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(www.rst.gov.ru)

© . « », 2023

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58651.10—2023

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58651.2.

United power system and isolated power systems. Information model of power industry. Information model profile of relay protection and automation devices

— 2023—04—01

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58651.10—2023

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 UML —

(Unified Modeling Language).

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[1] [2],

«rf:».

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	(.)	(.)
*	ProtectionEquipment	Equipment
(Asset), (PowerSystemResource)**	Specification	Document
- , , -	rf: PACS Devicespecification	Specification
,	rf:PACSOOperationEvent	ActivityRecord
* () , , () () ,** Specification ,) electronicAddress. [3].		

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2.

2 —

	(.)	(.)
, *	- rf:PACSDevice	Assetcontainer
**	rf:RelayProtection	ProtectionEquipment
***	rf: EmergencyControlAutomation	ProtectionEquipment
***	rf: Control Automation	ProtectionEquipment
***	rf:RegulatingAutomation	ProtectionEquipment
***	rf:OperationControlAutomation	ProtectionEquipment
***	rf:DisturbanceRecorder	ProtectionEquipment
*4 ,	Fault	IdentifiedObject
	LineFault	Fault
-	EquipmentFault	Fault
, -	ActivityRecord	IdentifiedObject
	rf:ProtectionOperationEvent	rfPACSOperationEvent
	rf: PACS DeviceOperation Event	rfPACSOperationEvent
-	FailureEvent	ActivityRecord
, -	Outage	Document
, ,	rfPACSTechnicalSpecification	rfPACSDeviceSpecification
, , -	rfPACSDiagramSpecification	rfPACSDeviceSpecification
, -	rfPACSSettingsSpecification	rfPACSDeviceSpecification
* ** * * * * 4		rf:FaultType.

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58651.10—2023

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	(.)	(.)	
*	- rf:algorithmVersion	ProtectionEquipment	
,	- rf:firmwareID	rfPACSDevice	
,	- rf:kind	rf:PACSDevice	rfPACSDeviceKind**
,	- rf:elementBaseKind	rfPACSDevice	rf:ElementBaseKind**
,	- rfguaranteedServiceLife	ProductAssetModel	
,	- occurredDateTime	Fault	/
	rf:type	Fault	rfPaultType**
	kind	Fault	PhaseConnectedFaultKind**
,	- phases	Fault	PhaseCode**
	actualPeriod	Outage	DateTimeInterval***
/ ()	- rf:kind	rfPACSOperationEvent	rf:OperationKind**
/	- rf:operationMark	rfPACSOperationEvent	rfProtectionOperationMark**
,	- rf: personnelCode	rfPACSOperationEvent	rfPersonnelCode**
	- rf:tech ReasonCode	rfPACSOperationEvent	rf:TechReasonCode**
	- rf:orgReasonCode	rfPACSOperationEvent	rf:OrgReasonCode**

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	()	()	
-	rf:kind	rfPACSTechnicalSpecification	rfPACSTechnicalSpecification-Kind**
	rf:kind	rfPACSDiagramSpecification	rfPACSDiagramSpecification-Kind**
-	rf:kind	rfPACSSettingsSpecification	rfPACSSettingsSpecification-Kind**
<p>* ** ***</p>			

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			()	-
-	rfPACSDeviceSpecification	rfPACSDevice	PACSDevice	1..1
-	rfPACSDevice	rfPACSDeviceSpecification	PACSDeviceSpecifications	0..*
-	ConductingEquipment	ProtectionEquipment	ProtectionEquipments	0..*
,	ProtectionEquipment	ConductingEquipment	ConductingEquipments	0..*
-	ProtectionEquipment	ProtectedSwitch	ProtectedSwitches	0..*
-	ProtectedSwitch	ProtectionEquipment	Operated ByProtectionEquipment	0..*

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58651.10—2023

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			(.)	-
() - - -	ProtectionEquipment	rf:SensorWinding	rf:SensorWindings	0..*
,	rf:SensorWinding	ProtectionEquipment	rfProtectionEquip- ment	0..*
-	Fault	Equipment	FaultyEquipment	0..1
-	Equipment	Fault	Faults	0..*
- ,	Fault	Outage	Outage	0..1
,	Outage	Fault	Faults	0..*
, -	Outage	Equipment	Equipments	0..*
, -	Equipment	Outage	Outages	0..*
/	Fault	rfPACSOOperation- Event	rf:OperationEvents	0..*
, - /	rfPACSOOperation- Event	Fault	Fault	0..1
/	rfProtectionOperation- Event	ProtectionEquipment	ProtectionEquipment	1
/	ProtectionEquipment	rfProtectionOperation- Event	rf:OperationEvents	0..*
/	rfPACSDDeviceOpera- tionEvent	rfPACSDDevice	PACSDDevice	1
/	rfPACSDDevice	rfPACSDDeviceOpera- tionEvent	rf:OperationEvents	0..*

