

AQ-F213 Feeder Protection IED

The AQ-F213 IED provides optimal performance for main medium voltage or back-up high voltage protection, control and monitoring applications. The AQ-F213 integrates protection, control, monitoring, measuring, communication and extensive diagnostics information in a one compact package. Fully modular hardware construction gives a high level of flexibility; additional I/O or communication cards can be simply plugged in according to application needs.

The AQ-F213 is developed using the latest available technologies providing a totally new dimension and options to protection engineers. Maximum usability of the IED is guaranteed by features such as graphical interfaces, highly customizable HMI, file storage of pdf or other supportive documents and extensive user log information. Easy to use and powerful configuration and setting software tools are provided free of charge.

The AQ-F213 communicates using variety of standard protocols including IEC 61850 substation communication standard.

Benefits

Scalable functionality

- From basic to comprehensive protection packages
- Allows for on-site upgrades
- Integrated protection, control, measurement, monitoring, communication and extensive diagnostic functions

Ultimate usability

- Large customizable HMI with configurable
- Mimic diagram
- Integrated file storage for protection documentation and note pages for user comments
- Extensive log and diagnostics information of all executed and received events
- 16 freely configurable multi-colour LEDs

Performance

- Sub-cycle instantaneous trip times
- Distinctive protection accuracy
- Fast integrated arc protection
- Fast power up for protection
- Powerful PLC programming included for the most demanding applications allowing for extensive customization

High recording capacity

- 60MB memory for disturbance records
- Up to 15000 events in permanent flash memory

Software Tools

- Easy to use and powerful AQtivate 200 freeware for setting and configuration
- AQviewer freeware for comtrade file analysis

Wide range of standard serial or Ethernet based communication protocols

- IEC 61850, HSR, PRP
- IEC 103/101/104, Modbus, DNP 3.0, SPA
- NTP, Precision Time Protocol (PTP) according to IEEE 1588



Exclusive features

- Frequency independent protection at 6...75Hz
- Download test reports, manuals or comment files to IED memory
- Safe Setting mode for secure setting change and commission or maintenance testing

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Features

Name	IEC	ANSI	Description	Function package				
				A	B	C	D	E
NOC(4)	I>	50/51	Overcurrent protection (4 stages)	✓	✓	✓	✓	✓
NEF(4)	I0>	50N/51N	Earth fault protection (4 stages)	✓	✓	✓	✓	✓
CUB(4)	I2>	46/46R/46L	Negative sequence overcurrent / phase current reversal / unbalance protection (4 stages)	✓	✓	✓	✓	✓
HOC(4)	Ih>	50h/51h/68H	Detection/blocking/tripping from selectable 2nd ... 19th harmonic (4 stages)	✓	✓	✓	✓	✓
DOC(4)	IDir>	67	Directional overcurrent protection (4 stages)				✓	✓
DEF(4)	IDir>	67N	Directional residual overcurrent protection (4 stages)			✓	✓	✓
CBF(1)	CBFP	50BF/52BF	Breaker failure protection	✓	✓	✓	✓	✓
REF(1)	I0d>	87N/64REF	Low and high impedance restricted earth fault, cable end differential protection	✓	✓	✓	✓	✓
TOLF1	TF>	49L	Feeder thermal overload protection	✓	✓	✓	✓	✓
OV(4)	U>	59	Overvoltage protection (4 stages)				✓	✓
UV(4)	U<	27	Undervoltage protection (4 stages)				✓	✓
NOV(4)	U0>	59N	Neutral voltage protection (4 stages)			✓	✓	✓
FRQV1	f>/<	81O/81U	Frequency protection (8 stages)				✓	✓
VUB(4)	U1&U2>/<	59P/27P/47	Sequence voltage protection (4 stages)					✓
OPW(1)	P>	32O	Over power					✓
UPW(1)	P<	32U	Under power					✓
RPW(1)	Pr	32R	Reverse power					✓
ROCOF1	df/dt	81R	Rate of change of frequency (8 stages)					✓
IMP(1)	Z<	78	Vector Jump					✓
ARC(1)	IArc>/I0Arc>	50Arc/50NArc	Arc protection (Option)	✓	✓	✓	✓	✓
SG	-	-	Set group settings (8)	✓	✓	✓	✓	✓
OBJ	-	-	Object control (5)	✓	✓	✓	✓	✓
AR	0 → 1	79	Autoreclosing function	✓	✓	✓	✓	✓
CLP	CLPU	-	Cold load pick-up	✓	✓	✓	✓	✓
SOF	SOTF	-	Switch on to fault logic	✓	✓	✓	✓	✓
CTS	-	-	Current transformer supervision	✓	✓	✓	✓	✓
VT	-	60	Fuse failure				✓	✓
DR	-	-	Disturbance recorder	✓	✓	✓	✓	✓
CBW	-	-	Circuit breaker wear monitor	✓	✓	✓	✓	✓
THD	-	-	Total harmonic distortion				✓	✓
FLOC	-	21FL	Fault locator				✓	✓

