UNIVERSITAS PGRI ADI BUANA SURABAYA
FAKULTAS TEKNIK

Program Studi : Teknik Lingkungan – Perencanaan Wilayah Kota
Teknik Industri – Teknik Elektro - PVKK
KAMPUS II: Jl. Dukuh Menanggal XII/4 ☎ (031) 8281181 Surabaya 60234
Website : www.ft.unipasby.ac.id E-mail : ft@unipasby.ac.id

BERITA ACARA BIMBINGAN SKRIPSI

Form Skripsi-03

Nama	:	Anggarda Saputra Wijaya
NIM	:	193600017
Program Studi	:	Teknik Elektro
Pembimbing	:	Dwi Hastuti, S.Kom., M.T.
Periode Bimbingan	:	~~Gasal~~/Genap*) Tahun 20.22 / 20.23
Judul Skripsi		Rancang Bangun Sistem Pengawasan, Pendeteksi Suhu dan Kelembaban Berbasis Internet Of Things (IOT) di Ruang Server Universitas PGRI Adi Buana Surabaya

KEGIATAN KONSULTASI / BIMBINGAN

No	Tanggal	Materi pembimbingan	Keterangan	Paraf
1	29-03-2023	KONSULTASI PERANCANGAN ALAT	Acc	
2	12-04-2023	BIMBINGAN BLOK DIAGRAM	Acc	
3	18-04-2023	BIMBINGAN DESAIN PROTOTYPE	Acc	
4	25-04-2023	BIMBINGAN ALUR KERJA SISTEM	Acc	
5	04-05-2023	BIMBINGAN FLOWCHART INTEGRASI	Acc	
6	10-05-2023	BIMBINGAN PENGUJIAN PROBUK	Acc	
7	17-05-2023	BIMBINGAN METODE ANALISA DATA	Acc	
8	25-05-2023	BIMBINGAN PENYAJIAN DATA	Acc	
9	01-06-2023	BIMBINGAN ANALISA DATA	Acc	
10	08-06-2023	SIAP PENGUJIAN	Acc	

Dinyatakan selesai tanggal : 09 Juni 2023

Mengetahui, Ketua Program Studi,	Pembimbing,	Surabaya, 10 Juni 2023 Mahasiswa,
(Akbar Sujiwa, S.Si., M.Si.)	(Dwi Hastuti, S.Kom., M.T.)	(Anggarda Saputra Wijaya)

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BERITA ACARA UJIAN SKRIPSI

Pada

Hari, tanggal : RABU, 21 JUNI 2023
Jam : 08.00 - 11.00
Tempat : LAB TEKNIK ELEKTRO LANTAI 1

Telah dilaksanakan Ujian Skripsi:

Nama Mahasiswa : ANGGARDA SAPUTRA WIJAYA
NIM : 19360017
Program Studi : TEKNIK ELEKTRO
Judul : RANCANG BANGUN SISTEM PENGAMANAN, KEAMANAN SUHU DAN KELEMBABAN BERBASIS INTERNET OF THINGS (IOT) PADA RUANG SERVER UNIVERSITAS PGRI ADI BUANA SURABAYA
Bidang Keahlian : TEKNIK ELEKTRO
Tanda Tangan :

Saran-saran perbaikan :

1. PERBAIKAN PADA KATA PENGANTAR
2. Perbaikan pada Daftar Isi

Tim Penguji

Nama	(Tanda tangan)
1. ATMIASRI, S.T., M.T.	.....
2. DRS. BUDI PRIJO SEMBODO, S.T., M.KOM	.....

*) Jangka waktu perbaikan Skripsi dua minggu setelah ujian.
Apabila waktu tersebut tidak dipenuhi, maka nilai Ujian Skripsi dianggap batal dan mahasiswa yang bersangkutan diwajibkan mengulang Ujian lisan

UNIVERSITAS PGRI ADI BUANA SURABAYA
FAKULTAS TEKNIK

Program Studi : Teknik Lingkungan – Perencanaan Wilayah Kota
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FORM REVISI SKRIPSI

Nama Mahasiswa : ANGGARA SAPUTRA WIJAYA
NIM : 1936 00017
Fakultas / Progdi : TEKNIK ELEKTRO
Judul Skripsi : RANCANG BANGUN SISTEM PENGAMANAN, PENDETEKSI SUHU DAN KELEMBABAN BERBASIS INTERNET OF THINGS (IOT) DI RUANG SERVER UNIVERSITAS PGRI ADI BUANA SURABAYA
Ujian Tanggal : 21 Juni 2023

No Bab.	Tanggal	Materi Konsultasi	Keterangan Catatan	Tanda Tangan Penguji
I	26/06/2023	REVISI KATA PENGANTAR		
II	26/06/2023	REVISI DAFTAR ISI		
III				
IV				
V				

Disetujui Dosen Penguji
Pada Tanggal, 26 Juni 2023

Penguji I,

ATMI ASRI, S.T, M.T.