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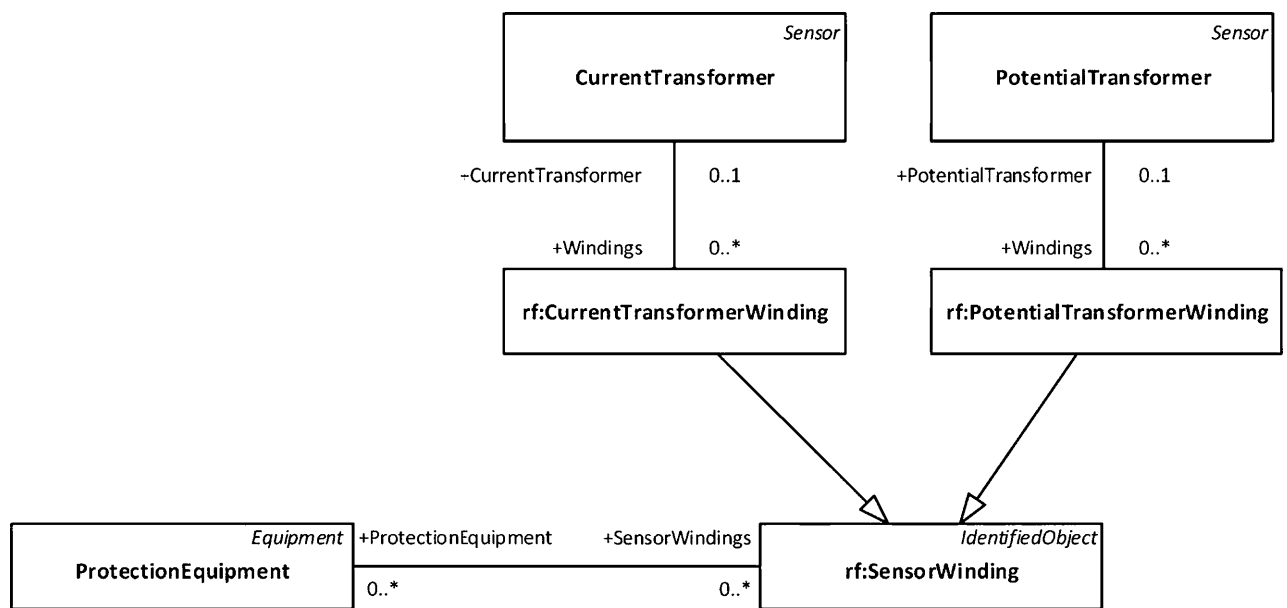
rfPACSDDevice, cim:AssetContainer rfPACSDDevice, -
cim:AssetContainer -
rfPACSDDevice, rfPACSDDevice.kind. -
cim:Asset.AssetContainer. -

58651.10—2023

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.1 UML-

ProtectionEquipment.SensorWindings.



