DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. **E-11189**

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

Manufactured by
ABB Oy, Distribution Automation
Vaasa, Finland

is found to comply with
Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards

Application
For installations inside switchboard/enclosures onboard ships and offshore units.

Høvik, 2011-09-29
for **Det Norske Veritas AS**

Marit Laumann
Head of Section

DNV local office:
Vaasa

This Certificate is valid until
2015-12-31

Nicolay Horn
Surveyor

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, phase discontinuity, 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.

Protection functions available in REF/REM/REU/RET/RED 615:

ANSI number	Protection function	REF615	REM615	REU615	RET615	RED615
51P-1	Three-phase non-directional overcurrent protection, low stage 3I>	x	x	x	x	x
51P-2	Three-phase non-directional overcurrent protection, high stage 3I>	x		x	x	x
50P/51P	Three-phase non-directional overcurrent protection, instantaneous stage 3I>>>	x	x	x	x	x
67-1	Three-phase directional overcurrent protection, low stage 3I> →	x				
67-2	Three-phase directional overcurrent protection, high stage 3I>> →	x				
51N-1	Non-directional earth-fault protection, low stage Io>	x	x		x	x
51N-2	Non-directional earth-fault protection, high stage Io>>	x	x		x	x
50N/51N	Non-directional earth-fault protection, instantaneous stage Io>>>	x				x
67N-1	Directional earth-fault protection, low stage Io> →	x	x			x
67N-2	Directional earth-fault protection, high stage Io>> →	x				x
21YN	Admittance based earth-fault protection Yo> →	x				x
67NIEF	Transient/intermittent earth-fault protection Io> → IEF	x				x

ANSI number	Protection function	REF615	REM615	REU615	RET615	RED615
51N-2	Non-directional (cross-country) earth fault protection, using calculated Io, Io>>	x				x
46	Negative-sequence overcurrent protection I2>	x			x	x
46PD	Phase contdiscontinuity protection I2/I1>	x				x
59G	Residual overvoltage protection Uo>	x		x	x	x
27	Three-phase undervoltage protection 3U<	x	x	x	x	
59	Three-phase overvoltage protection 3U>	x		x	x	
47U+	Positive-sequence undervoltage protection U1<	x	x	x		
47O-	Negative-sequence overvoltage protection U2>	x	x	x		
81	Frequencey protection f>/f<,df/dt	x	x	x		
49F	Three-phase thermal protection for feeders, cables and distribution transformers 3Ith>F	x				x
51BF/51 NBF	Circuit breaker failure protection 3I>/Io>BF	x	x		x	x
68	Three-phase inrush detector 3I2f>	x				x
94/86	Master trip, Master Trip	x	x	x		x
50L/50NL	Arc protection ARC	x	x	x	x	
46M	Negative-sequence overcurrent protection for motors I2>M		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			
49M	Thermal overload protection for motors		x			
MAP	Multi-purpose protection MAP		x	x	x	
49T	Three-phase thermal overload protection for power transformers, two time constants 3Ith>T			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	
BST	Binary signal transfer BST					x
87L	Line differential protection and related measurements, stabilized and instantaneous stages 3dI>L					x

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 0,1-440kV 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 Pt.4 Ch.8 Sec.1 and Pt.4 Ch.9 Sec.1 A 202 will be required. 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 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

Test reports:
ABB doc. "615 series – Type Test Certificate. ABB test report doc. No. 1MRS081892 issued 2010-10-01. VTT test report no. VTT-S-06-713-09 issued 2009-09-22. Nemko test report no. 139874 issued 2009-12.15

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 / RET 615 / RED 615

Certificate retention survey

The scope of the retention/renewal survey 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 survey 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.

Survey to be performed at least every second year.

END OF CERTIFICATE