



Relion® 615 series

REF615

Standard configurations

REF615 feeder protection and control standard configurations

Standard configurations

Description	Standard configuration
Non-directional overcurrent and directional earth-fault protection	A and B
Non-directional overcurrent and non-directional earth-fault protection	C and D
Non-directional overcurrent and directional earth-fault protection with phase-voltage based measurements	E
Directional overcurrent and earth-fault protection with phase-voltage based measurements, undervoltage and overvoltage protection	F

Note, all directional protection functions can also be used in non-directional mode • = included, o = optional

Supported functions with codes and symbols

Functionality	IEC 61850	IEC 60617	ANSI	A	B	C	D	E	F
Protection									
Three-phase non-directional overcurrent, low-set stage, instance 1	PHLPTOC1	3I> (1)	51P-1 (1)	•	•	•	•	•	-
Three-phase non-directional overcurrent, high-set stage, instance 1	PHHPTOC1	3I>> (1)	51P-2 (1)	•	•	•	•	•	-
Three-phase non-directional overcurrent, high-set stage, instance 2	PHHPTOC2	3I>> (2)	51P-2 (2)	•	•	•	•	•	-
Three-phase non-directional overcurrent, instantaneous stage, instance 1	PHIPTOC1	3I>>> (1)	50P/51P (1)	•	•	•	•	•	•
Three-phase directional overcurrent, low-set stage, instance 1	DPHLPDOC1	3I> → (1)	67-1 (1)	-	-	-	-	-	•
Three-phase directional overcurrent, low-set stage, instance 2	DPHLPDOC2	3I> → (2)	67-1 (2)	-	-	-	-	-	•
Three-phase directional overcurrent, high-set stage	DPHHPDOC1	3I>> →	67-2	-	-	-	-	-	•
Directional earth-fault, low-set stage (SEF), instance 1	DEFLPDEF1	I ₀ > → (1)	67N-1 (1)	•	•	-	-	•	•
Directional earth-fault, low-set stage, instance 2	DEFLPDEF2	I ₀ > → (2)	67N-1 (2)	•	•	-	-	•	•
Directional earth-fault, high-set stage	DEFHPDEF1	I ₀ >> →	67N-2	•	•	-	-	•	•
Non-directional (cross country) earth-fault, using calculated I ₀	EFHPTOC1	I ₀ >>	51N-2	•	•	-	-	•	•
Transient/intermittent earth-fault	INTRPTEF1	I ₀ > → IEF	67N-IEF	•	•	-	-	•	•
Non-directional earth-fault, low-set stage (SEF), instance 1	EFLPTOC1	I ₀ > (1)	51N-1 (1)	-	-	•	•	-	-
Non-directional earth-fault, low-set stage, instance 2	EFLPTOC2	I ₀ > (2)	51N-1 (2)	-	-	•	•	-	-
Non-directional earth-fault, high-set stage	EFHPTOC1	I ₀ >>	51N-2	-	-	•	•	-	-
Non-directional earth-fault, instantaneous stage	EFIPTOC1	I ₀ >>>	50N/51N	-	-	•	•	-	-
Negative-sequence overcurrent, instance 1	NSPTOC1	I ₂ > (1)	46 (1)	•	•	•	•	•	•
Negative-sequence overcurrent, instance 2	NSPTOC2	I ₂ > (2)	46 (2)	•	•	•	•	•	•
Phase discontinuity	PDNSPTOC1	I ₂ /I ₁ >	46PD	•	•	•	•	•	•
Thermal overload	T1PTTR1	3I _{th} >F	49F	•	•	•	•	•	•
Circuit-breaker failure	CCBRBRF1	3I>/I ₀ >BF	51BF/51NBF	•	•	•	•	•	•
Three-phase overvoltage, instance 1	PHPTOV1	3U> (1)	59-1 (1)	-	-	-	-	-	•
Three-phase overvoltage, instance 2	PHPTOV2	3U> (2)	59-2 (2)	-	-	-	-	-	•
Three-phase overvoltage, instance 3	PHPTOV3	3U> (3)	59-3 (3)	-	-	-	-	-	•

