

AQ-G257 Generator protection device



Description

The AQ-G257 generator protection device is well-suited for large machines that require complete generator protection and differential protection. The device has an integrated automatic voltage regulator function. You can add up to nine (9) I/O or communication modules into the device for extensive monitoring and control applications. You can also connect up to sixteen (16) RTD signals for thermal alarming and tripping. AQ-G257 communicates using various protocols, including the IEC 61850 substation communication standard.

The AQ-G257 generator protection device has two software options: the “A” variant (AQ-G257A) includes all the standard generator protection functions, while the “B” variant (AQ-G257B) also includes the synchronizer function. For more details on the software options, please see the order code below.

Highlights:

- Complete synchronous machine protection
- Integrated differential protection
- Power measurement accuracy of up to 0.2 %

Technical data

PROTECTION

- Non-directional overcurrent ($I_{>}$; 50/51) - 4 stages (INST, DT or IDMT)
- Non-directional earth fault ($I_{O>}$; 50N/51N) - 4 stages (INST, DT or IDMT)
- Directional overcurrent ($I_{dir>}$; 67) - 4 stages (INST, DT or IDMT)
- Directional earth fault ($I_{Odir>}$; 67N/32N) - 4 stages (INST, DT or IDMT)
- Negative sequence overcurrent/ Phase current reversal/ Current unbalance ($I_{2>}$; 46/46R/46L) - 4 stages (INST, DT or IDMT)
- Harmonic overcurrent ($I_{h>}$; 50H/51H/68H) - 4 stages (INST, DT or IDMT)
- Circuit breaker failure protection (CBFP; 50BF/52BF)
- High-impedance or low-impedance restricted earth fault/ Cable end differential ($I_{Od>}$; 87N)
- Overvoltage ($U_{>}$; 59) - 4 stages (INST, DT or IDMT)
- Undervoltage ($U_{<}$; 27) - 4 stages (INST, DT or IDMT)
- Neutral overvoltage ($U_{O>}$; 59N) - 4 stages (INST, DT or IDMT)
- Sequence voltage ($U_{1/U2>/<}$; 47/27P/59PN) - 4 stages (INST, DT or IDMT)
- Overfrequency and underfrequency ($f_{>/<}$; 81O/81U) - 8 stages (INST or DT)
- Rate-of-change of frequency ($df/dt_{>/<}$; 81R) - 8 stages (INST or DT)
- Power protection (P, Q, S $_{>/<}$; 32) - 4 stages (DT)
- Generator/transformer differential ($I_{dx>}$; 87T/87G/87M/87N)
- 100 % stator earth fault ($U_{O3rd>}$; 64S)
- Underexcitation ($Q_{<}$; 40)
- Underimpedance ($Z_{<}$; 21U)
- Underreactance ($X_{<}$; 21/40)
- Voltage-restrained overcurrent ($I_{v>}$; 51V)
- Inadvertent energizing ($I_{>U<I.A.E.}$; 50/27)
- Volts-per-hertz overexcitation ($V/Hz_{>}$; 24)
- Power factor protection ($PF_{<}$; 55)
- Pole slip/Out-of-step protection (78)
- Machine thermal overload ($TM_{>}$; 49M)
- Voltage memory
- Resistance temperature detectors (RTD)
- Programmable stage ($PGx_{>/<}$; 99)
- Arc protection ($I_{Arc>/IOArc>}$; 50Arc/50NArc) (optional)

CONTROL

- Number of objects to control and monitor: 10
- Number of indicators to monitor: 10
- Number of setting groups: 8
- Vector jump ($\Delta\phi$; 78)
- Synchrocheck ($\Delta V/\Delta a/\Delta f$; 25)
- Synchronizer ($\Delta V/\Delta a/\Delta f$; 25) (optional)

MEASURING AND MONITORING

- Phase, sequence and residual currents (IL1, IL2, IL3, IO1, IO2)
- Phase, sequence and residual voltages (UL1, UL2, UL3, UL12, UL23, UL31, U0)
- Frequency (f)
- Power (P, Q, S, pf) and Energy (E+, E-, Eq+, Eq-)
- Power and energy class 0.5
- Power and energy measurement accuracy of up to 0.2 % (optional)
- Current transformer supervision - 2 instances
- Voltage transformer supervision (60)
- Circuit breaker wear monitoring
- Total harmonic distortion (current)
- Total harmonic distortion (voltage)
- Measurement recorder
- Measurement value recorder
- Event recorder (max. 15 000 permanent event records)
- Disturbance recorder (max. 100 records á 5 seconds at 3.2 kHz sampling)

