Calculations Toolbox, SPL

Application

SPIDER provides a powerful software package for uniform implementation of calculations. By using this function it becomes easy to define and to amend the calculations.

Calculations are defined interactively and performed on data in the Avanti™ real-time database. Calculated values are processed and presented by SPIDER in the same manner as collected or manually entered data.

The toolbox Calculations facilitates easy definition of both the specific calculation and the system data involved in the calculation.

The user does not need knowledge of programming languages nor the data access language, neither for defining nor for implementing the calculation.

Benefits

- The Calculation Toolbox provides the operator with a user friendly calculation capability.
- An advanced and powerful 4GL programming language is offered, the SPIDER Programming Language, SPL.
- Easy on-line calculation definition, by using a spreadsheet application.
- No knowledge of database structure required. Neither to define nor to implement the calculations.
- The system provides a set of predefined algorithms for typical power system calculations, such as Apparent Power, Current and Power Factor.

Functions

The Calculation toolbox consists of the following parts:

- Power Calculations
- General Purpose Calculations
- User Defined Calculations, SPL

The user specifies the calculation by using external names. The definition of a calculation is stored in the database and interpreted at run-time

The results of the calculation may either be status data, indications, or measurement data.

Calculated results can be supervised and event handled in the same way as collected data or manually entered data.

Calculations can be started:

- manually
- automatically, e.g. cyclically
- on demand, e.g. when an indication changes status
Power Calculations

SCADA Power Calculations are intended for common electrical calculations. There are a number of predefined algorithms available for basic electrical calculations. The operator only needs to specify the object identities.

SCADA Power Calculation function consists of the following electrical calculations:

- Apparent Power (S)
- Current (I)
- Power Factor (Cos ϕ)

The Calculation Menu gives the operator on-line control on the execution of individual calculations. The starting criterion and an individual ON/OFF toggle is available in the Menu.

General Purpose Calculations

These calculations are intended for common general purpose calculations. The operator only needs to specify database references in addition to algorithms. The four basic arithmetic operations (+,-,* /) can be used and the calculations can be arranged in a four level hierarchy.

User Defined Calculations, SPL

By using SPL, the SPIDER Programming Language, the user can define and implement general purpose calculations related to power system data.

Several point groups can be assigned to the same algorithm and vice versa. Using this technique the number of required specifications is limited to a minimum.

Objects are collected in groups, so called point groups, which in turn are assigned to the defined arithmetic functions or formulas.

Human Machine Interface (HMI)

The presentation of calculated data is made in operational pictures. The operator can interactively define how frequent the calculation shall be performed and the calculation can be blocked temporarily.

The operator is provided with special pictures for the specification and creation of the calculations.

A list of all power calculations can be displayed in a list requested from the Calculation Menu. The user may include a new calculation by selecting the next free index from the list and then entering the object identity.

The specification of General Purpose Calculations is displayed in a dedicated picture. The operator is also provided with the possibility to add, remove or replace objects, change formulas and manually enter values for objects.