



**MONITORING TRAFODISTRIBUSI DENGAN
PEMASANGAN ALAT DRC
(STUDI KASUS PADA PT. PLN UP3 BALI TIMUR)**

SKRIPSI

Diajukan untuk memenuhi persyaratan penyelesaian program S-1

Bidang Ilmu Teknik Elektro Fakultas Teknik

Universitas Widya Kartika

Oleh :

David Ramadian

NRP. 21322003

PEMBIMBING

Dr. Ir. Tamaji, M.T

NIP. 213/01.65/02.12/003

Erwin Dhaniswara, S.Si., M.Kom

NIP. 008/04.87/04.16/111

**PROGRAM STUDI TEKNIK ELEKTRO
FAKULTAS TEKNIK
UNIVERSITAS WIDYA KARTIKA**

SURABAYA

2024

KATA PENGANTAR

Puji syukur kepada Tuhan Yang Maha Esa atas berkat dan hidayah-Nya saya dapat menyelesaikan skripsi saya yang berjudul **“MONITORING TRAFODISTRIBUSI DENGAN PEMASANGAN ALAT DRC (STUDI KASUS PADA PT. PLN UP3 BALI TIMUR)”**. Skripsi ini disusun sebagai salah satu syarat kelulusan dalam derajat Sarjana Teknik (S.T.) Program Teknik Elektro (S-1) Program Studi Fakultas Teknik Universitas Widya Kartika.

Selama penelitian dan penyusunan laporan penelitian dalam skripsi ini, penulis tidak luput dari banyak kendala. Kendala tersebut dapat teratasi berkat adanya bantuan, bimbingan dan dukungan dari berbagai pihak. Karena itu penulis ingin menyampaikan rasa terima kasih sebesar-besarnya kepada:

1. Ayah dan Ibu saya yang selalu mendukung saya.
2. Saudara yang selalu mendukung saya.
3. Bapak F. Priyo Suprobo, S.T. M.T. selaku Rektor Universitas Widya Kartika.
4. Bapak Dr. Ir. Tamaji, M.T selaku Ketua Program Studi Teknik Elektro Universitas Widya Kartika.
5. Bapak Dr. Ir. Tamaji, M.T. selaku Dosen Pembimbing I
6. Bapak Erwin Dhaniswara, S.Si. M.Kom. selaku Dosen Pembimbing II
7. Bapak Dosen Fakultas Teknik Elektro Universitas Widya Kartika.
8. Teman-teman sejawat dan seperjuangan di Program Studi Teknik Elektro

Penulis menyadari bahwa dalam penyusunan dan penelitian skripsi ini masih banyak terdapat kekurangan. Penulis menerima segala kritik dan saran agar penelitian ini semakin baik dan dapat menjadi pedoman penelitian berikutnya dan bermanfaat. Terima kasih.

Surabaya, 22 Mei 2024

Penulis

The logo of Universitas Widya Kartika (UWIK) is a large, light blue watermark centered on the page. It features a stylized circular emblem with a vertical line through the center and a horizontal line across the middle, creating a cross-like shape within the circle. Below the emblem, the word "UWIK" is written in a bold, sans-serif font.

ABSTRACT

In order to ensure that all equipment used in the distribution of electric power to customers requires continuous monitoring of the condition of the equipment. The reliability of the equipment will affect the quality of the electricity distributed. Monitoring consists of measuring certain quantities such as current and voltage, and processing the measurement results into information (data) that is meaningful, easy to understand and easy to access. Continuous monitoring is not enough just to measure at certain hours, but measurements are needed at any time (real time) because the equipment load on the electricity distribution network always changes according to electricity usage by customers. The distribution substation is a very vital part of the electric power distribution network because it is a source of electric power for customers. To ensure this and the quality of the electric power distributed, it is necessary to measure the transformer loading current, directional current and secondary side voltage of the transformer. It is hoped that the measurement results can be obtained as information regarding transformer loading conditions, load unbalance conditions, predicted voltage drops at the end of the line, etc., in addition to information on the measured current and voltage. With DRC, all the hopes above can be realized. DRC can carry out current and voltage measurements in real time, processing the measurement results into meaningful information related to the condition of the distribution substation and the quality of the electricity distributed, easily accessible online. The implementation of DRC is expected to simplify transformer maintenance management, reduce the value of the transformer damage ratio, reduce maintenance and replacement costs for distribution transformers, reduce losses, and improve the quality of the electricity distributed. The % ERROR results in the DRC sensor readings, namely by verifying the results with AVometer and Thermal Image, get % ERROR $\leq 0.5\%$ and the average satisfaction level is above 8.5/10 so that the main aim of this tool is to be able to monitor transformers well and users can monitor the health of the transformer and can plan preventive maintenance to avoid damage.

