Sepam S25/S35 specification

Protection and control unit specifications

All the basic **protection, measurement, operation and control / monitoring functions** shall be performed by the same digital Protection and Control unit.
Specific or complementary functions may however be provided by adding supplementary devices.
Since the Protection and Control unit is used as close as possible to the switchgear, it must meet the severest environmental withstand requirements, in particular:

IEC standards:
- 255-4 impulse withstand: 5 kV
- 255-22-1 1Mhz wave: Class III
- 255-22-4 fast transients: Class IV
- 255-22-3 electromagnetic radiation: 20 V/m minimum (30 V/m desirable).

The operating temperature shall be from - 5°C to + 55° C.
The Protection and Control unit range shall be designed to accommodate all types of auxiliary power supply voltages: 24, 48, 127, 220 Vdc, and all types of current sensors: 1A, 5A CT, or amagnetic sensors, and voltage sensors: 100, 110 V VT, 100/, 110/ VT.
The design and manufacturing process shall be ISO 9001 certified.

The unit shall be of the disconnectable or withdrawable type to facilitate replacement.
It should be possible to withdraw the unit without prior current circuit short-circuiting.
Each unit terminal shall accommodate 2.5 mm^2 wiring and 6 mm^2 wiring for the current circuits.

The output relays shall be capable of withstanding steady state current of 8 A.
The logic inputs, which shall have the same voltage rating as the auxiliary power supply, shall comply with the standards (IEC 11-32) relative to PLCs and the logic input drawn current shall be at least 4 mA

Operating dependability
The Protection and Control unit shall include:
- an internal function self-monitoring mechanism, which activates at least one (2 desirable) fail-safe watchdog changeover contacts
- an automatic device for switching to the fail-safe position, with disabling of output controls when an major internal failure is detected
- indication on the front of the device by signal lamps and messages indicating self-test status.

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Functions

Protection
Each Protection and Control Unit shall contain all the necessary protections, the number and type of which depend on the application being considered.
Each protection device shall have wide setting ranges, in particular for current protections, providing a choice of curve types (definite time) DT, (IDMT) SIT, VIT, EIT, UIT and time delay settings from Instantaneous (50 ms) to 500 s, as a minimum.
Overload protection will be based on through RMS current value (up to a minimum 17th harmonic)
Setting shall be performed by the direct input of primary current values.
Sensitive earth fault pick-up may reach 100 mA primary.
The unit shall allow for the use of upstream and downstream logic discrimination, this applying to protection plans using IDMT times as well.
Alternative Overcurrent Setting groups will be selectable by logical conditions to adapt fast protection plan change .
Protection tripping shall be indicated on the front of the device by a signal lamp and a message indicating the cause of the fault.

Measurement
Each Protection and Control unit shall include the measurements needed for operation and commissioning, i.e. at least the following:
- phase current measurement
- maximum phase current demand
- measurement of fault current broken in each phase
- additional measurements such as residual current, Phase RMS current...

Measurement accuracy shall be 1% for active and reactive power, 0,5% for currents and voltages.
If required by the application, the unit shall include voltage, frequency and energy measurements.
For power and energy data, the unit shall measure real and reactive values and take into consideration the direction of energy flow.

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Operation
The Protection and Control unit shall include an alphanumeric display unit (Display indication will be visible from at least 2 m distance) that indicates:
■ measurement values
■ operating messages (choice of language to be specified on order, with a choice of at least the following: English, French, Italian, Spanish)
■ device maintenance messages
■ circuit breaker open or closed position, displayed on the front of the device by two signal lamps.
It shall be possible to make the settings and perform parameter setting via a portable terminal or a PC.
Access to setting mode will be protected by a personal customised password of at least 5 characters.

Control and monitoring
The Protection and Control unit shall include the logic inputs and outputs ressources required for control of the breaking devices (circuit-breaker or contactor) and for interfacing with the process to be monitored, comprising at least :

Basic features
■ CB open and close control, whatever the type of shunt trip or undervoltage release coil control
■ CB connected position
■ earthing switch closed position
■ lockout of closing order in the presence of a fault
■ monitoring of the circuit breaker operating mechanism and trip circuit supervision (covering power supply, wiring and coil)
■ detection of plugged in connectors
■ operation counter, fault trip counter, etc.
■ SF6 pressure (for SF6 circuit breakers)
■ cumulative total of KA2 broken
■ storage of information (even during auxiliary power supply outages).

PLC facilities
■ will have to use programmable electrician’s language
■ minima characteristics:
■ 24 digital inputs
■ 12 digital outputs
■ 16 event counters.

Sepam S25/S35 specification
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Communication

The Protection and Control unit may be fitted with a communication interface option of the RS 485 type, up to 38400 baud speed, MOD BUS Protocol.
The response time for control order will be less than 10 ms (time from order sent to the unit up to order acknowledgement)
The unit will provide time-tagging of events within a 1ms accuracy.
The unit will provide an adapted input for external clock synchronization .

Implementation

The Protection and Control unit shall be delivered ready to use. Only settings and parameter selection specific to the installation will need to be performed on site.

However, the unit shall include capacity for customisation and adaptation:
- extension of the number of logic inputs and outputs to at least 20 inputs and 10 outputs
- modification of the control logic program on request
- Control logic functions will be fully tested at the manufacturer factory and fully documented.

Maintenance

In order to reduce as minimum time to repair:
- the parameter and setting values shall be saved on a movable storage medium which is part of the unit
- after a spare hardware base has been set up, the proposed system shall enable restarting without any setting or use of special equipment.

Service

The supplier agrees to contribute advice, when required, at the time of protection plan design, and to carry out network coordination studies on request (including setting sheets) according to the best terms possible.

After-sales service shall be provided by the manufacturer's personnel, the manufacturer having a competent organisation and the equipment necessary for making quick diagnosis locally.
The list of maintenance service outlets shall be enclosed with the proposal.

References

The proposed Protection and Control unit supplier shall have a large number of international references with well-known industrialists and utilities.
The list of references shall be enclosed with the proposal.

Sepam S26/S36 specification

Protection and control unit specifications

All the basic **protection, measurement, operation and control / monitoring functions** shall be performed by the same digital Protection and Control unit.
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Overload protection will be based on through RMS current value (up to a minimum 17th harmonic)
Setting shall be performed by the direct input of primary current values.
Sensitive earth fault pick-up may reach 100 mA primary.
The unit shall allow for the use of upstream and downstream logic discrimination, this applying to protection plans using IDMT times as well.
Alternative Overcurrent Setting groups will be selectable by logical conditions to adapt fast protection plan change as well as Remote Setting facilities for thresholds and time delay adjustments.
Protection tripping shall be indicated on the front of the device by a signal lamp and a message indicating the cause of the fault.

Measurement
Each Protection and Control unit shall include the measurements needed for operation and commissioning, i.e. at least the following:
- phase current measurement
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Oscillography:
■ oscillography record will be triggered on event (automatic or manual)
■ each record will allow to store datas according following elements:
■ both 12 analog and 16 logic values
■ at least 6 cycles before, 60 cycles after the triggering event
■ Comtrade IEC 37-111 protocole
■ oscillography will allow record of 2 minimum events
■ unloading and analyse from local laptop or remote PC through communication with following facilities:
■ standard DOS and Windows 3.1 or 95 softwares use
■ single or multi curve display
■ 2 pointers differencial measurement
■ zooming
■ printing.

Communication

The Protection and Control unit may be fitted with a communication interface option of the RS 485 type, up to 38 400 baud speed, MOD BUS Protocol.
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