DNV·GL

TYPE APPROVAL CERTIFICATE

Certificate No:
TAE000014Y
Revision No:
1

This is to certify:

That the Multifunction Relay

with type designation(s)
Feeder Protection REF615, Motor Protection REM615, Voltage Protection REU615, Line-differential Protection RED615 and Transformer Protection RET615, Generator and interconnection protection REG615 & Capacitator bank protection and control REV615

Issued to
ABB Oy, Distribution Solutions
HELSINKI, Finland

is found to comply with
DNV GL rules for classification – Ships, offshore units, and high speed and light craft

Application :

Products approved by this certificate are accepted for installation on all vessels classed by DNV GL.

Issued at **Høvik** on **2021-02-11**

This Certificate is valid until **2025-12-31**.
DNV GL local station: **Finland CMC**

Approval Engineer: **Nicolay Horn**

for **DNV GL**
Digitally Signed By: Alonso Pontes, Marta
Location: DNV GL Høvik, Norway

Marta Alonso Pontes
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid. The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

Job Id: **262.1-011484-5**
Certificate No: **TAE000014Y**
Revision No: **1**

Product description

a) Microprocessor based feeder protection and control - **type REF615**:

Basic functions:
Overcurrent, thermal overload, short circuit, earth fault, phase discontinuity, multi-shot auto-reclosing, measurement, condition monitoring and communication, general and standard.

b) Microprocessor based motor protection and control IED- **type REM615**:
Basic functions:

Motor startup, short circuit, thermal overload, undercurrent, unbalance, earth fault, phase reversal, measurement, condition monitoring, communication, general and standard.

c) Microprocessor based voltage protection and control IED - **type REU615**:
Basic functions:

Overvoltage protection, undervoltage protection, negative or positive sequence protection, automatic voltage regulator, measurement, condition monitoring, communication, general and standard.

d) Microprocessor based transformer protection and control IED- **type RET615**

Basic functions:
Diffential protection, Overcurrent, thermal overload, short circuit, earth fault, measurement and condition monitoring and communication, general and standard.

e) Microprocessor based line-differential protection and control IED - **type RED615**

Basic functions:
Differential protection, Overcurrent, thermal overload, short circuit, earth fault, phase discontinuity, multi-shot auto-reclosing, -measurement, condition monitoring and communication, general and standard.

f) Microprocessor based generator and interconnection protection and control IED- **type REG615**:

Basic functions:
Differential protection, Overcurrent, thermal overload, short circuit, earth fault, reverse power and directional overpower, measurement and condition monitoring and communication, general and standard.

g) Microprocessor based capacitor bank protection and control IED- **type REV615**:

Basic functions:
Overcurrent, thermal overload, short circuit, earth fault, overload, unbalance, measurement, condition monitoring and communication, general and standard.

Important protection functions available in REF/REM/REU/RET/RED/REG/REV615:

ANSI number	Protection function	REF 615	REM 615	REU 615	RET 615	RED 615	REG 615	REV 615
51P-1	Three-phase non-directional overcurrent protection, low stage 3I>	x	x	x	x	x	x	x
51P-2	Three-phase non-directional overcurrent protection, high stage 3I>	x	x	x	x	x	x	x
50P/51P	Three-phase non-directional overcurrent protection, instantaneous stage 3I>>>	x	x	x	x	x	x	x
67-1	Three-phase directional overcurrent protection, low stage 3I> →	x				x	x	
67-2	Three-phase directional overcurrent protection, high stage 3I>> →	x				x	X	

ANSI number	Protection function	REF 615	REM 615	REU 615	RET 615	RED 615	REG 615	REV 615
51N-1	Non-directional earth-fault protection, low stage Io>	x	x		x	x		X
51N-2	Non-directional earth-fault protection, high stage Io>>	x	x		x	x	x	x
50N/51N	Non-directional earth-fault protection, instantaneous stage Io>>>	x				x		x
67N-1	Directional earth-fault protection, low stage Io> →	x	x			x	x	x
67N-2	Directional earth-fault protection, high stage Io>> →	x				x	X	x
21YN	Admittance based earth-fault protection Yo> →	x				x		
67NIEF	Transient/intermittent earth-fault protection Io> → IEF	x				x	x	x
51N-2	Non-directional (cross-country) earth fault protection, using calculated Io, Io>>	x				x		
46	Negative-sequence overcurrent protection I2>	x			x	x	x	x
46PD	Phase discontinuity protection I2/I1>	x				x		
59G	Residual overvoltage protection Uo>	x		x	x	x	x	x
27	Three-phase undervoltage protection 3U<	x	x	x	x		x	x
59	Three-phase overvoltage protection 3U>	x		x	x		x	x
47U+	Positive-sequence undervoltage protection U1<	x	x	x			x	x
47O-	Negative-sequence overvoltage protection U2>	x	x	x			x	x
81	Frequencey protection f>/f<,df/dt	x	x	x			x	
49F	Three-phase thermal protection for feeders, cables and distribution transformers 3Ith>F	x				x	x	
51BF/51NBF	Circuit breaker failure protection 3I>/Io>BF	x	x		x	x	x	x
68	Three-phase inrush detector 3I2f>	x				x	x	
94/86	Master trip, Master Trip	x	x	x	x	x	x	x
50L/50NL	Arc protection ARC	x	x	x	x		x	x
46M	Negative-sequence overcurrent protection for machines I2>M		x				x	
37	Loss of load supervision 3I<		x					
51LR	Motor load jam protection Ist>		x					
49,66,48, 51LR	Motor start-up supervision Is2t n<		x					
46R	Phase reversal protection I2>>		x					

