

# TABLE OF CONTENTS

---



## Chapter 1: Introduction

<b>Introduction</b> .....	1-2
The Purpose of this Manual.....	1-2
Where to Begin.....	1-2
Supplemental Manuals.....	1-2
Technical Support.....	1-2
<b>Conventions Used</b> .....	1-3
Key Topics for Each Chapter.....	1-3
<b>CPU-Slot Controllers</b> .....	1-4
<b>DL205 System I/O Components</b> .....	1-5
Bases.....	1-5
I/O Configuration.....	1-5
I/O Modules.....	1-5

## Chapter 2: Installation and Power Wiring

<b>Safety Guidelines</b> .....	2-2
Plan for Safety.....	2-2
Three Levels of Protection.....	2-3
Emergency Stops.....	2-3
Emergency Power Disconnect.....	2-4
Orderly System Shutdown.....	2-4
Class 1, Division 2, Approval.....	2-4
<b>Mounting Guidelines</b> .....	2-5
Base Dimensions.....	2-5
Panel Mounting and Layout.....	2-6
Enclosures.....	2-7
Environmental Specifications.....	2-8

## Table of Contents

---

Power.....	2-8
Marine Use.....	2-9
Agency Approvals .....	2-9
24VDC Power Bases .....	2-9
<b>Installing DL205 Bases.....</b>	<b>2-10</b>
Choosing the Base Type.....	2-10
Mounting the Base.....	2-10
Using Mounting Rails .....	2-11
<b>Installing Components in the Base.....</b>	<b>2-12</b>
<b>Base Wiring Guidelines.....</b>	<b>2-13</b>
Base Wiring .....	2-13

## Chapter 3: I/O Wiring and Specification

<b>I/O Wiring Strategies .....</b>	<b>3-2</b>
PLC Isolation Boundaries .....	3-2
Powering I/O Circuits with the Auxiliary Supply .....	3-3
Powering I/O Circuits Using Separate Supplies.....	3-4
Sinking / Sourcing Concepts .....	3-5
I/O “Common” Terminal Concepts.....	3-6
Connecting DC I/O to “Solid State” Field Devices.....	3-7
Solid State Input Sensors.....	3-7
Solid State Output Loads.....	3-7
Relay Output Guidelines.....	3-9
Surge Suppression For Inductive Loads.....	3-9
<b>I/O Modules Position, Wiring, and Specification .....</b>	<b>3-13</b>
Slot Numbering.....	3-13
Module Placement Restrictions.....	3-13
Special Placement Considerations for Analog Modules .....	3-14
Discrete Input Module Status Indicators.....	3-14
Color Coding of I/O Modules.....	3-14
Wiring the Different Module Connectors.....	3-15
I/O Wiring Checklist .....	3-16
I/O Points Required for Each Module .....	3-17
<b>Calculating the Power Budget .....</b>	<b>3-18</b>
Managing your Power Resource .....	3-18

CPU Power Specifications .....	3-18
Module Power Requirements.....	3-18
Power Budget Calculation Example .....	3-20
Power Budget Calculation Worksheet.....	3-21
<b>DL205 Digital Input Modules .....</b>	<b>3-22</b>
D2-16ND3-2, DC Input.....	3-22
D2-08ND3, DC Input.....	3-22
D2-32ND3, DC Input .....	3-23
D2-32ND3-2, DC Input.....	3-24
D2-08NA-1, AC Input.....	3-25
D2-08NA-2, AC Input.....	3-26
F2-08SIM, Input Simulator .....	3-27
D2-16NA, AC Input.....	3-27
D2-04TD1, DC Output.....	3-28
<b>DL205 Digital Output Modules .....</b>	<b>3-28</b>
D2-08TD2, DC Output .....	3-29
D2-08TD1, DC Output .....	3-29
D2-16TD2-2, DC Output .....	3-30
D2-16TD1-2, DC Output .....	3-30
F2-16TD1(2)P, DC Output With Fault Protection.....	3-31
F2-16TD1P, DC Output With Fault Protection .....	3-32
F2-16TD2P, DC Output with Fault Protection.....	3-33
D2-32TD2, DC Output .....	3-34
D2-32TD1, DC Output .....	3-34
D2-08TA, AC Output .....	3-35
F2-08TA, AC Output.....	3-35
D2-12TA, AC Output.....	3-36
D2-04TRS, Relay Output.....	3-37
D2-08TR, Relay Output.....	3-38
F2-08TR, Relay Output.....	3-39
F2-08TRS, Relay Output.....	3-40
D2-12TR, Relay Output.....	3-41
D2-08CDR, 4 pt. DC Input / 4pt. Relay Output.....	3-42
<b>DL205 Analog Input Modules .....</b>	<b>3-44</b>
F2-04AD-1 4-Channel 4-20mA Analog Input Module.....	3-44

