DESCRIPTIVE BULLETIN

REM615 ANSI

Motor protection and control

The REM615 is a dedicated motor protection and control relay perfectly aligned for the protection, control, measurement and supervision of asynchronous motors in manufacturing and process industry.

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REF615 ANSI 5.0 FP1

REM615 is a member of ABB's Relion® product family and a part of its 615 protection and control product series. The 615 series relays are characterized by their compactness and withdrawable design. Engineered from the ground up, the 615 series has been designed to unleash the full potential of the IEC 61850 standard for communication and interoperability between substation automation devices.

Application

The REM615 constitutes main protection for asynchronous motors and their drives in manufacturing and process industry. Typically, the motor relay is used with circuit breaker or contactor controlled HV motors, and contactor controlled medium sized and large LV motors in a variety of drives, such as pumps and conveyors, crushers and choppers, mixers and agitators, fans, and aerators. Flexible coding allows for choosing current-only or current-and-voltage configurations to best fit your motor application needs.

Protection and control

REM615 offers all the functionality needed to manage motor starts and normal drive operations, including protection and fault clearance in abnormal situations. The main features of the motor relay include thermal overload protection, motor start-up time supervision, locked rotor protection, and protection against too frequent motor starts. Furthermore, the relay offers negative phase sequence current unbalance protection, motor running stall protection, loss-of-load supervision, phase-reversal protection, and a provision to perform a forced emergency start.

REM615 incorporates non-directional and directional ground fault protection, back-up overcurrent protection, three phase undervoltage, negative phase sequence overvoltage, and positive sequence undervoltage protection. A fast three-channel arc fault protection system for arc flash supervision of the switchgear compartments is offered. To protect from unauthorized access and to maintain the integrity of information, the protection and control relay has been provided with a four-level, role-based, user authentication system. The access control system applies to the front panel HMI, the web browser based HMI and the PCM600 Protection and Control Manager.

Standardized communication

REM615 genuinely supports the new IEC 61850 standard for inter-device communication in substations. It also supports the industry standard Modbus® protocol, and the well-established DNP3 protocol.For accurate time stamping, REM615 supports synchronization over Ethernet using SNTP or over a separate bus using IRIG-B.

Pre-emptive condition monitoring
For continuous knowledge of the operational availability of the REM615 features, a comprehensive set of monitoring functions to supervise the relay health, the trip circuit, and the circuit breaker health is included. The breaker monitoring can include checking the wear and tear of the circuit breaker, the spring charging time of the breaker operating mechanism, and the gas pressure of the breaker chambers. The relay also monitors the breaker travel time and the number of circuit breaker operations to provide basic information for scheduling breaker maintenance.

Bus protection via GOOSE
The IEC 61850 implementation in REM615 also includes fast peer-to-peer communication over the substation bus. Use GOOSE communication between the the REM615, RET615, and REF615 protection and control relays of the incoming and outgoing feeders of a substation cooperate to form a stable, reliable and high-speed busbar protection system. The cost-effective GOOSE-based busbar protection is obtained just by configuring the relays and the operational availability of the protection is assured by continuous supervision of the protection relays and their GOOSE messaging over the station bus. No separate hard-wiring is needed for the horizontal communication between the switchgear cubicles.

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01 REM615 V5.0 ANSI
Functional Application A

