Instead of a pre-defined set of protection functions, SIPROTEC 5 relays have a flexible system of Function Points. Each relay is ordered with a Function Point Class. In the DIGSI 5 Library a large range of protection and control functions are available – each with an associated function point consumption. Functions can be selected from the library to allow a customised protection application. At a later stage, if the application changes, any unwanted functions can be replaced with new functions from the library (Figure 1).
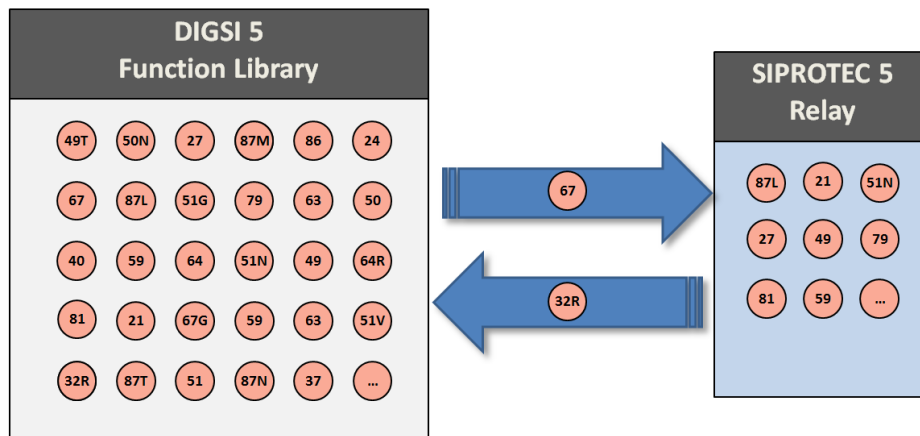

Figure 1. Transferring functions between the DIGSI 5 Library and a SIPROTEC 5 device.

At a later stage, if more function points are required for the application than were ordered in the device, additional points can be ordered and the additional license file applied via DIGSI 5 to the relay.

This document describes the use of the Single-Line Configuration view to select functions and transfer them to the device. An alternative method is to transfer the functions directly into the relay device in the Project Tree.

