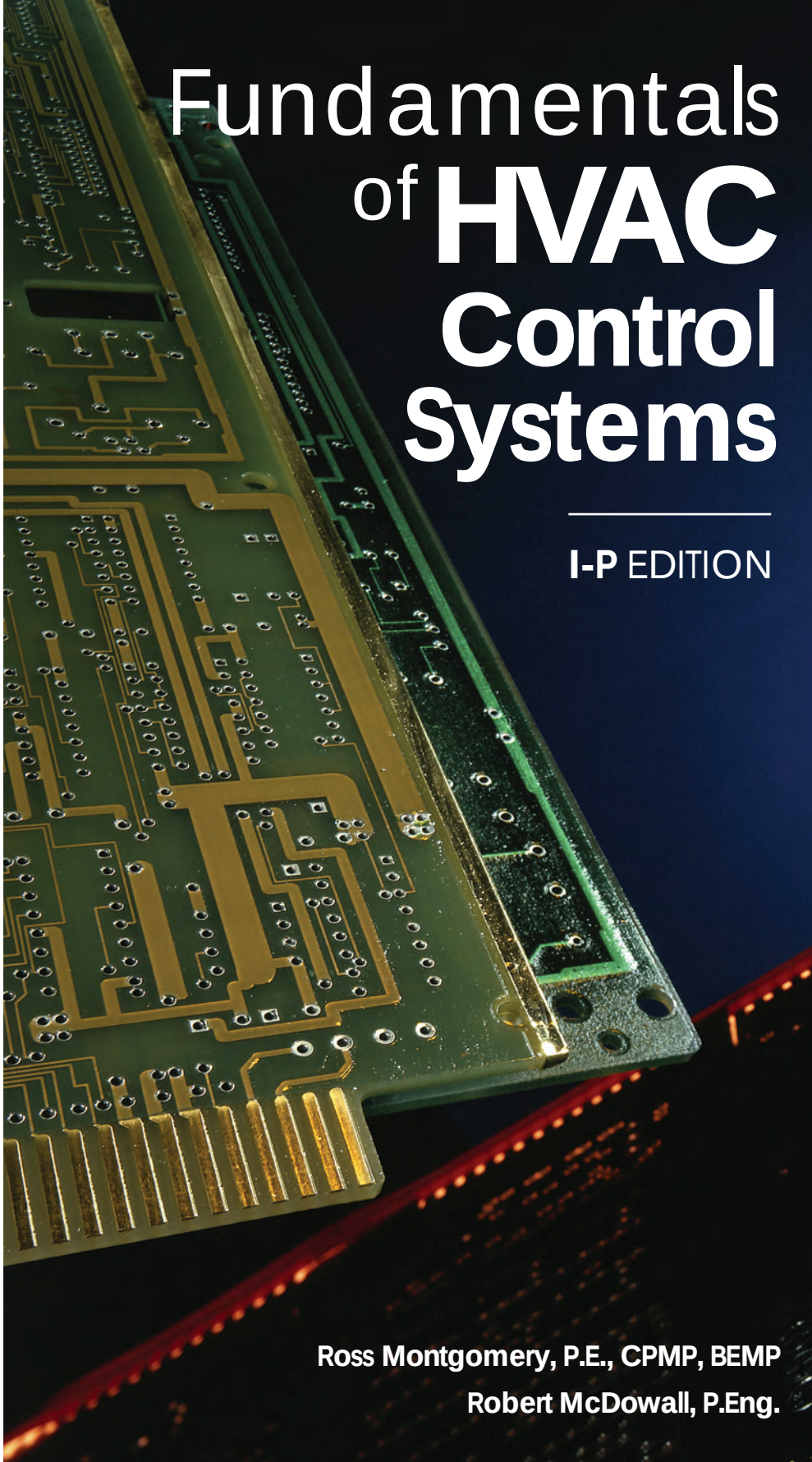
Fundamentals of HVAC Control Systems

I-P EDITION



Ross Montgomery, P.E., CPMP, BEMP
Robert McDowall, P.Eng.

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Contents

1 Introduction to HVAC Control Systems 1

1.1 Why Do We Need Controls? 2
1.2 A Brief History of Controls 3
1.3 Control Loops 4
1.4 Control Modes 9
Two-position Control 10
Floating Control 14
Modulating Control 15
Pulse-width Modulating, and Time-proportioning Control 20
1.5 Gains and Loop Tuning 21
1.6 Control Actions and Normal Position 24
1.7 Control Range, and Sequencing 27
1.8 Controls Documentation, Maintenance, and Operations 28
The Next Step 29

2 Basics of Electricity 30

2.1 Simple Circuits and Ohm's Law 31
2.2 AC Circuits 35
2.3 Transformers and Power Services 39
2.4 Relays 42
2.5 Motors and Motor Starters 45
2.6 Variable Speed Drives 51
2.7 Relay Logic and Ladder Diagrams 54
The Next Step 60

3 Control Valves and Dampers 61

Introduction 61
3.1 Two-way Control Valves 62
Styles and Principles of Operation 62
3.2 Three-way Control Valves 72
3.3 Selecting and Sizing Valves 76
Flow Characteristic Selection 81
Close-off Pressure 85
3.4 Control Dampers 87
Styles and Principles of Operation 87