Measurement function	Function package				
	A	B	C	D	E
Current (IL1, IL2, IL3, I01, I02)	✓	✓	✓	✓	✓
Voltages (U1, U2, U3)			✓	✓	✓
Power (P, Q, S & PF)			✓	✓	✓
Energy (E+, E-, Eq+, Eq-)			✓	✓	✓
Voltage and current harmonics			✓	✓	✓

Communication protocols	Function package				
	A	B	C	D	E
IEC 61850		✓	✓	✓	✓
FTP, SNTP	✓	✓	✓	✓	✓
IEC 60870-5-103	✓	✓	✓	✓	✓
IEC 60870-5-101	✓	✓	✓	✓	✓
IEC 60870-5-104	✓	✓	✓	✓	✓
Modbus RTU	✓	✓	✓	✓	✓
Modbus TCP/IP	✓	✓	✓	✓	✓
DNP 3.0	✓	✓	✓	✓	✓
DNP 3.0 over TCP/IP	✓	✓	✓	✓	✓
SPA	✓	✓	✓	✓	✓

Hardware (all function packages)

Phase current inputs (1/5A settable)	3
Residual current inputs (0.2/15A settable)	2
Voltage inputs	3
Digital inputs standard	6
Output relays standard	6
Digital inputs optional	up to 24
Output relays optional	up to 15
RTD / mA inputs optional	8
Power supply (85-265Vac/dc or 18-72 Vdc)	✓

Communications (all function packages)

RJ 45 Ethernet 100M (Front)	✓
RJ 45 Ethernet 100M (rear)	✓
RS 485 (rear)	✓
2 x Fiber optic Ethernet 100M (rear)	option
Serial fiber & RS 232 (rear)	option

Electrical environment compatibility (all function packages)

CE approved	EN 50081-2, EN 50082-2
Emission (conducted, emitted)	EN 55011 Class A
Electrostatic discharge (ESD)	IEC 244-22-2 and EN61000-4-2, class III
Burst immunity	IEC 60255-22-1
Electrical Fast Transients (EFT)	EN 61000-4-4, class III and IEC801-4, level 7
Surge	EN61000-4-5, level 4
RF electromagnetic field test	EN 61000-4-3, class III
Conducted RF field	EN 61000-4-6, class III
Power frequency magnetic field	EN 61000-4-8
Insulation test voltage	IEC 60255-5
Impulse test voltage	IEC 60255-5

Physical environment compatibility (all function packages)

Vibration test	IEC 60255-21-1
Shock/Bump test acc. to	IEC 60255-21-2
Damp heat	IEC 60068-2-30
Dry heat	IEC60068-2-2
Cold test	IEC 60068-2-1
Casing protection degree	IP54 front, IP21 rear
Ambient service temperature range	-35... +70°C
Transport and storage temperature range	-40...70°C