

## DAFTAR GAMBAR

Gambar 2.1 BAS ( <i>Building Automation System</i> )	8
Gambar 2.2 IBMS ( <i>Integrated Building Management System</i> )	9
Gambar 2.3 Skema DDC ( <i>Direct Digital Control</i> )	11
Gambar 2.4 Elemen Sistem SCADA	12
Gambar 2.5 RTU ( <i>Remote Terminal Unit</i> )	14
Gambar 2.6 MTU ( <i>Master Terminal Unit</i> )	15
Gambar 2.7 Kontrol PLC ( <i>Programmable Logic Controller</i> )	17
Gambar 2.8 External I/O PLC	20
Gambar 2.9 Ladder diagram PLC	21
Gambar 2.10 <i>Statement List</i> (STL)	21
Gambar 2.11 <i>Function Block Diagram</i> (FBD) PLC	22
Gambar 2.12 Contoh tampilan monitoring HMI	23
Gambar 2.13 <i>Function Block Diagram</i> (FBD) Modbus	24
Gambar 2.14 Modbus data package construction TCP	25
Gambar 2.15 Router Wifi	25
Gambar 2.16 Arduino Uno R3 Layout	26
Gambar 2.17 Contoh program arduino	27
Gambar 2.18 Infrared Flame Sensor	28
Gambar 3.1 Diagram BAS ( <i>Building Automation System</i> )	29
Gambar 3.2 Diagram Blok Sistem	31
Gambar 3.3 Diagram Alur Sistem Penerangan	32

Gambar 3.4 Diagram Alur Sistem Pendistribusian Air Bersih	34
Gambar 3.5 Diagram Alur Sistem <i>Fire Alarm</i>	36
Gambar 3.6 Modul PLC Schneider M221-16R	40
Gambar 3.7 Wiring Internal Input PLC	41
Gambar 3.8 Wiring Internal Output PLC	42
Gambar 3.9 Router Merk TP link tipe TL-WR840N	44
Gambar 3.10 Konfigurasi Input dan Ouput pada Arduino	45
Gambar 3.11 Rung0 – Konfigurasi RTC	51
Gambar 3.12 Rung1 – <i>Mapping</i> RTC	52
Gambar 3.13 Rung0 - <i>Mapping Output</i>	54
Gambar 3.14 Rung1 – <i>Indicator Lamp</i> Manual & Auto	56
Gambar 3.15 Rung2 – <i>RTC Mode</i> pada pukul 00.00 – 16.00	58
Gambar 3.16 Rung2 – <i>RTC Mode</i> pada pukul 17.00 – 23.00	59
Gambar 3.17 Rung3 – <i>Lamp Logic</i>	60
Gambar 3.18 Rung4 – <i>Mapping Fire Alarm</i>	63
Gambar 3.19 Rung5 – <i>Mapping Tank Level</i>	64
Gambar 3.20 Rung6 – <i>Pump Logic</i>	66
Gambar 3.21 Tampilan Awal Layar <i>Interface</i>	70
Gambar 3.22 Tampilan Kontrol Penerangan Gedung	71
Gambar 3.23 Tampilan Kontrol pompa transfer	72
Gambar 3.24 Tampilan Status Roof Tank	73
Gambar 3.25 Tampilan <i>Fire Alarm</i> status	74
Gambar 3.26 Layout PCB 1 Kontrol Penerangan	75
Gambar 3.27 Layout PCB 2 Kontrol <i>Fire Alarm</i>	76
Gambar 3.28 Layout PCB 3 Kontrol Pompa	78

Gambar 3.29 Layout PCB 4 Arduino Extention	80
Gambar 3.30 Wiring Arduino & Relay 5v	81
Gambar 4.1 Aktualisasi BAS ( <i>Building Automation System</i> )	84
Gambar 4.2 Komponen Panel	85
Gambar 4.3 Layout dan Miniatur Gedung	86

