

图书基本信息

书名：<<液压与气压传动/普通高等学校机械工程类专业双语系列教材>>

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## 前言

This textbook introduces some new concepts and methods according to the development of fluid power. It is intended for undergraduate students of mechanical design manufacturing and automation ( including mechanical engineering and automation major ) which announced by Chinas ministry of education in recent. It is written and compiled according to the requirement of bilingual education. There are 11 chapters in this book. Chapter 1 is a brief introduction to the subject of fluid power and the fluid power industry. Chapter 2 through chapter 7 cover the hydraulic components ( including pump, motor, cylinder, direction control valve, pressure control valve, flow control valve, logic valve, proportional valve, servo valve and ancillary hydraulic components ) , the emphasis is on understanding their construction and function. Chapters 8 through 10 cover basic hydraulic circuit, typical hydraulic system and the emphasis is on understanding their function and design. Chapter 11 covers the basic principles of pneumatics, pneumatic components and pneumatic circuits. After finishing each chapter, students are provided with key points, key terms and definitions, exercises and review questions. Pneumatic and hydraulic graphical symbols are attached at the end of this book as appendix I. This textbook is written and compiled by many experienced teachers from several universities and colleges. They are : Chen Kuisheng from Wuhan University of Science and Technology ( chapter 1 ) ; Ma Jian from Taiyuan University of Technology ( chapter 2, 6 ) ; Huanghao from Wuhan University of Science and Technology, Zhu Jiangong from South West University of Science and Technology ( chapter 3 ) , Rong Zhijun from Wuhan University of Science and Technology, Zhu Jiangong from South West University of Science and Technology ( chapter 4 ) , Wan Huixiong and Yuanbin from Wuhan University of Technology ( chapter 5 ) , Rong Zhijun from Wuhan University of Science and Technology ( chapter 7 ) ; Liu Shiping from North China Institute of Water Conservancy and Hydroelectric Power ( chapter 8,9 ) ; Huanghao from Wuhan University of Science and Technology ( chapter 10 ) , Wu Hongmin from Wuhan University of Technology and Tian Yong from Henan University of Technology ( chapter 11 ) .

## 内容概要

There are 11 chapters in this textbook; Introduction to fluid power, Hydraulic pumps and motors, Hydraulic cylinders, Ancillary hydraulic components, Directional control valves, pressure control valves, flow control valves and other hydraulic valves, basic hydraulic circuit, typical hydraulic systems and some examples, the design and calculation of hydraulic system, pneumatics. At the end of each chapter some exercises and notes are presented for practice and better understanding. Appendix I illustrates the pneumatic and hydraulic graphical symbols. This book can be used as textbook for teachers and students of mechanical engineering, and reference for engineers who major in fluid power, control engineering or automation.

书籍目录

Chapter 1 Introduction to fluid power 1.1 History of fluid power 1.2 Theory of hydraulics and hydraulic system 1.3 Advantages and disadvantages of fluid power 1.4 Hydraulic fluids

Chapter 2 Hydraulic pumps and motors 2.1 Introduction 2.2 Gear pumps 2.3 Vane pumps 2.4 Piston pumps 2.5 Hydraulic motors

Chapter 3 Hydraulic cylinders 3.1 Types and calculation of cylinders 3.2 Cylinder construction 3.3 Cylinder calculation and design

Chapter 4 Ancillary hydraulic components 4.1 Filters 4.2 Accumulators 4.3 Reservoirs 4.4 Pipes and connectors 4.5 Heat exchanger

Chapter 5 Directional control valves 5.1 Check valve 5.2 Shuttle valve 5.3 Sliding spool valves 5.4 Direction control valve actuation 5.5 The rotary spool valve 5.6 Parallel circuit 5.7 Direction control valve specification

Chapter 6 Pressure control valves 6.1 Introduction 6.2 Pressure relief valves 6.3 Pressure reducing valves 6.4 Sequence valves 6.5 Pressure switches 6.6 Applications of pressure control valves

Chapter 7 Flow control valves and other hydraulic valves 7.1 Flow control valve 7.2 Combined flow control and check valves 7.3 Flow regulating valve (adjustable compensated flow-control valve) 7.4 Flow divider 7.5 Cartridge valve, proportional valve, servo valve

Chapter 8 Basic hydraulic circuit 8.1 Rapid motion circuit 8.2 Speed control 8.3 Synchronous circuit 8.4 Sequencing circuit 8.5 Counterbalance circuit 8.6 Pump-unloading circuit

Chapter 9 Typical hydraulic systems and some examples 9.1 The movable platform hydraulic system of modular machine tools 9.2 The hydraulic system of hydraulic press 9.3 The hydraulic system of 8-ton hydraulic truck cranes 9.4 The hydraulic system of an electric arc steelmaking furnace

Chapter 10 The design and calculation of hydraulic system 10.1 Design and calculation of hydraulic system 10.2 The example of the hydraulic system design

Chapter 11 Pneumatics 11.1 Pneumatics overview 11.2 Air generation and treatment 11.3 Actuators 11.4 Pneumatic control valves 11.5 Basic pneumatic circuits

Appendix A: Hydraulic and Pneumatic Graphic Symbols (GB/T 786.1—93)

References

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