



Meet the PLC - BBB (Borrow)

Programmable Controllers (3rd & 4th editions) by T. A. Hughes

Reviewed by Nick Sands

If you wouldn't know a PLC if was sitting on your desk, this book is just the introduction you need. Thomas Hughes, a long time member of ISA with over 30 years of experience including Dow Chemical, Rockwell international, and the International Atomic Energy Agency, has again updated his reference book Programmable Controllers, with a 4th edition. The first edition was published 25 years ago. Dividing the book into sections, for summary purposes, Hughes covers some basic information, then programming, and then systems level information and practices.

The basic chapters start with a history of, and introduction to, programmable controllers. It doesn't take long to see how the PLC program differs from a typical computer program. The next chapter covers the native numbering systems for computers, binary, octal, and hexadecimal, as well as BCD and ASCII. Also covered are Boolean logic functions and their schematic and logic representations. Chapter 3 has a nice introduction to the concepts of electrical circuits and symbology. The next chapters build on this and show typical I/O and the representation of I/O values in memory. Hughes covers the basics well.

After establishing the background, the next section is on programming. Being a book on PLCs, the focus is on ladder logic, or ladder diagram. The basic and advanced functions of ladder diagram programming are shown for a typical PLC. The explanation of functions is good, but there are few examples where more complex logic is built with basic functions, although the exercise problems provide some opportunities for the industrious reader. After ladder comes a review of the other standard languages. The 4th edition uses the newer terminology for the languages. Sequential function charts and structured text are together covered in 5 pages, but Instruction list, or statement list, is discussed in detail. To understand instruction list programming is to understand how a microprocessor works. It is good knowledge for any control engineer or technician. The function block language is thoroughly reviewed in the last chapter of this section.

The last section addresses the system level. Chapter 10 is an interesting overview of data communications, touching on protocols and networks that have become so much more important. The 4th edition adds only a little on networks over the 3rd. Hughes does explain serial communications and error checking in detail. Chapter 11 brings together the components from the earlier chapters to complete a slightly more comprehensive example. The final chapter addresses some of the issues of physical design as well as maintenance of an installed system. While maintenance is covered in only a few pages, at least some good practices are covered since few books even mention maintenance of PLCs.

Hughes book is a guide to the classic programmable controller, perhaps a bit dated compared to latest PLCs, but there are many classic models still in service. The 4th edition is definitely an improvement over the 3rd, with terminology consistent with IEC61131-3 and many corrections to the examples. It is a introductory book with simple problems and limited examples on style. It's a must have for a larger control library, but of limited value over time, making it a good book for many people to borrow (BBB) (and return in a timely manner please). The 4th edition should be available in December from ISA for \$89 (member price).