Within the Single-Line Configurator view, the function-groups and functions within each relay can be viewed by selecting the drop-down menu arrow for the device.
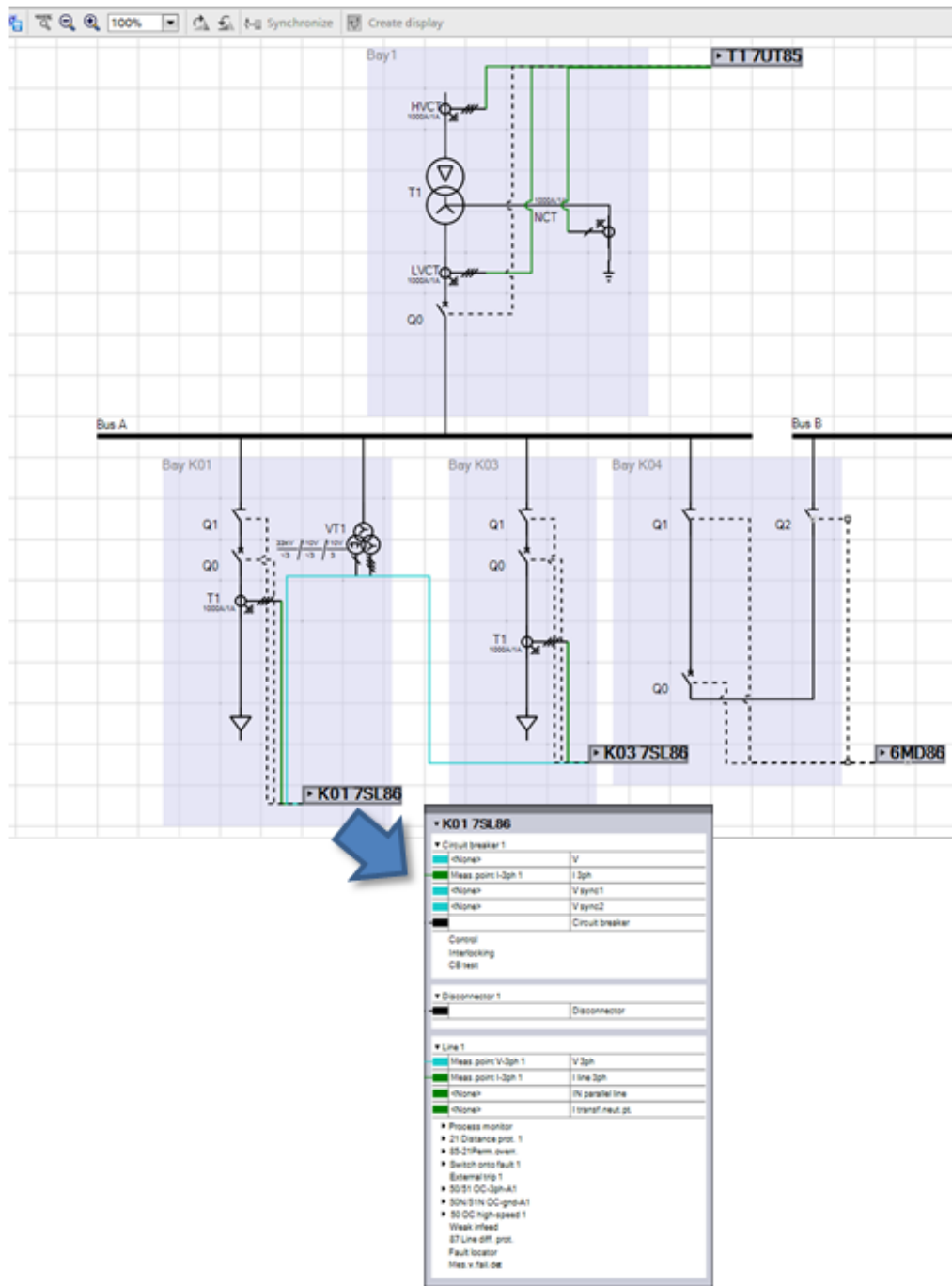

Figure 2. Single Line Configurator view. To see details of a SIPROTEC device select its drop-down arrow.

The available functions for each device type can be seen by navigating the DIGSI 5 Global Libraries. To add a function to a relay, select the function in the library and drag to the device (Figure 3).
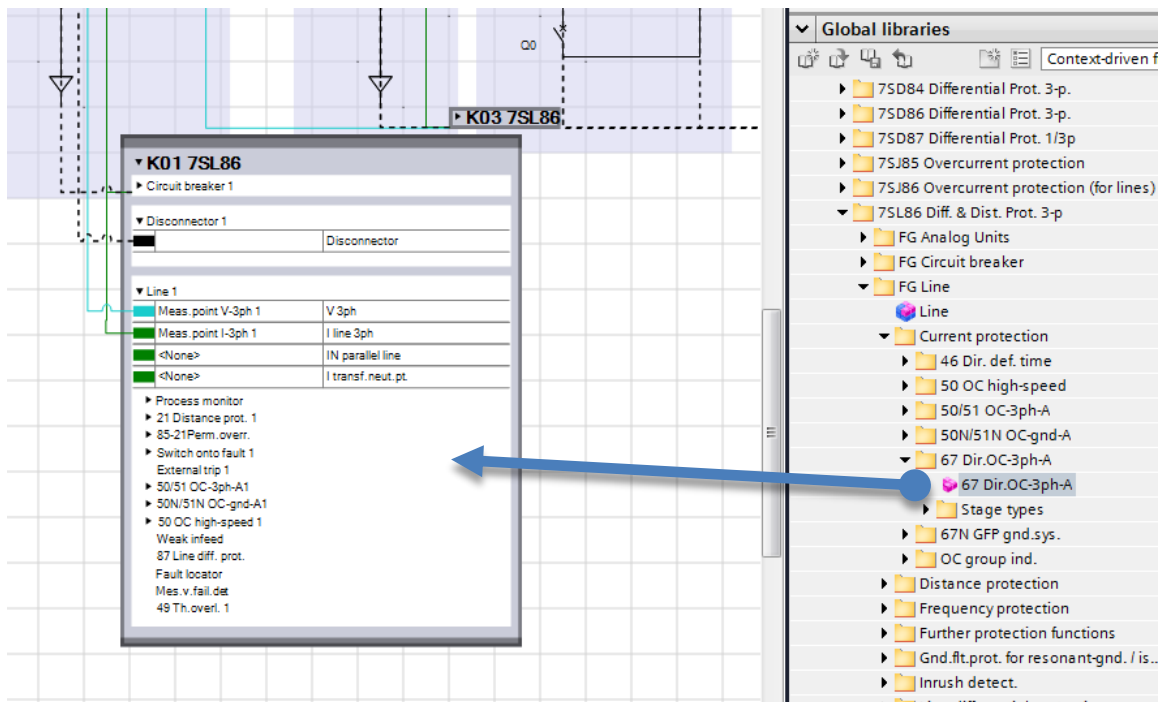