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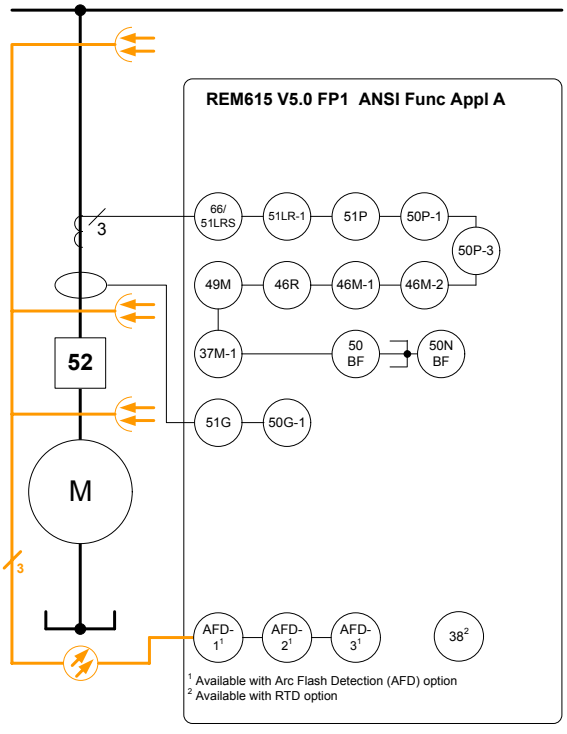
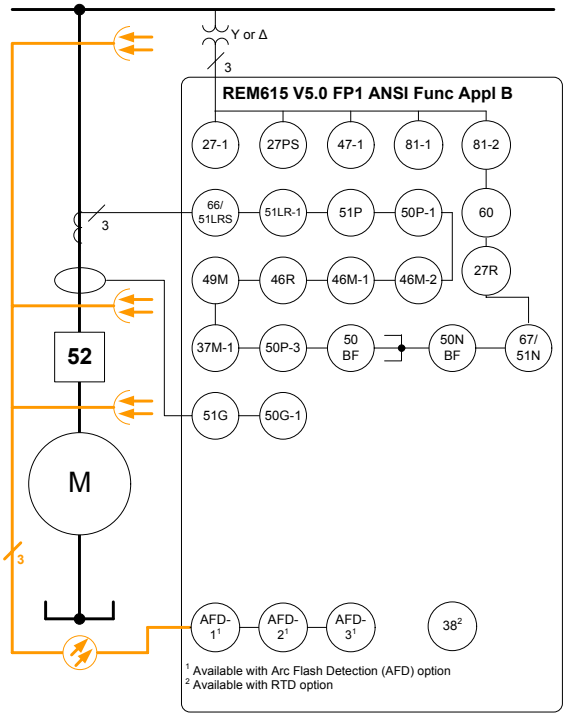
02 REM615 V5.0 ANSI
Functional Application B





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03 REM615 V5.0 ANSI Functional Application D

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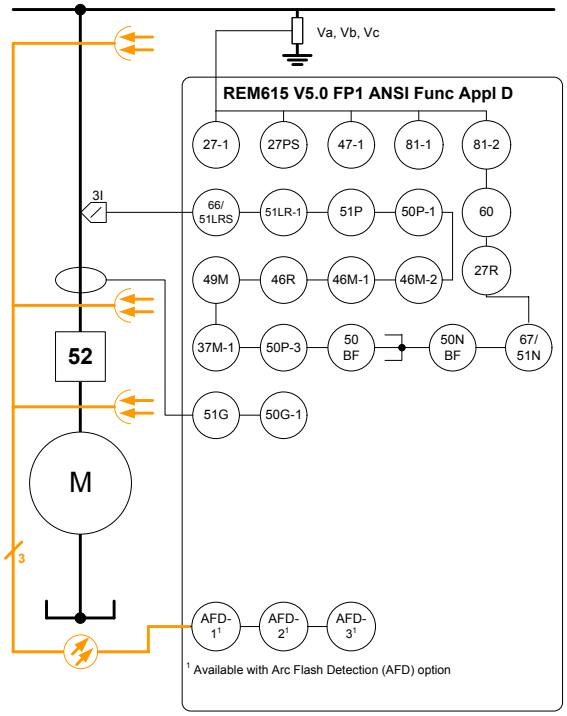