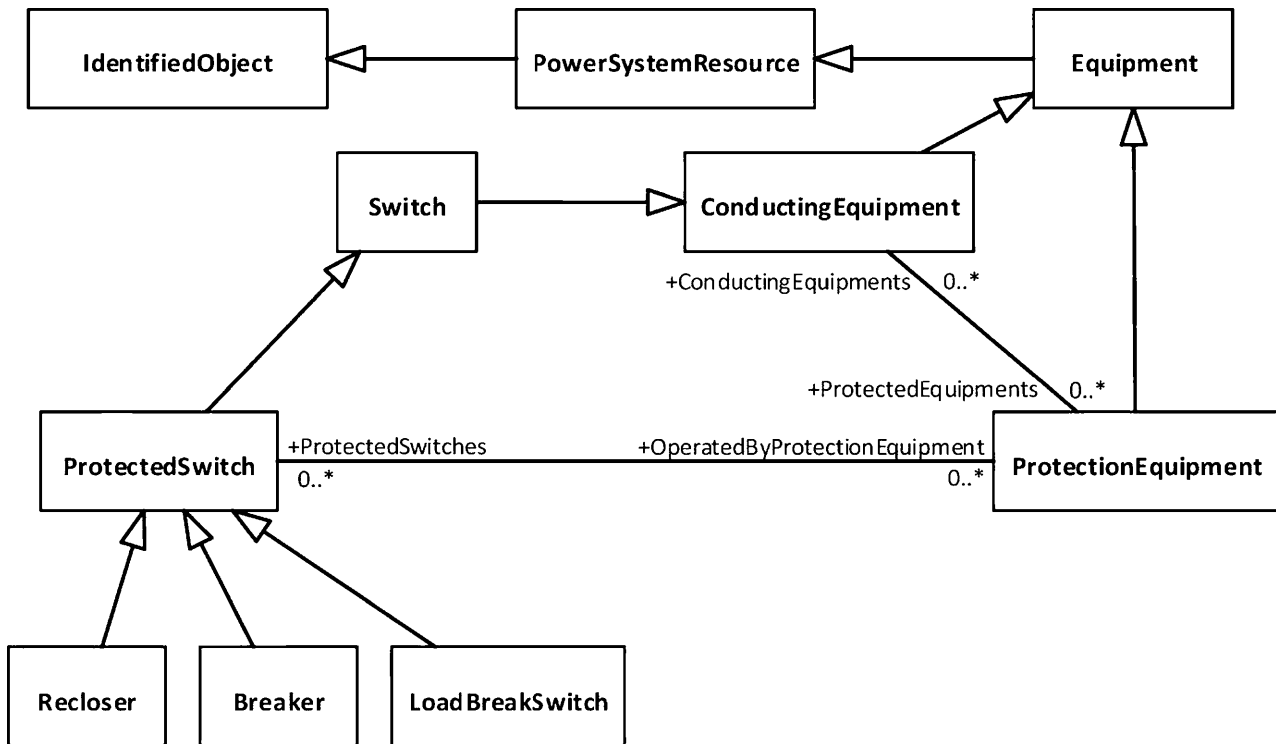
.1 — UML-

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.1 UML-

ProtectionEquipment.ConductingEquipments.

ProtectionEquipment.ProtectedSwitches.



.1 — UML-

58651.10—2023

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- rf:RelayProtection — ;
- rf:ControlAutomation — ;
- rf:DisturbanceRecorder — ;
- rf:Emergencycontrol Automation — ;
- rf:OperationControlAutomation — ;
- rf:RegulatingAutomation — .

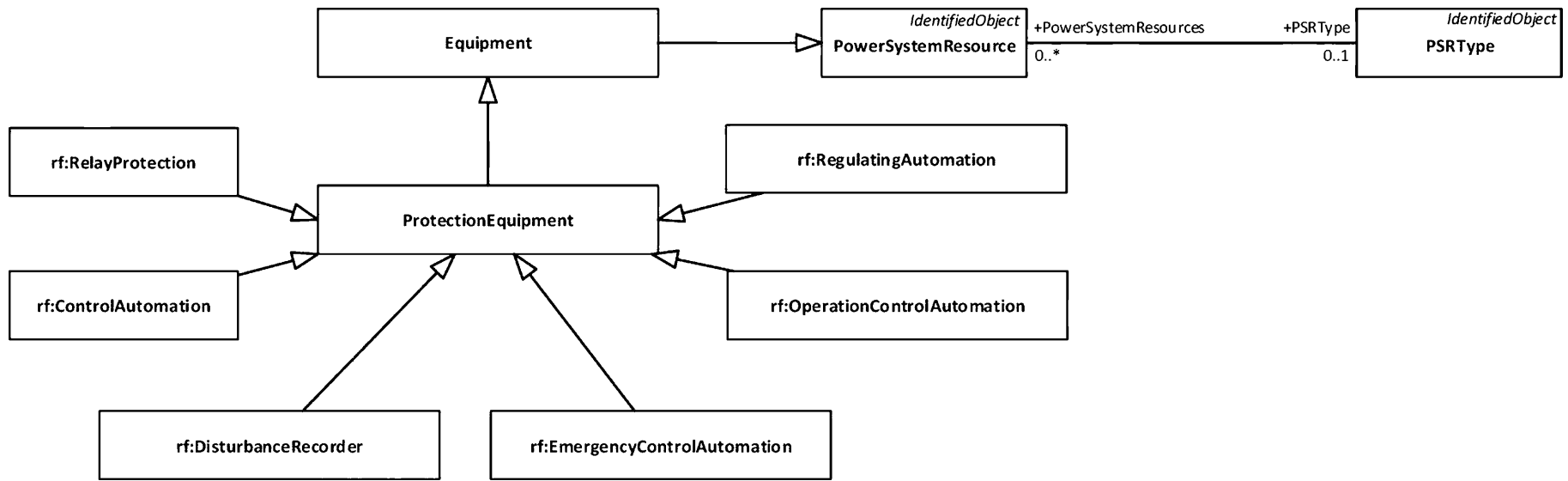
PSRType, (.1. , , , . .)