Figure 3. To add the 67 Dir. OC function, select it from the Global Library and drop into the device.

Double-clicking a function navigates to the setting page. Extra setting stages can be added here and the results seen graphically by selecting Diagram view.
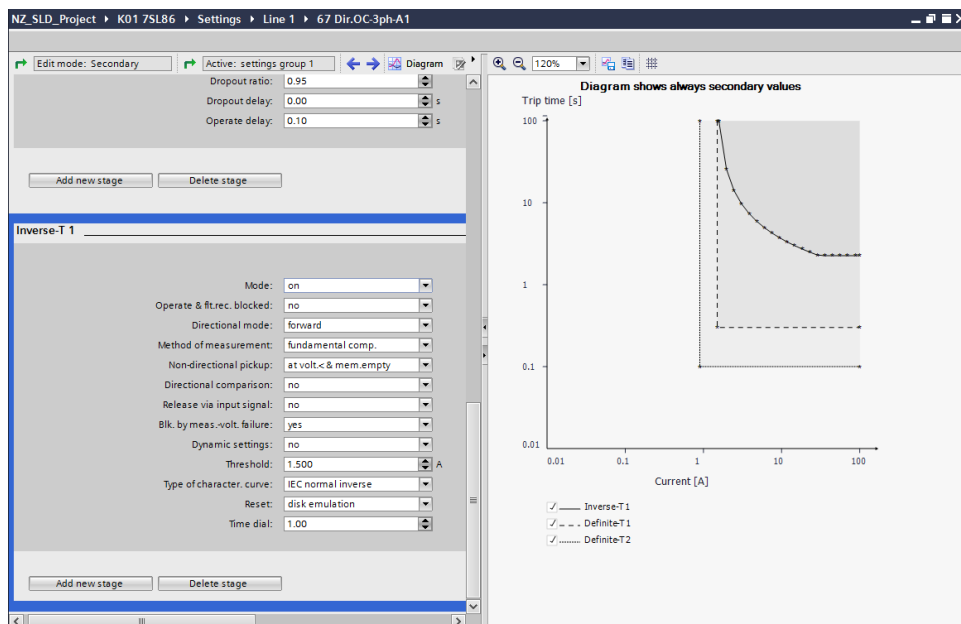

Figure 4. DIGSI 5 Settings editor showing the overcurrent settings in Diagram view.

The routing of each protection element to circuit breaker trip functions is configured in the Circuit Breaker Interaction settings tab. This is useful in applications such as a transformer where the desired circuit breaker tripping can be function-specific.