Penguji II,

DIS. BUDI PRIO SEMBODO, S.T., M.Kom

1. a. Penyelesaian Revisi paling lambat 2 minggu dari pelaksanaan Ujian Skripsi.
   b. Pengetikan, penjilidan, penandatangani Skripsi dan mengumpulkan Skrispi paling lambat 2 minggu dari revisi.
2. Apabila sampai batas waktu tersebut (point 1,a dan b) mahasiswa belum menyelesaikan revisi dan tanda tangan, maka **Ujian dinyatakan Gugur**.
3. a. Foto copy Form Revisi diserahkan ke Program Studi.
   b. Skripsi yang sudah direvisi diserahkan ke Fakultas tiga eksemplar untuk dijilid.

LAMPIRAN

1. Instal dan Konfigurasi Docker Daemon

1.1. Instal Docker Daemon

- sudo apt install apt-transport-https ca-certificates curl software-properties-common
- curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo apt-key add
- sudo add-apt-repository "deb [arch=amd64] https://download.docker.com/linux/ubuntu focal stable"
- apt-cache policy docker-ce
- sudo apt install docker-ce
- sudo systemctl status docker

```
anggarda.wijaya@vps: $ systemctl status docker
● docker.service - Docker Application Container Engine
     Loaded: loaded (/lib/systemd/system/docker.service; enabled; vendor preset: enabled)
     Active: active (running) since Thu 2023-06-01 14:09:03 WIB; 5 days ago
TriggeredBy: ● docker.socket
       Docs: https://docs.docker.com
   Main PID: 694 (dockerd)
      Tasks: 92
     Memory: 57.1M
        CPU: 2min 23.308s
     CGroup: /system.slice/docker.service
             ├─ 694 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/containerd.sock
             ├─1102 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 18083 -conta
             ├─1107 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 18083 -container-
             ├─1126 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 8123 -contai
```

Lampiran 1.1 Docker Daemon Aktif

1.2. Utility Command

- systemctl status docker
- systemctl restart docker
- systemctl start docker
- sudo ufw enable
- sudo ufw disable
- sudo ufw allow [port]/tcp
- docker images
- docker container ls
- docker stop [container]
- docker start [container]
- docker exec it- [container] bash

2. Instal dan Konfigurasi MQTT Server

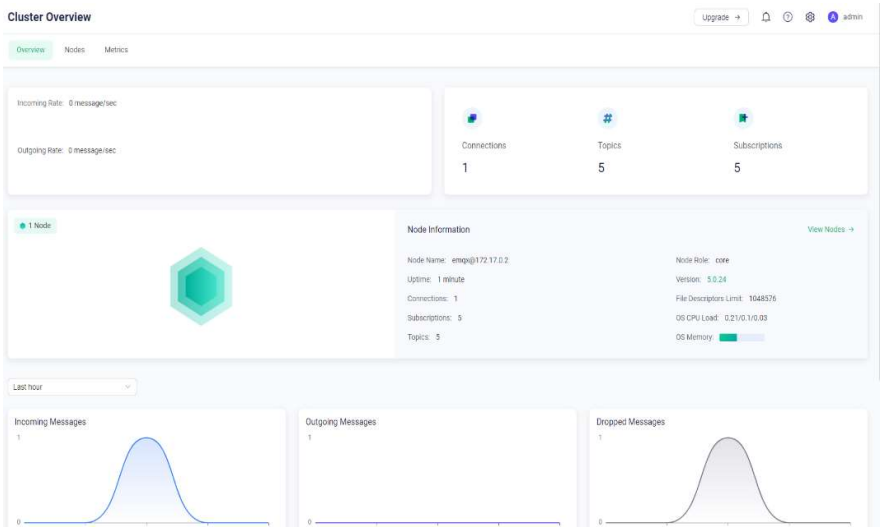
2.1. Instal MQTT Server di Docker

- docker pull emqx/emqx
- mkdir -p ~/emqx-data/emqx.lic
- docker run -d --name emqx --restart unless-stopped -p 1883:1883 -p 8081:8081 -p 8083:8083 -p 8883:8883 -p 8084:8084 -p 18083:18083 -v ~/emqx-data/emqx.lic:/opt/emqx/etc/emqx.lic emqx/emqx

```
root@vps:/home/anggarda.wijaya# docker container ls | grep emqx
fd53fdc1ed47   emqx/emqx                                          "/usr/bin/docker-ent…"
  5 weeks ago   Up 5 days   4370/tcp, 0.0.0.0:1883->1883/tcp, :::1883->1883/tcp, 0.0.
0.0:8081->8081/tcp, :::8081->8081/tcp, 0.0.0.0:8083-8084->8083-8084/tcp, :::8083-8084
->8083-8084/tcp, 5369/tcp, 0.0.0.0:8883->8883/tcp, :::8883->8883/tcp, 0.0.0.0:18083->
18083/tcp, :::18083->18083/tcp, 11883/tcp   emqx
```