HARDWARE

- Current inputs: 10
- Voltage inputs: 4
- Digital inputs (fixed): 3
- Digital outputs (fixed): 5
- Number of empty slots: 9
- Digital inputs: +8/16/24/32/40/48/56/64/72 (optional)
- Digital outputs: +5/10/15/20/25/30 (optional)
- High-speed high-current output module (optional)
- Milliampere I/O module (4 mA inputs + 1 mA output) (optional)
- Milliampere I/O module (4 mA outputs + 1 mA input) (optional)
- RTD input module (8 RTD inputs) (optional)
- Arc protection module (4 sensors + 2 HSO + 1 BI) (optional)
- Communication media (see "Communication" below)
- External I/O modules (see "Accessories" below)

COMMUNICATION

Communication inputs

- RJ-45 100 Mbps Ethernet (front panel, fixed)
- RJ-45 100 Mbps Ethernet and RS-485 (rear panel, fixed)
- Double RJ-45 Ethernet & IIRIG-B communication module (optional)
- Double ST Ethernet & IIRIG-B communication module (optional)
- Double SFP Ethernet & IIRIG-B communication module (optional)
- Double LC (HSR/PRP) Ethernet communication module (optional)
- Double RJ-45 (HSR/PRP) Ethernet communication module (optional)
- RS-232 & serial fiber communication module (optional)

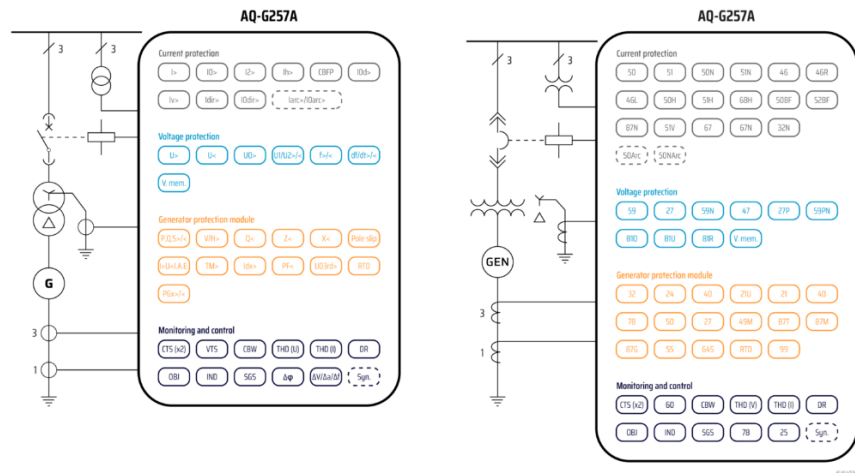
Communication protocols

- IEC 61850 (edition 1)
- IEC 61850 (edition 2)
- IEC 60870-5-101/104
- IEC 60870-5-103
- Modbus/RTU and Modbus/TCP
- DNP3
- SPA