Protection group	Circuit breaker 1 Trip
(All)	(All)
49 Th.overl. 1	X
▶ 21 Distance prot. 1	X
▶ 85-21Perm.overr.	X
▶ Switch onto fault 1	X
▶ External trip 1	X
▶ 50/51 OC-3ph-A1	X
▶ 50N/51N OC-gnd-...	X
▶ 50 OC high-speed 1	X
▶ 87 Line diff. prot.	X
▼ 67 Dir.OC-3ph-A1	X
Definite-T 1	X
Definite-T 2	X
Inverse-T 1	X

Figure 5. Circuit Breaker Interaction view showing the tripping configuration of each protection function.

QUICK GUIDE TO: Monitoring function points used

The current Function Point consumption can be viewed in the Device Information View.

Function points

Function-points consumption

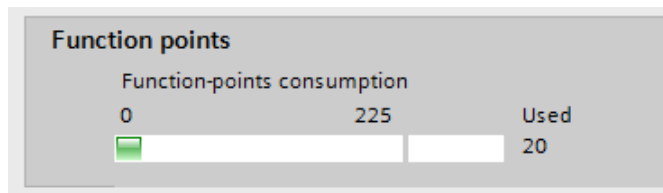| 0	225	Used
		20

Figure 6. Function point consumption monitor. Example showing 225 available in the relay, with 20 used.

Any unwanted functions can be deleted from the device by the right-click context menu. Any associated function points are automatically released by DIGSI.

Alternatively, to plan an application in advance without the use of DIGSI 5, the SIPROTEC 5 Online Configurator can be used to indicate the number of functions points required.

Figure 7. SIPROTEC 5 Online configurator, indicates the points required for available functions.

QUICK GUIDE TO: Changing the function point allowance

When a relay code is generated, such as using the online configurator (or in DIGSI 5 using the Hardware and protocol editor), the code includes the function point allowance that was specified. If additional functions are then added to the design which exceed the function point allowance (see prior section), the code will need to be updated, to allow future relays to be ordered with the appropriate function point allowance.

Right click on the relay (name) in the DIGSI 5 Project Tree, then select Properties from the menu. In the tab that opens, select the 'Settings' section from the tree in that tab. A pull down menu is provided to allow the Function-point class to be updated. [See Figure 8.]

This process may also be used to reduce the function point allowance specified by the order code, such as may be desired when a design is completed and not as many function points were used as expected.

