

AQ-T257 Transformer Protection Device



Description

AQ-T257 is a transformer protection device with a differential protection function and an integrated automatic voltage regulator function. The relay also provides complete current-based and voltage-based protection functions as well as full measurements. You can add up to nine (9) I/O or communication cards into the device for extensive monitoring and control applications. AQ-T257 communicates using various protocols, including communication according to the IEC 61850 standard.

AQ-T257 has two software options: the “A” variant (AQ-T257A) includes all the protection functions for transformers including differential protection, while the “B” variant (AQ-T257B) also includes the automatic voltage regulator that allows you to control more than one transformer at the same time. For more details on the software options, please see the order code below.

CONFIGURE AQ-T257A IN THE PRODUCT CONFIGURATOR

CONFIGURE AQ-T257B IN THE PRODUCT CONFIGURATOR

Highlight:

- A large I/O capacity.
- Automatic/manual voltage regulating (AVR) and/or parallel voltage regulating.
- Complete transformer protection.
- 2nd and 5th harmonic blocking.
- Automatic verification of a connection group and nominal value settings.
- Overloading and through fault statistics for preventive maintenance.

- Power and energy measurement accuracy of up to 0.2 %.

Technical data

SOFTWARE OPTIONS

AQ-T257A – Standard transformer protection functionality

AQ-T257B – Standard transformer protection functionality + Transformer AVR (automatic voltage regulator)

PROTECTION

- Non-directional overcurrent ($I_{>}$; 50/51) - 4 stages
- Non-directional earth fault ($I_{0>}$; 50N/51N) - 4 stages
- Directional overcurrent ($I_{dir>}$; 67) - 4 stages
- Directional earth fault ($I_{0dir>}$; 67N/32N) - 4 stages
- Negative sequence overcurrent/ Phase current reversal/ Current unbalance ($I_{2>}$; 46/46R/46L) - 4 stages
- Harmonic overcurrent ($I_{h>}$; 50H/51H/68H) - 4 stages
- Circuit breaker failure protection (CBFP; 50BF/52BF)
- High-impedance or low-impedance restricted earth fault/ Cable end differential ($I_{0d>}$; 87N)
- Overvoltage ($U_{>}$; 59) - 4 stages
- Undervoltage ($U_{<}$; 27) - 4 stages
- Neutral overvoltage ($U_{0>}$; 59N) - 4 stages
- Sequence voltage ($U_1/U_2>/<$; 47/27P/59PN) - 4 stages
- Overfrequency and underfrequency ($f>/<$; 81O/81U) - 8 stages
- Rate-of-change of frequency ($df/dt>/<$; 81R) - 8 stages
- Power protection (P, Q, S>/<; 32) - 4 stages
- Transformer status monitoring
- Transformer thermal overload ($TT_{>}$; 49T)
- Generator/motor/transformer differential ($I_{dx>}$; 87T/87G/87M/87N)
- Volts-per-hertz overexcitation ($V/Hz_{>}$; 24)
- Underimpedance ($Z_{<}$; 21U)
- Pole slip/Out-of-step protection (78)
- Resistance temperature detectors (RTD)
- Programmable stage ($PSx>/<$; 99)
- Arc protection ($I_{Arc>}/I_{0Arc>}$; 50Arc/50NArc) (optional)

CONTROL (AQ-T257A)

- Number of objects to control and monitor: 10
- Number of indicators to monitor: 10
- Number of setting groups: 8
- Cold load pick-up (CLPU)
- Switch-on-to-fault (SOTF)
- Vector jump ($\Delta\phi$; 78)
- Synchrocheck ($\Delta V/\Delta a/\Delta f$; 25)

CONTROL (AQ-T257B)

- Number of object to control and monitor: 10
- Number of indicators to monitor: 10
- Number of setting groups: 8
- Cold load pick-up (CLPU)
- Switch-on-to-fault (SOTF)
- Automatic voltage regulator – parallel control (AVR; 90)
- Vector jump ($\Delta\phi$; 78)
- Synchrocheck ($\Delta V/\Delta a/\Delta f$; 25)