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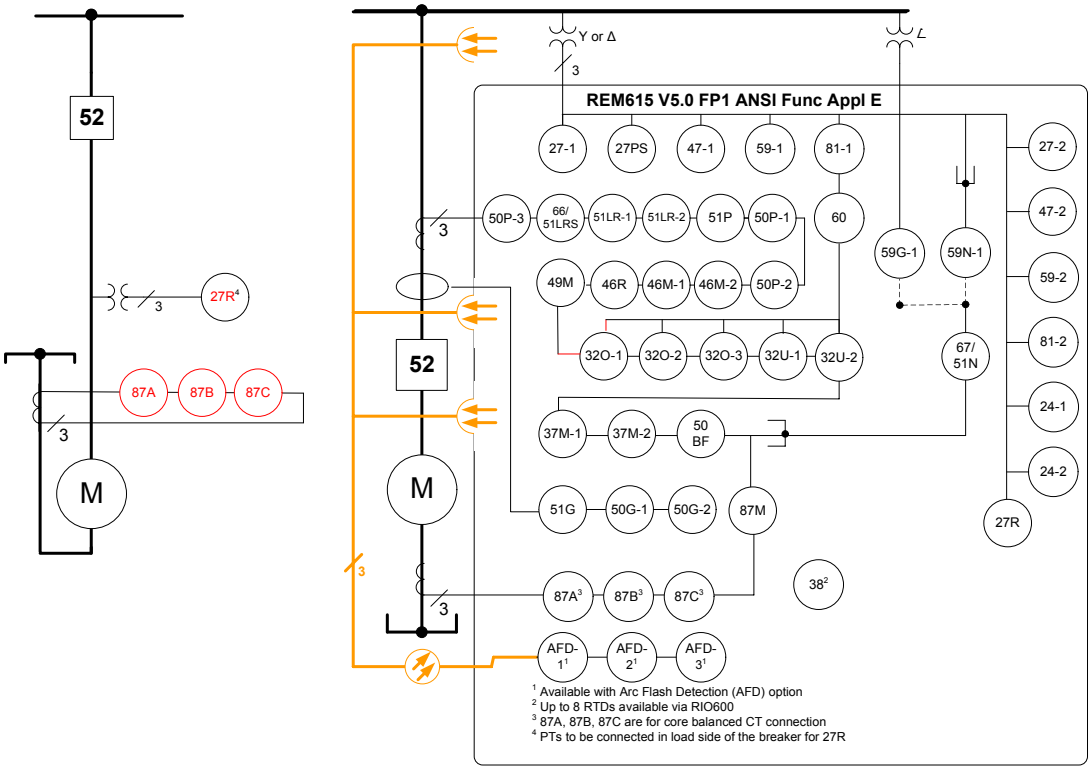

