Production in focus
Efficient process control with zenon

zenon®

Contents

S7 Graph Integration in zenon

The current market situation requires vehicle manufacturers to be more and more flexible. As a result there is a great deal of pressure on both the production plants and the employees. Today, machine operators often have to control and monitor various stations simultaneously. The deployed systems should thereby also support less qualified or inexperienced employees and support with troubleshooting.

Control programs are becoming increasingly complex due to the demand for enhanced flexibility in the production. For production processes in flow-production the "S7 Graph" programming system often comes into play. This programming language is appropriate for classical processes that are worked through step by step, such as in the following example: "Take component➔ position it for processing ➔ add glue ➔ attach other component to it ➔ transport the structure to the next production step".

The S7 Graph programming language makes it possible to display and correspondingly run such working processes graphically in the PLC. The module "PLC diagnosis" clearly displays the zenon sequence and supports with error analysis. The same familiar "optics" are used as seen in the control program. Additionally, the user has further information – such as the cause of an error in plain text – given as an overview, in order to monitor production processes even more precisely.

Simple Embedding in the zenon World

Engineering in the zenon screens to display the sequences is as simple as with all zenon functionalities. Appropriate templates for various monitor resolutions are available for screen creation. These can be used as standard or also according to individual requirements. You have the same flexibility here as with all zenon screens. For sequence specific display (e.g. sequence overview, individual step view or symbol table) corresponding screen elements are available.
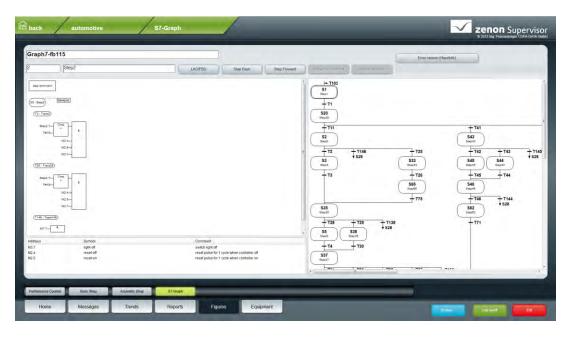
The associated online data of the sequence is transferred via corresponding variables from the control system. For generation of these communication variables the integrated zenon S7 Graph import supports here, automatically taking on all necessary settings.

Overview of Process States

All current states of steps are displayed online in the zenon Runtime. In addition to the display of the complete sequence in various colors for active and faulty steps, the contents of the active steps are displayed automatically in the individual step view. The user can therefore choose online between the Ladder Diagram (LAD) view or the Function Block Diagram (FBD). The individual program elements are again identified with color according to their status. In addition to the contents of the active steps the corresponding "extract" from the symbol table is displayed for your orientation. Here the utilized operands of the shown steps are displayed. You thereby not only have an overview of the absolute address but also the symbolic name and the corresponding comment of the operand.

The active steps on the screen display are automatically shown during running operations. The operator can also call up steps which are currently not in use via associated navigation elements. The process can therefore be controlled with future actions in mind.

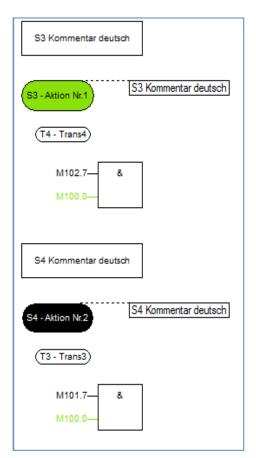**Display of an active step, the sequence overview and the symbol table**
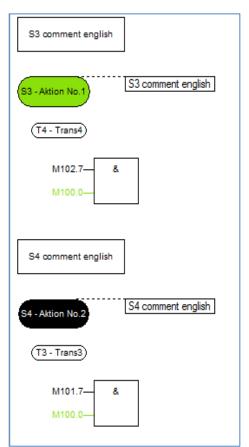
Automatic Data Distribution in the Network

With the integration of the S7 Graph sequence in zenon, you are provided with a wide range of zenon functionalities. For example, it allows data to be automatically distributed in the zenon network. A manual update of individual display clients is therefore obsolete and all stations automatically display identical information. Exactly the same applies for an update of the sequence: these updates only need be run on the corresponding zenon server. Subsequently the server automatically distributes all edited data to each client through the integrated reload function. Therefore the entire information is displayed in its most current status without requiring any further manual steps. The update of data takes place in running operations, which means the display need not be closed. Monitoring and operating the production is therefore made possible at any time.

Display of Information in your Language of Preference

The display of comments and step names is carried out in the format defined by the programmer. In this case the language in the display is that in which the the program code was created. The integration in zenon enables the S7 Graph display for zenon online language switching to be enhanced. You can switch both the display language of the operator screens as well as the text language of the S7 Graph program code. The shift to various languages is possible online – without having to shut of the system or restart it. This increases the availability of the system and at the same time allows the operator to use his language of preference for the display.

Display of the sequence in German and English

Tailored Support for Troubleshooting

In the case of an error the sequence view displays the faulty steps. These are marked in color in the sequence overview. In the individual step view an experienced user can now identify the possible error source.

A great deal of support is given to you by zenon with the "Analyze S7 Graph heuristics" function: here the error step is analyzed and the possible error source is clearly displayed. Therefore equipment operators can quickly rectify errors without the need for programming experience and time-consuming analysis of the program code.

The heuristic function analyzes the logical gate of the error step and determines the most likely cause for the program stop based on the logical regularity. The

result of the analysis is then registered as a string variable for display or processing. The "Symbolic names" of the S7 Graph codes are also used for simpler interpretation of the error cause. If there are more reasons for the program stop then the result string can be updated in order to resolve each error individually.

Screen 1: Display of error cause

Naturally, production interruptions should always be as short as possible. Normally there is no extra time for in depth analyses of codes. Particularly when it comes to recurring stops the cause does however have to be found quickly and be permanently eliminated. In order to take time pressure off, zenon supports with the "Snapshot function". This function saves the current state of the sequence in an internal buffer. Production can begin again, while the saved sequence is available for detailed analysis. This memory map allows you to again display the states of the steps in the zenon screen at any required time and continue analysis. There is no more time pressure for finding out the cause of the stand still.

Summary and Conclusion

The zenon "PLC diagnosis" minimizes production interruptions and allows for efficient control of the processes which are controlled by the S7 Graph. These features support you here:

- Automatic import of sequence data from the PLC program

- Display of the entire sequence, as well as the individual steps in LAD or FBD

- Display of operand information: Symbolic name, address, comment, current status

- Automatic distribution of current sequences through the reload function

- Online language switching in any desired language

- Automatically generated display of error cause in plain text through a code analysis

- Creation of snapshots for an offline code analysis