## Table of Contents

---

F2-08AD-1 8-Channel 4-20mA Analog Input Module.....	3-46
F2-04AD-2 4-Channel Voltage Analog Input Module .....	3-48
F2-08AD-2 8-Channel Voltage Analog Input Module .....	3-50
<b>DL205 RTD and Thermocouple Modules.....</b>	<b>3-52</b>
F2-04RTD 4-Channel RTD Input Module.....	3-52
F2-04THM 4-Channel Thermocouple Input Module.....	3-54
<b>DL205 Analog Output Modules .....</b>	<b>3-56</b>
F2-02DA-1 2-Channel 4-20mA Analog Output Module.....	3-56
F2-02DA-1L 2-Channel 4-20mA Analog Output Module .....	3-58
F2-02DAS-1 2-Channel Isolated 4-20mA Analog Output Module.....	3-60
F2-08DA-1 8-Channel 4-20mA Analog Output Module.....	3-62
F2-02DA-2 2-Channel Voltage Analog Output Module .....	3-64
F2-02DA-2L 2-Channel Voltage Analog Output Module.....	3-66
F2-02DAS-2 2-Channel 0-5V, 0-10V Isolated Analog Output Module.....	3-68
F2-08DA-2 8-Channel Voltage Analog Output Module .....	3-70
<b>DL205 Combination Analog I/O Modules .....</b>	<b>3-72</b>
F2-04AD2DA 4-Channel Analog Input / 2-Channel Analog Output Module.....	3-72
F2-08AD4DA-1 8-Channel Analog Current Input / 4-Channel Analog Current Output Module .....	3-74
F2-08AD4DA-2 8-Channel Analog Voltage Input / 4-Channel Analog Voltage Output Module .....	3-76
<b>Glossary of Specification Terms .....</b>	<b>3-78</b>
Inputs or Outputs Per Module .....	3-78
Commons Per Module .....	3-78
Input Voltage Range.....	3-78
Output Voltage Range.....	3-78
Peak Voltage .....	3-78
AC Frequency.....	3-78
ON Voltage Level .....	3-78
OFF Voltage Level.....	3-78
Input impedance.....	3-78
Input Current.....	3-78
Minimum ON Current.....	3-78
Maximum OFF Current .....	3-78
Minimum Load.....	3-78

External DC Required .....	3–78
ON Voltage Drop .....	3–78
Maximum Leakage Current .....	3–79
Maximum Inrush Current .....	3–79
Base Power Required .....	3–79
OFF to ON Response .....	3–79
ON to OFF Response .....	3–79
Terminal Type .....	3–79
Status Indicators .....	3–79
Fuses .....	3–79

## Appendix A: European Union (EU) Directives

<b>European Union (EU) Directives .....</b>	<b>A-2</b>
Member Countries .....	A-2
Applicable Directives .....	A-2
Compliance .....	A-2
General Safety .....	A-3
Special Installation Manual .....	A-4
Other Sources of Information .....	A-4
<b>Basic EMC Installation Guidelines .....</b>	<b>A-4</b>
Enclosures .....	A-4
AC Mains Filters .....	A-5
Suppression and Fusing .....	A-5
Internal Enclosure Grounding .....	A-5
Equi-potential Grounding .....	A-6
Communications and Shielded Cables .....	A-6
Analog and RS232 Cables .....	A-7
Shielded Cables within Enclosures .....	A-7
Analog Modules and RF Interference .....	A-8
Network Isolation .....	A-8
DC Powered Versions .....	A-8
Items Specific to the DL205 .....	A-9