....	426
Table 423 – Attributes of UserDefinedModels::CSCUserDefined .....	428
Table 424 – Association ends of UserDefinedModels:: CSCUserDefined with other classes .....	428
Table 425 – Attributes of UserDefinedModels::SVCUserDefined .....	428
Table 426 – Association ends of UserDefinedModels:: SVCUserDefined with other classes .....	429
Table 427 – Attributes of UserDefinedModels::VSCUserDefined .....	429
Table 428 – Association ends of UserDefinedModels:: VSCUserDefined with other classes .....	429
Table 429 – Attributes of UserDefinedModels::WindPlantUserDefined .....	430
Table 430 – Association ends of UserDefinedModels:: WindPlantUserDefined with other classes .....	430
Table 431 – Attributes of UserDefinedModels::WindType1or2UserDefined .....	430
Table 432 – Association ends of UserDefinedModels:: WindType1or2UserDefined with other classes .....	431
Table 433 – Attributes of UserDefinedModels::WindType3or4UserDefined .....	431
Table 434 – Association ends of UserDefinedModels:: WindType3or4UserDefined with other classes .....	431
Table 435 – Attributes of UserDefinedModels::SynchronousMachineUserDefined .....	432
Table 436 – Association ends of UserDefinedModels:: SynchronousMachineUserDefined with other classes .....	432
Table 437 – Attributes of UserDefinedModels::AsynchronousMachineUserDefined .....	432
Table 438 – Association ends of UserDefinedModels:: AsynchronousMachineUserDefined with other classes .....	433
Table 439 – Attributes of UserDefinedModels::TurbineGovernorUserDefined .....	433
Table 440 – Association ends of UserDefinedModels:: TurbineGovernorUserDefined with other classes .....	434
Table 441 – Attributes of UserDefinedModels::TurbineLoadControllerUserDefined .....	434
Table 442 – Association ends of UserDefinedModels:: TurbineLoadControllerUserDefined with other classes .....	434
Table 443 – Attributes of UserDefinedModels::MechanicalLoadUserDefined .....	435

Table 444 – Association ends of UserDefinedModels:: MechanicalLoadUserDefined with other classes .....	435
Table 445 – Attributes of UserDefinedModels::ExcitationSystemUserDefined .....	435
Table 446 – Association ends of UserDefinedModels:: ExcitationSystemUserDefined with other classes .....	436
Table 447 – Attributes of UserDefinedModels::OverexcitationLimiterUserDefined .....	436
Table 448 – Association ends of UserDefinedModels:: OverexcitationLimiterUserDefined with other classes .....	436
Table 449 – Attributes of UserDefinedModels::UnderexcitationLimiterUserDefined .....	437
Table 450 – Association ends of UserDefinedModels:: UnderexcitationLimiterUserDefined with other classes .....	437
Table 451 – Attributes of UserDefinedModels::PowerSystemStabilizerUserDefined .....	437
Table 452 – Association ends of UserDefinedModels:: PowerSystemStabilizerUserDefined with other classes .....	438
Table 453 – Attributes of UserDefinedModels:: DiscontinuousExcitationControlUserDefined .....	438
Table 454 – Association ends of UserDefinedModels:: DiscontinuousExcitationControlUserDefined with other classes .....	438
Table 455 – Attributes of UserDefinedModels::PFVArControllerType1UserDefined .....	439
Table 456 – Association ends of UserDefinedModels:: PFVArControllerType1UserDefined with other classes .....	439
Table 457 – Attributes of UserDefinedModels::VoltageAdjusterUserDefined.....	439
Table 458 – Association ends of UserDefinedModels:: VoltageAdjusterUserDefined with other classes .....	440
Table 459 – Attributes of UserDefinedModels::PFVArControllerType2UserDefined .....	440
Table 460 – Association ends of UserDefinedModels:: PFVArControllerType2UserDefined with other classes .....	440
Table 461 – Attributes of UserDefinedModels::VoltageCompensatorUserDefined.....	441
Table 462 – Association ends of UserDefinedModels:: VoltageCompensatorUserDefined with other classes .....	441
Table 463 – Attributes of UserDefinedModels::LoadUserDefined .....	441
Table 464 – Attributes of UserDefinedModels::ProprietaryParameterDynamics .....	442
Table 465 – Association ends of UserDefinedModels:: ProprietaryParameterDynamics with other classes .....	442
Table A.1 – Models, their identification and specific details.....	445

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

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**ENERGY MANAGEMENT SYSTEM APPLICATION  
PROGRAM INTERFACE (EMS-API) –**
**Part 457: Dynamics profile****FOREWORD**

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International Standard IEC 61970-457 has been prepared by IEC technical committee 57: Power systems management and associated information exchange.