— ProtectionEquipment.

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PowerSystemResou PSRType.



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58651.10—2023

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	()	()
, -	rfPACSDDeviceKind	—
	rfPaultType	—
	PhaseConnectedFaultKind	—
*	rf:ElementBaseKind	—
	rfPACSTechnicalSpecificationKind	—
**	rfPACSDiagramSpecificationKind	—
,	rfPACSSettingsSpecificationKind	—
, *** -	rfPersonnelCode	—
*** -	rf:OrgReasonCode	—
*** -	rf:TechReasonCode	—
***	rfProtectionOperationMark	—
	rf:OperationKind	—
* [4]. ** [5]. *** [3].		

.2 —

	()	()
*	relay Protection Device	rfPACSDDeviceKind
	relayProtectionCabinet	rfPACSDDevice Kind
	relayProtectionPanel	rfPACSDDeviceKind
	relayProtectionTerminal	rfPACSDDeviceKind
	relay	rfPACSDDeviceKind

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	()	()
	module	rfPACSDeviceKind
	asynchronousStroke	rf:FaultType
	closure	rf:FaultType
	shortCircuit	rf:FaultType
	tumToTurnShortCircuit	rf:FaultType
	sweep	rf:FaultType
	decreaseInsulationLevel	rf:FaultType
	overloadcurrent	rf:FaultType
	overVoltage	rf:FaultType
	underVoltage	rf:FaultType
	overFrequency	rf:FaultType
	underFrequency	rf:FaultType
	overloadPower	rf:FaultType
	electromechanics	rf:ElementBaseKind
	microelectronics	rf:ElementBaseKind
	microprocessor	rf:ElementBaseKind
	lineToGround	PhaseConnectedFaultKind
	lineToLine	PhaseConnectedFaultKind
-	lineToLineToGround	PhaseConnectedFaultKind
	lineOpen	PhaseConnectedFaultKind
	passport	rfPACSTechnicalSpecificationKind
	manual	rfPACSTechnicalSpecificationKind
	equipmentspecification	rfPACSTechnicalSpecificationKind
	schematic	rfPACSDiagramSpecificationKind
	installation	rfPACSDiagramSpecificationKind
	asBuilt	rfPACSDiagramSpecificationKind
-	protocol	rfPACSSettingsSpecificationKind
- -	settingsCalculationProcedure	rfPACSSettingsSpecificationKind
	settingsSheetDispatchCenter	rfPACSSettingsSpecificationKind

58651.10—2023

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	(.)	(.)
-	settingsSheetOwner	rfPACSSettingsSpecificationKind
01 ()	operational_01	rf: PersonnelCode
02 ()	rpa_02	rf:PersonnelCode
03 [, (-) ,]	thirdParties_03	rf: PersonnelCode
04 (- -)	operationalDispatchControl_04	rfPersonnelCode
05 (-)	installation_05	rfPersonnelCode
06 ()	adjustment_06	rfPersonnelCode
07 (-)	design_07	rfPersonnelCode
08 (- -)	manufacturingPlant_08	rfPersonnelCode
101 ()	performingWorkMistake_101	rf:TechReasonCode
102 ()	setupMistake_102	rf:TechReasonCode
103 (, -)	afterWorkDefect_103	rf:TechReasonCode
104 ()	givenSetPointsMistake_104	rf:TechReasonCode
105 ()	setPointsMistake_105	rf:TechReasonCode
106 [()]	agreedSchematicDiagramsMistake_106	rf:TechReasonCode
107 ()	schematicDiagramsMistake_107	rf:TechReasonCode
108 (-)	secondarySwitchingCircuitMistake_108	rf:TechReasonCode
109 ()	rpaDeviceSwitchMistake_109	rf:TechReasonCode
110 (-)	ctDefect_110	rf:TechReasonCode
111 (-)	ptDefect_111	rf:TechReasonCode

