



A Rockwell Automation Company

In-House R&D Project Grafcet Graphical Automation Language

The Client:

Hinz - In-house Research and Development (R&D) Project.

The Requirement:

In an ongoing endeavor to preserve Hinz's position in the industrial automation industry, a search for time efficient and cost reduction tools was undertaken. In this instance, to investigate Famic's new Grafcet

Automation Language Software and evaluate its potential as an alternative graphical programming tool for PLC programming.

The Design Solution:

Grafcet is a graphical automation language that is used to program PLCs in the Grafcet method and then convert it into a PLC of choice (Modicon, Allen Bradley, Siemens, etc.). Grafcet is supported by the French National Standard NFC-03-190 and the International Standard IEC 848.

Grafcet allows you to place sequential, parallel, Boolean, and numerical control actions with commenting on a single page and remove the need for cross referencing as with conventional ladder logic. One page of Grafcet can be equivalent to 5-15 pages of ladder logic, thus making it more concise. It also promotes a top down, structured approach that results in reduced software development and start-up hours. As it is graphical in nature, it allows non programmers; such as process staff, to participate and understand the automation design process. Shown in figure 1 are typical Grafcet elements, the boxes represent steps and the crosses represent transitions. These elements used in flow chart format typically use Steps as command actions and Transitions as triggers or permissives for the Steps.

The methodology was to assume the role of a process person with relatively no programming knowledge and write a PLC program given only process related

sequential information. To develop a program that was comparable to an existing conventional PLC program currently running in the field, a compressor start-up sequence was chosen as the application.

It was concluded that Grafcet accomplished all the functional requirements of the compressor start up sequence. It proved portability of logic over various PLC manufacturer's processors such as Modicon, Allen Bradley, and Siemens. Grafcet also shows great promise with regard to engineering time and cost reduction as compared to conventional programming methods.

However, at this time Grafcet does not support more complex math functions; such as PID control.

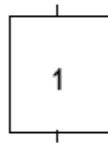
In final evaluation, Grafcet is most certainly on the right track, but does require continuing software development before it could be implemented on a company wide basis.



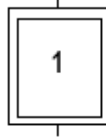
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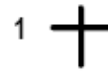
Grafcet Elements



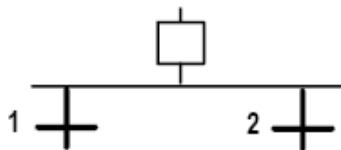
Normal Step



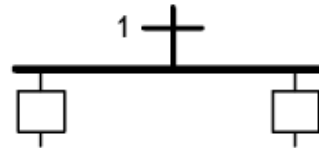
Initial Step



Transition



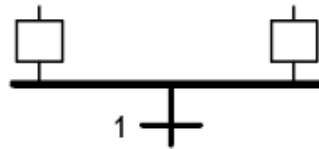
OR Divergence



AND Divergence



OR Convergence



AND Convergence

System Specifications:

- 386 Computer - Programming Station
- 386 Azionix Industrial Computer
- 386 Computer - Remote Operator Station
- Allen Bradley 1784KT Communication Interface Cards (2)
- Radio LAN Communication Cards
- Allen Bradley PLC 5/25 with Rack and P/S
- Hinz Consulting Standard Compressor Panel
- Famic Grafcet Industrial Automation Language Software
- Intellution FIX-DMACS MMI Software
- Taylor Industrial Programming Software
- Novell LAN Software

For further information or to contact a Hinz office near you, please check our website at:

www.hinz.com