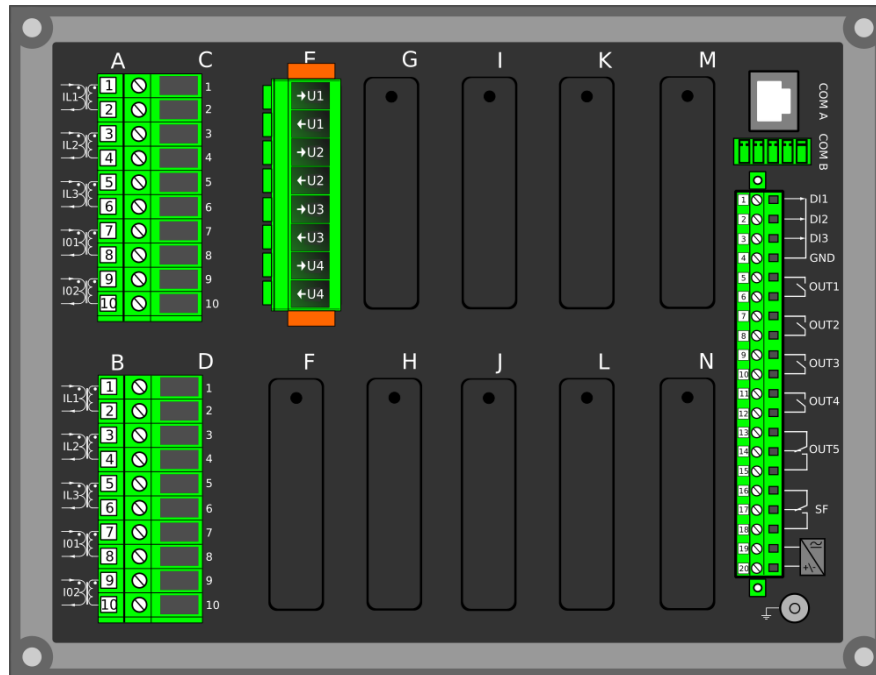
ACCESSORIES

- AX007 External 6-channel 2-/3-wire RTD input module (pre-configured)
- AX008 External 8-channel thermocouple and mA input module (pre-configured)
- AX013 Raising frame (120 mm)
- AX014 Raising frame (40 mm)
- AX015 Wall mounting bracket

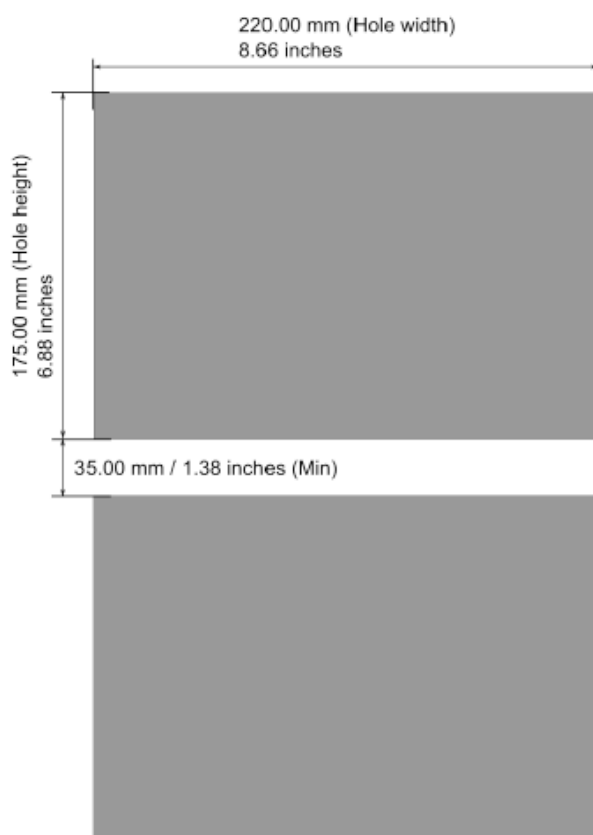
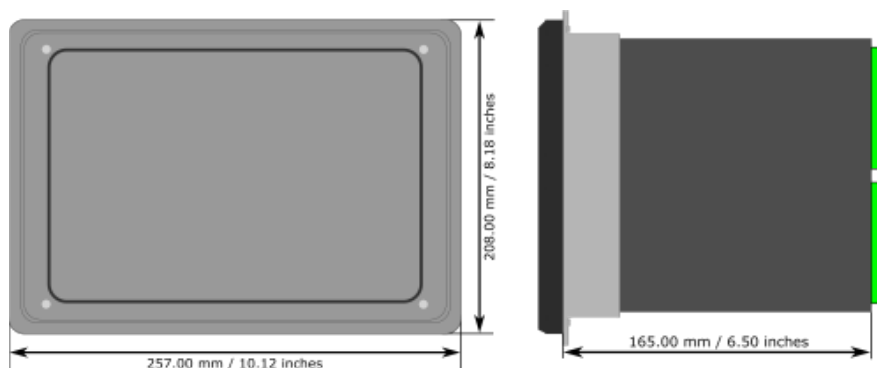
Application Drawing



Device Rear Image



Device and Cut-out Image



AQ - G 2 5 7 X - P X X X A X A - X X X X X X X X X X

- * One card at most per IED
- ** Two cards at most per IED
- *** Can only be applied to the two last slots
- **** Five cards at most per IED