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Protection									
Positive sequence undervoltage	PSPTUV1	U1<	47U+	-	-	-	-	-	•
Negative sequence overvoltage	NSPTOV1	U2>	47O-	-	-	-	-	-	•
Residual overvoltage, instance 1	ROVPTOV1	U _r > (1)	59G-1 (1)	-	-	-	-	-	•
Residual overvoltage, instance 2	ROVPTOV2	U _r > (2)	59G-2 (2)	-	-	-	-	-	•
Residual overvoltage, instance 3	ROVPTOV3	U _r > (3)	59G-3 (3)	-	-	-	-	-	•
Three-phase undervoltage, instance 1	PHPTUV1	3U< (1)	27-1 (1)	-	-	-	-	-	•
Three-phase undervoltage, instance 2	PHPTUV2	3U< (2)	27-2 (2)	-	-	-	-	-	•
Three-phase undervoltage, instance 3	PHPTUV3	3U< (3)	27-3 (3)	-	-	-	-	-	•
Three-phase inrush current detection	INRP HAR1	3I2f>	68	•	•	•	•	•	•
Master trip, instance 1	TRPPTRC1	Master Trip (1)	94/86 (1)	•	•	•	•	•	•
Master trip, instance 2	TRPPTRC2	Master Trip (2)	94/86 (2)	•	•	•	•	•	•
Arc protection with three sensors, instance 1	ARCSARC1	ARC (1)	50L/50NL (1)	o	o	o	o	o	o
Arc protection with three sensors, instance 2	ARCSARC2	ARC (2)	50L/50NL (1)	o	o	o	o	o	o
Arc protection with three sensors, instance 3	ARCSARC3	ARC (3)	50L/50NL (1)	o	o	o	o	o	o
Control									
Circuit breaker control with basic interlocking ¹⁾	CBXC BR1	I ↔ O CB	I ↔ O CB	•	•	•	•	•	•
Circuit breaker control with extended interlocking ²⁾	CBXC BR1	I ↔ O CB	I ↔ O CB	-	•	-	•	•	•
Auto-reclosing of one circuit breaker	DARREC1	O → I	79	o	o	o	o	o	o
Supervision and Monitoring									
Fuse failure supervision	SEQRFUF1	FUSEF	60	-	-	-	-	•	•
Current circuit supervision	CCRDIF1	MCS 3I	MCS 3I	-	-	-	-	•	•
Circuit breaker condition monitoring	SSC BR1	CBCM	CBCM	-	•	-	•	•	•
Trip-circuit supervision of two trip circuits, instance 1	TCSSC BR1	TCS (1)	TCM (1)	•	•	•	•	•	•
Trip-circuit supervision of two trip circuits, instance 2	TCSSC BR2	TCS (2)	TCM (2)	•	•	•	•	•	•
Disconnecter position indication	DCSXSW1	I ↔ O DC	I ↔ O DC	-	•	-	•	•	•
Earthing switch position indication	ESSXSW1	I ↔ O ES	I ↔ O ES	-	•	-	•	•	•
Measurement									
Transient disturbance recorder	RDRE1	DREC	DREC	•	•	•	•	•	•
Three-phase current	CMMXU1	3I	3I	•	•	•	•	•	•
Current sequence components	CSMSQ1	I ₁ , I ₂ , I ₀	I ₁ , I ₂ , I ₀	•	•	•	•	•	•
Three-phase voltage	VMMXU1	3U	3U	-	-	-	-	•	•
Voltage sequence components	VSMQI1	U ₁ , U ₂ , U ₀	U ₁ , U ₂ , U ₀	-	-	-	-	•	•
Residual current	RESCMMXU1	I ₀	I _N	•	•	•	•	•	•
Residual voltage	RESVMMXU1	U ₀	V _N	•	•	-	-	•	•
Power, including power factor	PEMMXU1	P, E	P, E	-	-	-	-	•	•
Energy	PEMMXU1	P, E	P, E	-	-	-	-	•	•

- 1) Basic interlocking functionality: Closing of the circuit breaker can be enabled by a binary input signal. The actual interlocking scheme is implemented outside the IED. The binary input serves as a "master interlocking input" and when energized it will enable circuit breaker closing.
- 2) Extended interlocking functionality: The circuit breaker interlocking scheme is implemented in the IED configuration, based on primary equipment position information (via binary inputs) and the logical functions available. The signal matrix tool of PCM600 can be used for modifying the interlocking scheme to suit your application.

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