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Functions and features

		REM615 Functional Application										
		Firmware Version 4.0, 4.2							Firmware version 5.0 FP-1			
Included = •, Optional = ◦	**ANSI function**	**A**	**B**	**C**	**D**	**E**	**F**	**G[1]**	**A**	**B**	**D**	**E**
Protection												
Phase overcurrents	51P, 50P	•	•	•	•	•	•	•	•	•	•	•
Ground overcurrents	50G	•	•	•	•	•	•	•	•	•	•	•
Ground overcurrents	51G	•	•	•	•	•	•	•	•	—	—	•
Directional neutral overcurrent	67N	—	—	•	•	•	•	•	—	•	•	•
Machine differential Multi-Restrained Differential	87M	—	•	—	—	—	—	•	—	—	—	•
Machine differential Self-Balancing	87M	—	—	—	—	—	—	•	—	—	—	•
Thermal overload	49M	•	•	•	•	•	•	•	•	•	•	•
Loss-of-load	37M	•	•	•	•	•	•	•	•	•	•	•
Phase reversal	46R	•	•	•	•	•	•	•	•	•	•	•
Locked rotor / start	66/51LRS	•	•	•	•	•	•	•	•	•	•	•
Locked rotor / jam	51LR	•	•	•	•	•	•	•	•	•	•	•
Negative sequence overcurrents	46M	•	•	•	•	•	•	•	•	•	•	•
Phase undervoltage	27	—	—	•	•	•	•	•	—	•	•	•
Three—phase directional overpower	32O	—	—	—	—	•[1]	•[1]	•	—	—	—	•
Three—phase directional underpower	32U	—	—	—	—	•[1]	•[1]	•	—	—	—	•
Volts—per—hertz	24	—	—	—	—	•[1]	•[1]	•	—	—	—	•
Remanent undervoltage	27R	—	—	—	—	•[1]	•[1]	•	—	•	•	•
Positive sequence undervoltage	27PS	—	—	•	•	•	•	•	—	•	•	•
Phase sequence overvoltage	47	—	—	•	•	•	•	•	—	•	•	•
Phase overvoltage	59	—	—	•	•	•	•	•	—	—	—	•
Neutral overvoltage	59N	—	—	—	—	•	•	•	—	—	—	•
Ground overvoltage	59G	—	—	•	•	—	—	•	—	—	—	•
Frequency	81	—	—	•	•	•	•	•	—	•	•	•
Resistive thermal devices (RTD)	38	—	6	—	2	—	6	8	—	—	—	—
Circuit breaker failure	50BF	•	•	•	•	•	•	•	•	•	•	•
Electrically latched/self-resetting trip digital outputs	86/94	•	•	•	•	•	•	•	•	•	•	•
Arc flash detection via three lens sensors	AFD-1, AFD-2, AFD-3	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦
Control												
Circuit breaker control	52	•	•	•	•	•	•	•	•	•	•	•
Control for disconnector		—	—	—	—	—	—	—	•	•	•	•
Control for earthing switch		—	—	—	—	—	—	—	•	•	•	•
Emergency restart	62EST	•	•	•	•	•	•	•	•	•	•	•
Number of pages in HMI		1	1	1	1	1	1	1	2	2	2	2
Customizable HMI		•	•	•	•	•	•	•	•	•	•	•
User programmable LEDs		11	11	11	11	11	11	11	11	11	11	11
User programmable push buttons		—	—	—	—	—	—	—	—	—	—	—
Monitoring and Supervision												
Trip circuit monitoring	TCM	•	•	•	•	•	•	•	•	•	•	•
Breaker condition monitoring	52CM	•	•	•	•	•	•	•	•	•	•	•
Fuse failure	60	—	—	•	•	•	•	•	—	•	•	•
Current circuit supervision	CCM	•	—	•	•	•	•	•	•	•	•	•
Machine run timers	OPTM	•	•	•	•	•	•	•	•	•	•	•
Metering												
Three-phase currents	IA, IB, IC	•	•	•	•	•	•	•	•	•	•	•
Sequence currents	I1, I2, I0	•	•	•	•	•	•	•	•	•	•	•
Ground current	IG	•	•	•	•	•	•	•	•	•	•	•
Demand phase currents		•	•	•	•	•	•	•	•	•	•	•