Key words: *distribution substation, substation measurement management, electric power quality, monitoring system, power quality system*

DAFTAR ISI

	Halaman
HALAMAN PENGESAHAN	ii
SURAT PERNYATAAN KEASLIAN	iii
KATA PENGANTAR	iv
DAFTAR ISI.....	v
DAFTAR GAMBAR.....	viii
DAFTAR TABEL.....	x
ABSTRAK.....	xii
ABSTRACT.....	xiii
BAB I Pendahuluan	1
1.1 Latar Belakang	1
1.2 Rumusan Masalah	2
1.3 Tujuan.....	2
1.4 Manfaat.....	3
1.5 Batasan Masalah.....	3
1.6 Sistematika Skripsi.....	4
BAB II Tinjauan Pustaka	5
2.1 Isu Yang dihadapi.....	5
2.2 Pembebanan Trafo Distribusi.....	5
2.3 <i>Total Harmonic Distortion (THD)</i>	8
2.4 Tegangan Drop.....	9
2.5 Kuat Hantar Arus	10
2.6 Error Measurement.....	11
2.7 Platform Android.....	12
2.8 <i>Fitur</i>	12
2.9 Library.....	12
2.10 MCU IC STM32F429ZGT6.....	13
2.11 Analog Digital IC AD7616	14
2.12 Sensor Tegangan TR 3121 CH.....	15
2.13 Sensor Suhu PT 100.....	16
2.14 Sensor Arus TP5532.....	17

2.15	JSON	18
2.16	XML.....	19
BAB III Metode Penelitian		20
3.1	Metodologi	20
1.	<u>Pemahaman Materi</u>	20
2.	<u>Perancangan Sistem</u>	20
3.	<u>Pembuatan Software</u>	20
4.	<u>Uji Coba Sistem</u>	20
3.2	Deskripsi DRC	21
3.3	Konsep Perencanaan Sistem Manajemen Pembebanan Gardu	23
	Konsep perencanaan perangkat keras (hardware) / Alat DRC.....	23
3.4	Perencanaan Perangkat Keras (<i>hardware</i>) DRC	24
3.5	Perencanaan Perangkat Lunak (<i>software</i>) Aplikasi DRC	38
BAB IV Implementasi dan Analisa		50
4.1	Hasil Pengujian	50
4.1.1	Hasil Pembacaan Tegangan	50
4.1.2	Hasil Pembacaan Arus	60
4.1.3	Hasil Pengukuran Suhu.....	71
4.1.4	Hasil Pengukuran Harmonic	75
4.1.5	Hasil Pemantauan Respon Alarm	80
4.1.6	Hasil Waktu Pengiriman Data	86
4.2	Pembahasan	88
4.3	Hasil Survey	89
4.3.1	Kepuasan Terhadap Tampilan	89
4.3.2	Kepuasan Terhadap Kemudahan Penggunaan.....	91
4.4	Hasil Pengujian Factory Test Report	92
4.4.1	Hasil Pengujian Pembacaan Tegangan dan Arus.....	93
4.4.2	Hasil Pengujian Pembacaan Suhu.....	93
4.4.3	Hasil Pengujian Respon Alarm.....	93
4.4.4	Hasil Pengujian Tampilan dan Fungsi Tombol	94
BAB V Kesimpulan dan Saran		95
5.1	Kesimpulan.....	95

5.2 Saran.....	95
DAFTAR PUSTAKA.....	96
LAMPIRAN.....	98