The text of this standard is based on the following documents:

FDIS	Report on voting
57/2331/FDIS	57/2344/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

It is based on the IEC 61970 UML version ‘IEC61970CIM17v40’, dated ‘2020-08-24’.

A list of all parts of the IEC 61970 series, under the general title: *Energy management system application program interface (EMS-API)*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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## INTRODUCTION

The IEC 61970-300 series of documents specify the common information model (CIM). The CIM is an abstract model that represents the objects in an electric utility enterprise typically needed to model the operational aspects of a utility.

This document is one of the IEC 61970-400 series of component interface standards that specify the semantic structure of data exchanged between components (or applications) and/or made publicly available data by a component. This document describes the payload that would be carried if applications are communicating via a messaging system, but the document does not include the method of exchange, and therefore is applicable to a variety of exchange implementations. All examples provided in this document are serialised according to in the IEC 61970-552:2016.

This document specifies the profile (or subset) of the CIM required to describe the exchanged dynamic model information needed to support the analysis of the steady state stability (small-signal stability) and/or transient stability of a power system or parts of it. The information is described with reference to a power system model that conforms to IEC 61970-452 and IEC 61970-456 in this series of related standards. Thus, equipment and other related power flow model data is not repeated in the information exchanged with this document. The schema(s) for expressing the dynamic model information are derived directly from the CIM, more specifically from IEC 61970-302.



# ENERGY MANAGEMENT SYSTEM APPLICATION PROGRAM INTERFACE (EMS-API) –

## Part 457: Dynamics profile

### 1 Scope

This part of IEC 61970 specifies a standard interface for exchanging dynamic model information needed to support the analysis of the steady state stability (small-signal stability) and/or transient stability of a power system or parts of it. The schema(s) for expressing the dynamic model information are derived directly from the CIM, more specifically from IEC 61970-302.

The scope of this document includes only the dynamic model information that needs to be exchanged as part of a dynamic study, namely the type, description and parameters of each control equipment associated with a piece of power system equipment included in the steady state solution of a complete power system network model. Therefore, this profile is dependent upon other standard profiles for the equipment as specified in IEC 61970-452, CIM static transmission network model profiles, the topology, the steady state hypothesis and the steady-state solution (as specified in IEC 61970-456, *Solved power system state profiles*) of the power system, which bounds the scope of the exchange. The profile information described by this document needs to be exchanged in conjunction with IEC 61970-452 and IEC 61970-456 profiles' information to support the data requirements of transient analysis tools. IEC 61970-456 provides a detailed description of how different profile standards can be combined to form various types of power system network model exchanges.

This document supports the exchange of the following types of dynamic models:

- standard models: a simplified approach to exchange, where models are contained in predefined libraries of classes interconnected in a standard manner that represent dynamic behaviour of elements of the power system. The exchange only indicates the name of the model along with the attributes needed to describe its behaviour.
- proprietary user-defined models: an exchange that would provide users the ability to exchange the parameters of a model representing a vendor or user proprietary device where an explicit description of the model is not described in this document. The connections between the proprietary models and standard models are the same as described for the standard models exchange. Recipient of the data exchange will need to contact the sender for the behavioural details of the model.

This document builds on IEC 61970-302, CIM for dynamics which defines the descriptions of the standard dynamic models, their function block diagrams, and how they are interconnected and associated with the static network model. This type of model information is assumed to be pre-stored by all software applications hence it is not necessary to be exchanged in real-time or as part of a dynamics model exchange.

### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 61970-301:2020, *Energy management system application program interface (EMS-API) - Part 301: Common information model (CIM) base*

IEC 61970-302:2018, *Energy management system application program interface (EMS-API) - Part 302: Common information model (CIM) dynamics*

IEC 61970-452:2017, *Energy management system application program interface (EMS-API) - Part 452: CIM static transmission network model profiles*

IEC 61970-456:2018, *Energy management system application program interface (EMS-API) - Part 456: Solved power system state profiles*