ANSI number	Protection function	REF 615	REM 615	REU 615	RET 615	RED 615	REG 615	REV 615
49M	Thermal overload protection for motors		x					
MAP	Multi-purpose protection MAP	x	x	x	x	x	x	x
49T/G/C	Three-phase thermal overload protection, two time constants			x	x	x	x	x
81LSH	Load shedding and restoration UFLS/R			x				
87T	Stabilized and instantaneous differential protection for two-winding transformers 3dI>T				x			
87NL	Numerical stabilized low impedance restricted earth-fault protection dIoLo>				x			
87NH	High impedance based restricted earth-fault protection dIoHi>	x			x			
BST	Binary signal transfer BST					x		
87L	Line differential protection and related measurements, stabilized and instantaneous stages 3dI>L					x		
87G/M	Stabilized and instantaneous differential protection for machines						x	
32U	Underpower protection						x	
32R/32O	Reverse power/directional overpower protection	x					x	
40	Three-phase underexcitation protection						x	
21G	Three-phase underimpedance protection						x	
78	Out-of-step protection						x	
21YN	Admittance-based earth-fault protection	x				x		
32N	Wattmetric-based earth-fault protection	x				x		
67YN	Multifrequency admittance-based earth-fault protection	x						
32Q, 27	Directional reactive power undervoltage protection	x					x	
27RT	Low-voltage ride-through protection	x					x	
78V	Voltage vector shift protection	x					x	
24	Overexcitation protection						x	
27/59THD	Third harmonic-based stator earth-fault protection						x	
51NHA	Harmonics-based earth-fault protection Io>HA	x				x		

For aditional protection functions see supplier datasheet

Rated primary current 1 – 6000 A on primary transformer, rated secondary current 5A, 1A and 0.2 A of the primary current transformer. Rated primary voltage 0,1-440 kV on primary transformer, rated secondary voltage 60-210 V.

Power supply U_{aux} =100/110/120/220/240 V AC & 48/60/110/125/220/250 V DC or Power supply Uaux = 24/30/48/60 VDC

Application/Limitation

Installation of the unit is to be according to manufacturer's specifications.

The total panel instrumentation to be in accordance with the Rules.

Product certificate:

When the unit is used for protection purposes no product certificate is required. When the unit is used for other control purposes a product certificate acc. to DNV GL Rules Pt.4 Ch.8 Sec.1 and Pt.4 Ch.9 Sec.1 [1.2.3] will be required if serving essential or important functions. Correct configuration and set up for each delivery to be tested during commissioning after installation.

The Type Approval covers hardware and software for the unit.

The Type Approval does not cover application software.

The following documentation of the actual application is to be submitted for approval in each case:

- System Block Diagram

- Power supply arrangement (may be part of the system block diagram)

The Type Approval covers hardware listed under Product description.

Clause for application software control:

All changes in software are to be recorded. Major changes are to be forwarded to DNV GL for evaluation and approval. Major changes in the software are to be approved before installed in the computer. A certification of application functions may be required for the particular vessel.

Type Approval documentation

Technical info:
Feeder Protection and control REF615 Brochure.
Motor Protection and control REM615 Brochure.
Voltage Protection and control REU615 Brochure.
Transformer Protection and control RET615 Brochure
Line-differensial Protection and control RED615 Brochure
Generator and interconnection protection REG615 Brochure
Capacitator bank protection and control REV615 Brochure

Test reports:
ABB doc. "615 series – Type Test Certificate. ABB test report doc. No. 1MRS757185 rev F, issued 2014-01-24. ABB Type Test Report no. 1MRS081892 rev G issued 2015-10-29.
VTT test report no. VTT-S-03818-14 & VTT-S-03681-14 issued 2014-08-22, VTT-S-06-713-09 issued 2009-09-22. Nemko test report nos. 204526A issued 2012-03-30 and 139874 issued 2009-12.15.
SGS test report no. 278843-1-3 issued2015-04-30.

Tests carried out

Type tests in accordance with IEC 60255, Environmental tests according to DNV Standard for Certification No. 2.4, April 2001. (Power supply variation, dry heat, cold, damp heat and vibration.)
EMC in accordance with IEC 60255.

Marking of product

ABB – REF615 / REM615 / REU 615 / RET615 / RED615 / REG615 / REV615

Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the type are complied with, and that no alterations are made to the product design or choice of systems, software versions, components and/or materials.

The main elements of the assessment are:

- Ensure that type approved documentation is available.
- Inspection of factory samples, selected at random from the production line (where practicable)
- Review of production and inspection routines, including test records from product sample tests and control routines.
- Ensuring that systems, software versions, components and/or materials used comply with type approved documents and/or referenced system, software, component and material specifications.
- Review of possible changes in design of systems, software versions, components, materials and/or performance, and make sure that such changes do no affect the type approval given.
- Ensuring traceability between manufacturer's product type marking and the type approval certificate.
- Ensuring that type approved documentation is available.

Assessment to be performed at 2 and 3.5 year and at renewal.

END OF CERTIFICATE