MONITORING

- Current transformer supervision - 2 instances
- Voltage transformer supervision (VTS; 60)
- Circuit breaker wear monitoring
- Total harmonic distortion (current)
- Total harmonic distortion (voltage)
- Fault locator (21FL)
- 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)

MEASUREMENTS

- 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 measurement accuracy of 0.5 %
- Power and energy measurement accuracy of up to 0.2 % (optional)

HARDWARE

Standard hardware

- Current inputs: 10
- Voltage inputs: 4
- Digital inputs: 3
- Digital outputs: 5
- Number of empty slots: 9

Optional hardware modules

- Digital input module (8 x DI)
- Digital output module (5 x DO)
- High-speed high-current output module (3 x out)
- Milliampere input module (4 x mA in, 1 x mA out)
- Milliampere output module (4 x mA out, 1 x mA in)
- RTD input module (8 RTD inputs)
- Arc protection module (4 x channels, 2 x HSO, 1 x BI)
- Communication media (see "Communication" below)
- External I/O modules (see "Accessories" below)

COMMUNICATION

Standard communication ports

- RJ-45 100 Mbps Ethernet (front panel)
- RJ-45 100 Mbps Ethernet and RS-485 (rear panel)

Optional communication modules

- Double RJ-45 Ethernet & IRIg-B communication module
- Double ST Ethernet & IRIg-B communication module
- Double SFP Ethernet & IRIg-B communication module
- Double LC (HSR/PRP) Ethernet communication module
- Double RJ-45 (HSR/PRP) Ethernet communication module
- RS-232 & serial fiber communication module