		REM615 Functional Application										
		Firmware Version 4.0, 4.2							Firmware version 5.0 FP-1			
Included = •, Optional = ◦	**ANSI function**	**A**	**B**	**C**	**D**	**E**	**F**	**G[1]**	**A**	**B**	**D**	**E**
Metering (continued)												
Maximum and minimum demand values		•	•	•	•	•	•	•	•	•	•	•
Three-phase voltages	VA, VB, VC	—	—	•	•	•	•	•	—	•	•	•
Sequence voltages	V1, V2, V0	—	—	•	•	•	•	•	—	•	•	•
Ground voltage	VG	—	—	•	•	—	—	•	—	—	—	•
RTD/mA measurement		—	—	—	—	—	—	—	◦	◦	—	—
Frequency	f	—	—	•	•	•	•	•	—	•	•	•
Power and energy (1-phase, 3-phases) and power factor	P, E and PF	—	—	•	•	•	•	•	—	•	•	•
Automation & Communications												
Max number of Digital Inputs		18	8	16	12	14	8	12	12	14	8	12
Max number of Digital Outputs		13	10	10	10	13	10	10	10	13	10	10
RTD via RIO600[1]		—	—	—	—	—	•[1]	•	•	•	•	•
Max number of High-Speed Outputs (HSOs are optional and take the place of some digital outputs)		3	3	3	3	3	3	3	3	3	3	3
Current and Voltage sensor inputs		—	—	—	—	—	—	—	—	—	•	—
Sample values per IEC 61850-9-2LE		—	—	—	—	—	—	—	—	◦	◦	◦
Front 100Base-TX Ethernet (RJ45) port		•	•	•	•	•	•	•	•	•	•	•
Rear 100Base-TX Ethernet (RJ45) port		◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦
Rear 100Base-FX Ethernet (LC) port		◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦
Rear 100Base-TX Ethernet (RJ45) + RS-485 (1x4-wire or 2x2-wire) + IRIG-B ports		◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦
Rear [2 * Ethernet 100FX (LC) + Ethernet 10/100BaseT (RJ45) + serial glass fiber (ST)] w HSR/PRP		—	—	—	—	◦[1]	◦[1]	◦	◦	◦	◦	◦
Rear 100Base-FX Ethernet(LC) + RS-485(1x4-wire or 2x2-wire) + IRIG-B ports		◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦
Rear 100Base-TX and -FX Ethernet (1 * LC, 2 * RJ45) + serial glass fiber (ST) ports w HSR/PRP [3]		◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦
Rear 100Base-TX Ethernet (3 * RJ45) + serial glass fiber (ST) ports with HSR/PRP		◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦
Rear [2 * Ethernet 100FX (LC) + Ethernet 10/100BaseT (RJ45)] w HSR/PRP		—	—	—	—	—	—	—	◦	◦	◦	◦
Rear 100Base-TX Ethernet (3 * RJ45) w HSR/PRP		—	—	—	—	—	—	—	◦	◦	◦	◦
Ethernet 100Base-TX (RJ45) + configurable RS232/RS485 + [RS485 or serial glass fiber (ST) + IRIG-B] ports[2]		—	—	—	—	—	—	—	◦	◦	◦	◦
DNP3.0, Modbus, and IEC61850 communication protocols		•	•	•	•	•	•	•	◦	◦	◦	◦
Records												
Sequence of events recorder	SER	•	•	•	•	•	•	•	•	•	•	•
Fault recorder	FLR	•	•	•	•	•	•	•	•	•	•	•
Digital fault (waveform) recorder	DFR	•	•	•	•	•	•	•	•	•	•	•
Load profile	LoadProf	—	—	—	—	—	—	—	•	•	•	•
Digital Fault Recorder signal channels (Analog/Digital)		4/64	4/64	4/64	4/64	4/64	4/64	4/64	12/64	12/64	12/64	12/64
Events recorder (FIFO), 1ms resolution		1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024
Fault records		128	128	128	128	128	128	128	128	128	128	128

1 REM615 Firmware version 4.2 must be selected
2 May not be combined with Arc Flash Detection (AFD) option
3 HSR/PRP Redundancy option available only for 615 series 4.2 and 5.0 FP1 and 620 series 2.1

Analog inputs
- Three phase currents: 5/1 A programmable
- Ground current: 5/1 A programmable or 0.2 A Rated frequency: 60/50 Hz programmable
- Three-phase and ground voltages: programmable nominal secondary voltage (available as options)

Binary inputs and outputs
- Four, eight with VT inputs, binary inputs standard
- Two NO outputs with trip circuit monitoring
- Three NO outputs
- One Form C output and self-check alarm output
- Additional binary inputs and outputs available as options

Communication
- IEC 61850-8-1 with GOOSE messaging
- DNP3.0 Level 2+ over TCP/IP
- Modbus over TCP/IP
- Time synchronization via SNTP (primary and backup servers)
- Optional serial RS-485 port programmable for DNP3.0 Level 2+ or Modbus RTU
- Optional IRIG-B time synchronization
- Optional HSR/PRP communication (available with REM615 V4.2 and latest)
- Optional time synchronization via IEEE1588v2 (available with REM615 V5.0 FP1 and latest)
- IEC 61850-9-2-LE (available with REM615 V5.0 FP1 and latest)

Product dimensions and weights
- Frame: 6.97” (177 mm) W x 6.97” (177 mm) H
- Case: 6.57” (165 mm) W x 6.30” (160 mm) H x 6.10” (155 mm)
- Weight: Relay - 7.72 lbs. (3.5 kg); Draw-out unit - 3.97 lbs. (1.8 kg)

Tools
- PCM600 V2.8 for setting, configuration and data retrieval
- COM600 Station Automation series products V5.0
- Web browser based user interface (IE 11.0 or later)

Certificates
- UL Listed product, File E103204

Control voltage
- Option 1: 48 ... 250 V dc, 100 … 240 V ac
- Option 2: 24 ... 60 V dc

Notes

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1MAC259118-DB REV D DEC 2017