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	()	()
112 (-)	operatingCurrentCircuitDefect_112	rf:TechReasonCode
113 (-)	electromechanicalDeviceDefect_113	rf:TechReasonCode
114 (-)	microelectronicDeviceDefect_114	rf:TechReasonCode
115 (-)	microprocessorDeviceDefect_115	rf:TechReasonCode
116 (-)	operationEnsuringDeviceDefect_116	rf:TechReasonCode
117 (-)	technicalCommunicationDeviceDefect_117	rf:TechReasonCode
118 (-)	softwareDefect_118	rf:TechReasonCode
119 (-)	rpaSecondaryCircuitDefect_119	rf:TechReasonCode
120 ()	unsatisfactoryElectromagneticEnvironment Defect_120	rf:TechReasonCode
121 ()	otherTechnicalReasons_121	rf:TechReasonCode
122 ()	notDefinedReason_122	rf:TechReasonCode
123 ()	externalMechanicalAction_123	rf:TechReasonCode
124 (-)	physicalDeterioration_124	rf:TechReasonCode
125 ()	incorrectlyPrimaryCircuit_125	rf:TechReasonCode
201 ()	setupMethodDisadvantages_201	rf:OrgReasonCode
202 ()	verificationDeviceDisadvantages_202	rf:OrgReasonCode

58651.10—2023

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	(.)	(.)
203 (-)	unfulfilledMaintenanceOnSchedule_203	rf:OrgReasonCode
204 (-)	unfulfilledRoutineMaintenanceWorkInAccor- danceWithRTD_204	rf:OrgReasonCode
205 ()	incorrectRPAInstructions_205	rf:OrgReasonCode
206 ()	noRPAInstructions_206	rf:OrgReasonCode
207 (-)	lateMakingRPAInstructionChanges_207	rf:OrgReasonCode
208 ()	invalidSourceData_208	rf:OrgReasonCode
209 ()	calculationMethodDisadvantages_209	rf:OrgReasonCode
210 (-)	serviceLifeExtension_210	rf:OrgReasonCode
211 (-)	sparePartsSupply_211	rf:OrgReasonCode
212 (, -)	rpaDeviceConfigurationTask_212	rf:OrgReasonCode
213 (-)	rtd Req u i reme nts_213	rf:OrgReasonCode
214 (- , -)	actionAgreement_214	rf:OrgReasonCode
215 (-)	detected DefectElimination_215	rf:OrgReasonCode
216 (-)	incorrectStaffActions_216	rf:OrgReasonCode
217 [()]	projectDefect_217	rf:OrgReasonCode

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	()	()
218 [() ,]	manufacturingDefect_218	rf:OrgReasonCode
219 [()]	installationDefect_219	rf:OrgReasonCode
220 ()	otherOrgReasons_220	rf:OrgReasonCode
221 ()	notDefinedReason_221	rf:OrgReasonCode
	correct	rf:ProtectionOperationMark
	maloperation	rfProtectionOperationMark
	permittedIncorrectFailure	rfProtectionOperationMark
	unnecessaryOperation	rfProtectionOperationMark
	permittedMaloperation	rfProtectionOperationMark
**	refusalToOperate	rfProtectionOperationMark
	trip	rf:OperationKind
	start	rf:OperationKind
	signal	rf:OperationKind
***	failure	rf:OperationKind
<p>* « » rfPACSDDevice, - () , , , ,), - [6].</p> <p>* * « » / [3].</p> <p>* ** « » .</p> <p>—</p> <p>— (current transformer);</p> <p>PT — (potential transformer);</p> <p>RPA— (relay protection and automation);</p> <p>RTD — - (regulatory technical documentation).</p>		

58651.10—2023

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	(.)	(.)
	DateTi me Interval	—

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	(.)	(.)	
	start	DateTimeInterval	
	end	DateTimeInterval	

- [1] 61968 () [Application integration at electric utilities — System interfaces for distribution management (all parts)]
- [2] 61970 () [Energy management system application program interface (EMS-API) (all parts)]
- [3] 8 2019 . 80) (-
- [4] 13 2020 . 555) (
- [5] 13 2019 . 100) (,
- [6] 13 2018 . 937) (