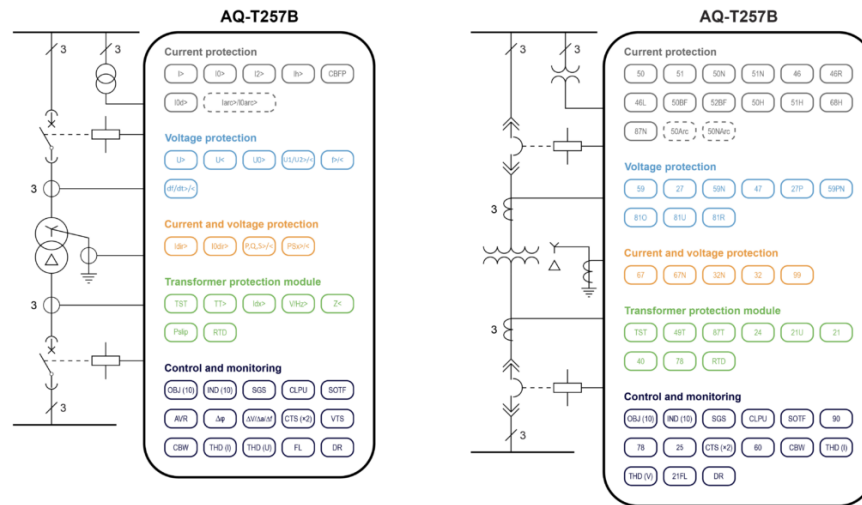
Communication protocols

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

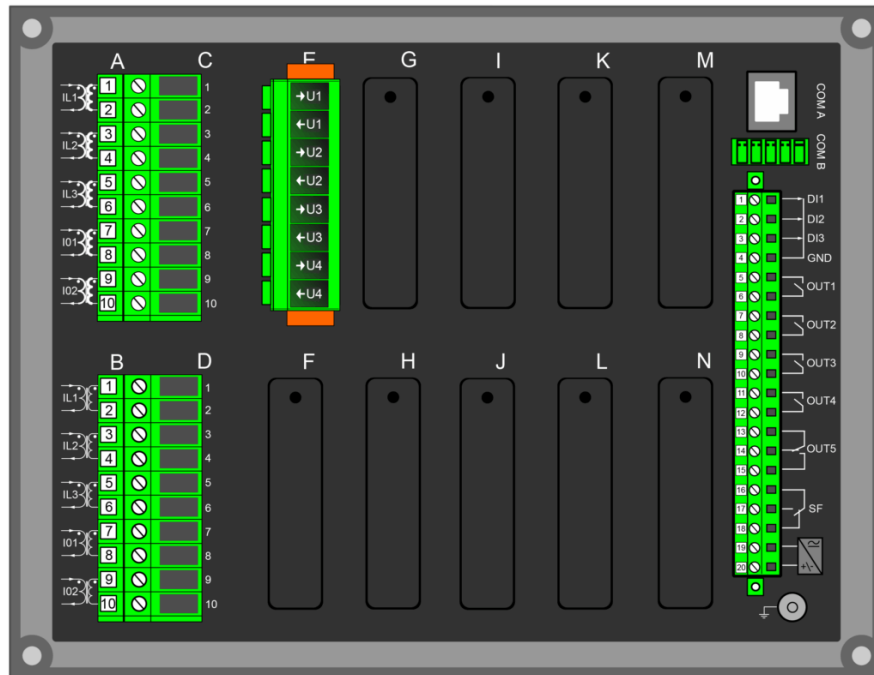
ACCESSORIES

- 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
- AX020 SFP module (2 km, MM)
- AX021 SFP module (40 km, SM)
- AX022 SFP module (120 km, SM)

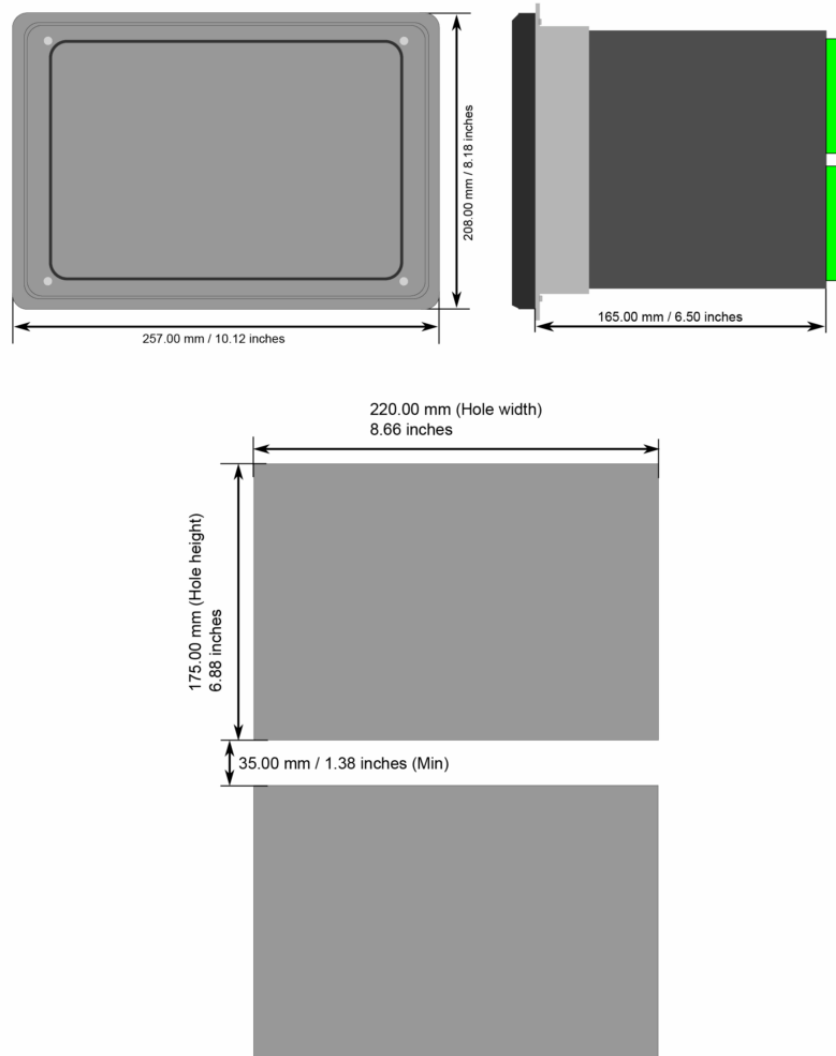
Application Drawing



Device Rear Image



Device and Cut-out Image



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** Can only be applied to the four last slots. Requires an SFP adapter. See "Accessories" list.