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3.5 Selecting and Sizing Dampers 91
Two-position Duty 91
Capacity Control Duty 92
Mixing Duty 98
The Next Step 104

4 Sensors and Auxiliary Devices 106

4.1 Introduction to Terms 107
Accuracy 107
Range 107
Reliability 108
Repeatability, Precision 108
Transmitter 108
4.2 Temperature Sensors 109
Bimetal 109
Fluid Expansion 111
Electrical, Self-powered 113
Electrical Resistance 113
4.3 Humidity and the Psychrometric Chart 118
Indoor Air is a Mixture of Dry Air and Water Vapor 118
Relative Humidity 119
4.4 Moisture Sensors 128
Relative Humidity Sensors 128
4.5 Pressure Sensors 133
4.6 Flow Sensors and Meters 136
4.7 Auxiliary Devices 148
The Next Step 159

5 Self- and System-powered Controls 160

5.1 Principles of Operation – Self-powered Controls 160
5.2 Examples of Self-powered Controls 161
Thermopile Controls 161
Hot Water Control Valve 162
Self-powered VAV Diffuser 162
5.3 System-powered Controls 164
System-powered Air Valves 164
System-powered Water System Valves 165
The Next Step 166

6 Electric Controls 167

6.1 Sensors 167
6.2 Controllers, Two-position 169
6.3 Controllers, Modulating 171
6.4 Example Application 174
6.5 Actuators 177
6.6 Auxiliary Devices 178
The Next Step 179

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7 Pneumatic Controls 180

7.1 Principles of Operation 181
7.2 Sensors 183
7.3 Controllers 184
7.4 Actuators 188
7.5 Auxiliary Devices 190
7.6 Compressed Air Supply 196
7.7 Example Applications 198
The Next Step 204

8 Analog Electronic Controls 205

8.1 Principles of Operation 205
8.2 Sensors 206
8.3 Controllers 206
8.4 Actuators 211
8.5 Auxiliary Devices 212
8.6 Example Applications 212
The Next Step 215

9 Control Diagrams and Sequences 216

9.1 Control Systems Design Criteria 217
9.2 Control Systems Design Process 218
9.3 Control Diagrams and Symbols 218
9.4 Control Sequences 220
9.5 Example Applications 222
Typical Single-Zone System 222
Typical Constant Air Volume System with Face and Bypass Dampers 226
Typical Constant Air Volume System with Multiple Zones or Reheat 227
Typical Variable Air Volume System 227
Typical Constant Air Volume System, with Variable Speed Fan for Filter Loading 237
Chiller Plant, Pumps, and Boilers – Monitoring and Control 239
Temperature and Humidity Monitoring and Control 240
Carbon Dioxide Control 241
Exhaust Fan Control 242
Fume Hood Control 243
Condensate Management and Control 245
Ventilation Monitoring and Control 245
Filtration Monitoring and Control 246
Outside Air Monitoring and Control 246
DX – Direct Expansion Systems 246
Water Source Heat Pumps 247

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10 DDC Introduction to Hardware and Software 250

10.1 Introduction, and Input and Output Points 250
10.2 I/O Point Characteristics 254
10.3 Control Sequences 258
10.4 Software Introduction 260
10.5 Specific Programming System Features and Parameters 269
10.6 Operator Terminal 278

11 DDC Networks and Controls Protocols 285

11.1 Interoperability 286
11.2 System Hardware Architecture 288
Sample Controllers 295
11.3 Network Standards 296
Ethernet (IEEE 802.3) 298
ARCNET 299
RS-485 299
Wireless 299
11.4 BACnet 301
What is a PICS? 303
1 Devices – Groups of Objects to Manage Activity 303
2 Objects – To Represent Information 304
3 Services – Making and Responding to Requests 305
4 Network – Transporting Request and Responses 306
11.5 LonWorks 308
The Next Step 310

12 Digital Controls Specification 311

12.1 Benefits and Challenges of DDC 312
12.2 Design 316
12.3 Bidding and Interoperability 323
12.4 Monitoring 325
12.5 Wiring 330
Network Wiring 330
Fiber Optic Cable 333
Power Wiring 333
12.6 Commissioning and Warranty 334
12.7 Resources 336

Index 339

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Chapter 1

Introduction to HVAC Control Systems

Contents of Chapter 1

Study Objectives of Chapter 1
1.1 Why Do We Need Controls?
1.2 A Brief History of Controls
1.3 Control Loops
1.4 Control Modes
1.5 Gains and Loop Tuning
1.6 Control Actions and Normal Position
1.7 Control Range and Sequencing
1.8 Controls Documentation, Maintenance, and Operations
The Next Step
Bibliography

Study Objectives of Chapter 1

Chapter 1 introduces basic control concepts. It begins with a discussion of why controls are required in HVAC systems and a brief history of the development of control products. Next, we introduce the concept of a control loop, the basic building block of all control systems, and the various control strategies and algorithms used in control loops. After studying this chapter, you should understand:

Why controls are necessary in HVAC systems.

The difference between open and closed control loops.
How two-position, floating, and modulating control loops work.
Proportional control.
Integral and derivative control action in modulating control loops.
How to tune control loops.
The difference between direct acting and reverse acting.
Difference between normally open and normally closed.
How controlled devices may be sequenced using a single controller.