Changing the Function Point allowance will update the relay 'Long' order (Product) code. (The order codes are found in the Device Information screen). The old short code (if displayed) will disappear. A new short code will only be shown if the 'TNS list' within DIGSI has that specific combination. The 'Update' button can be used to download an updated TNS list from Siemens website. If the short code is still not shown, but needed, then copy the displayed long product code and paste it into the Siemens website Online Configurator which will force the generation of a new short code.
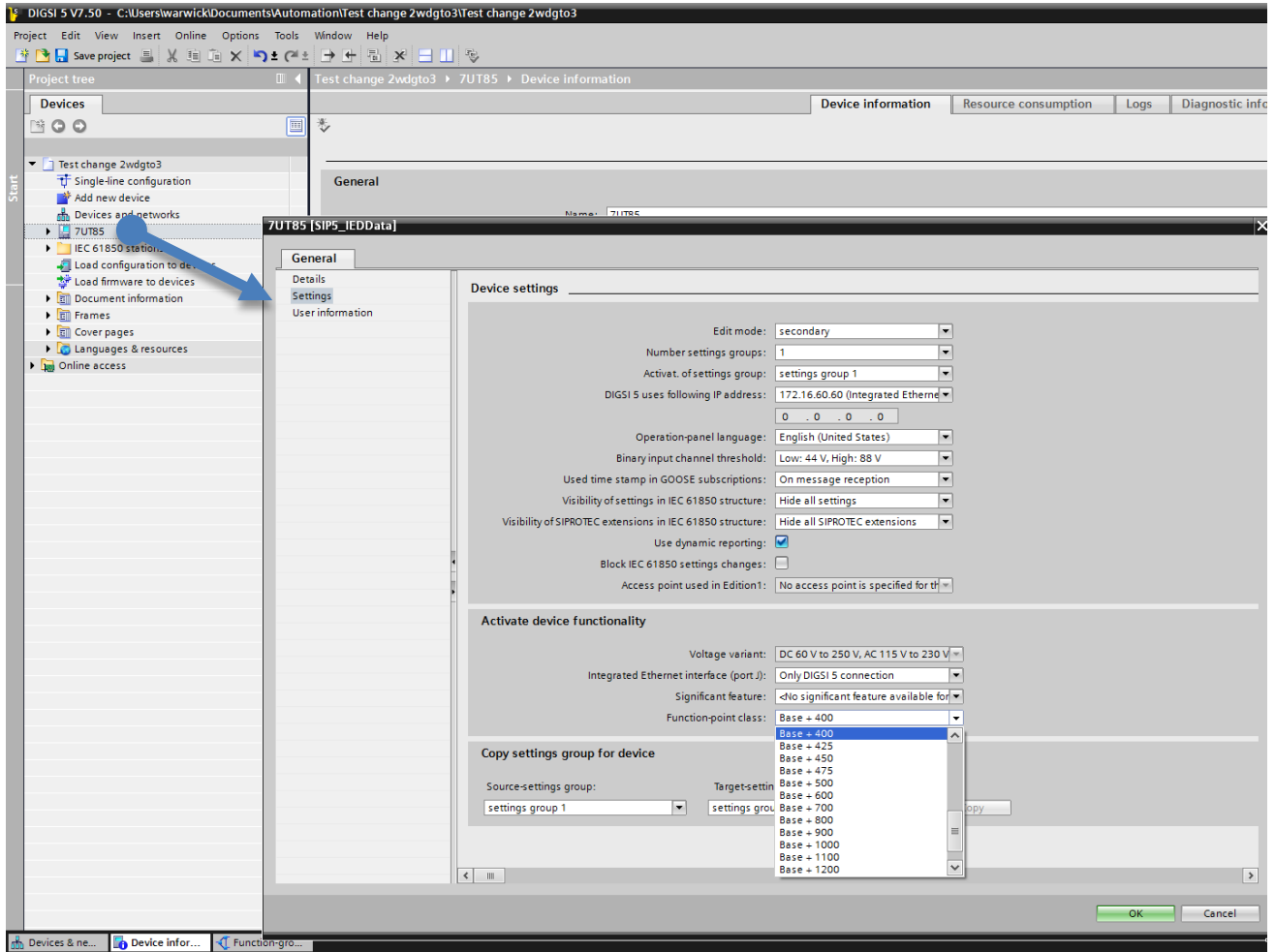
Figure 8. SIPROTEC 5 Online configurator, indicates the points required for available functions.

QUICK GUIDE TO: Upgrading Function Points (Adding points to the relay)

The Function Point Class of a relay device can be upgraded at any stage via a 'Device-functionality upgrade' file. This is the process of "adding more licenced points" to the relay. The relay serial number is specified and the upgrade is ordered from HV Power. The resulting file is applied via the DIGSI 5 'Upgrade Device Functionality' function from the Project Tree to the relay, increasing its function point allowance (and changing its long/short codes).
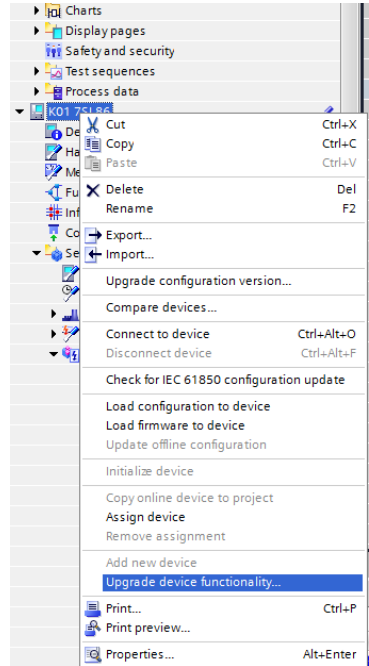
Figure 9. Upgrading the function points of a device.

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