

DAFTAR GAMBAR

Gambar 2.1 Thermogun.....	15
Gambar 2.2. Konsep dasar logika fuzzy.....	18
Gambar 2.3 Diagram Blok Sistem Kendali PID..	21
Gambar 2.4 Blok diagram Fuzzy-PID.....	23
Gambar 2.5 Fungsi keanggotaan error level.....	24
Gambar 2.6 Fungsi keanggotaan d_error level....	25
Gambar 2.7 Sensor Suhu DS18B20 Waterproof.	28
Gambar 2.8 Heater Plate.....	29
Gambar 2.9 Board Arduino Mega 2650.....	31
Gambar 2.10 LCD TFT Nextion 3,2 Inch.....	32
Gambar 2.11 Driver VNH2SP30.....	33
Gambar 2.12 Power Supply.....	34
Gambar 3.1 Diagram Blok.....	35
Gambar 3.2 Diagram Alir Program.....	37
Gambar 3.3 Diagram Mekanis Tampak Depan...	39
Gambar 3.4 Diagram Mekanis Tampak Belakang.....	39
Gambar 4.1 Rancangan Modul Alat.....	51
Gambar 4.2 Hasil Tuning PID.....	53
Gambar 4.3 Fungsi keanggotaan error.....	54
Gambar 4.4 Fungsi keanggotaan delta error.....	55
Gambar 4. 5 Plot Fungsi Anggota Output Variabel Kpf.....	58
Gambar 4. 6 Plot Fungsi Anggota Output Variabel Kif.....	59
Gambar 4. 7 Plot Fungsi Anggota Output Variabel Kdf.....	59
Gambar 4.8 Respon Sistem FUZZY-PID Setting Suhu 32°C.....	68
Gambar 4.9 Respon Sistem FUZZY-PID Setting Suhu 33°C.....	69

Gambar 4.10 Respon Sistem FUZZY-PID Setting Suhu 34°C.....	70
Gambar 4.11 Respon Sistem FUZZY-PID Setting Suhu 35°C.....	71
Gambar 4. 12 Respon Sistem FUZZY-PID Setting Suhu 36°C.....	72
Gambar 4. 13 Respon Sistem FUZZY-PID Setting Suhu 37°C.....	73
Gambar 4. 14 Respon Sistem FUZZY-PID Setting Suhu 38°C.....	74
Gambar 4. 15 Respon Sistem FUZZY-PID Setting Suhu 39°C.....	75
Gambar 4.16 Respon Sistem FUZZY-PID Setting Suhu 40°C.....	76
Gambar 4.17 Respon Sistem FUZZY-PID Setting Suhu 41°C.....	77
Gambar 4.18 Respon Sistem FUZZY-PID Setting Suhu 42°C.....	78
Gambar 4.19 Respon Sistem FUZZY-PID Setting Suhu 43°C.....	79
Gambar 4.20 Respon Sistem FUZZY-PID Setting Suhu 44°C.....	80
Gambar 4. 21 Respon Sistem FUZZY-PID Setting Suhu 45°C.....	81
Gambar 5. 1 Rangkaian Keseluruhan Alat.....	85