Lampiran 2.1 Container MQTT Server Aktif

- port 1883 protokol MQTT untuk komunikasi microcontroller
- port 18083 protokol HTTP untuk akses MQTT Server via GUI
- default username : admin, password : public
- restart policies : unless stopped

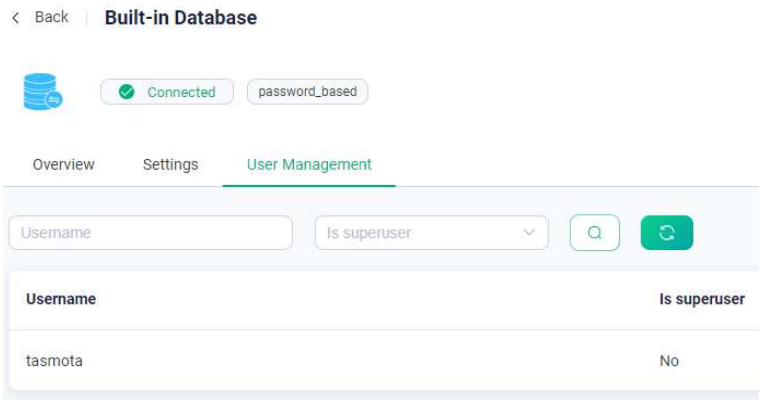


Lampiran 2.2 Tampilan MQTT Server

2.2. Konfigurasi MQTT

Authentication :
Create -> Built-in Database [Password Based]
User -> Username/Password : tasmota/tasmota

f



Lampiran 2.3 Authentication MQTT Server

3. **Instal Home Assistant Server di Docker**
   - docker volume create homeassistant_data
   - docker run -d \
     --name homeassistant \
     --privileged \
     --restart unless-stopped \
     -e TZ=Asia/Jakarta \
     -v /homeassistant_data:/config \
     -p 8123:8123 \
     --net=bridge \
     ghcr.io/home-assistant/home-assistant:stable

Lampiran 3.1 Container Home Assistant Server Active

Port 8123 protokol HTTP untuk akses Home Assistant Server

4. **Instal dan Konfigurasi Cloud Tuya Platform**

4.1. Instal IP Camera CCTV di Aplikasi Tuya Apps

- Login menggunakan Gmail
- Add IP Camera CCTV
- Scan QRCode
- Sambungkan ke jaringan W-Fi

4.2. Konfigurasi Cloud Tuya IOT Platform Development

- Login Cloud IOT
- Create Cloud Project
- Add Authorization
- Add Authorize
  - → IOT Core
  - → Authorization Token Management
  - → Smarthome Scene Linkage
  - → Data Dashboard Service
- Add User
- Select Data Center, Western America Data Center
- Add Device -> PTZ IP Camera

5. Instal dan Konfigurasi Tasmota Firmware

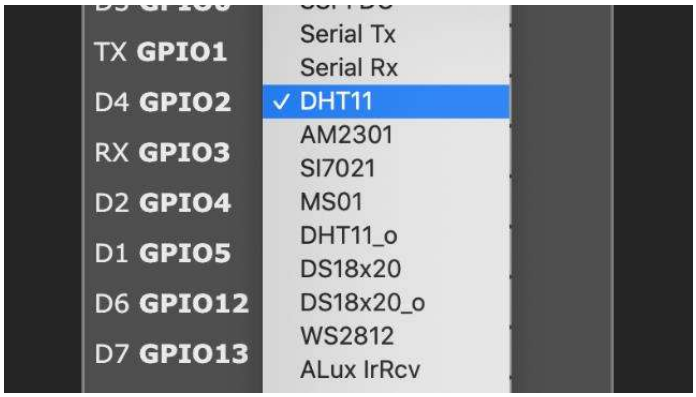
5.1. Instal Tasmota Firmware Microcontroller ESP8266

- Open browser : https://tasmota.github.io/install/
- Pilih, ESP8266 connect dengan driver USB console CH340 atau CP2102
- Instal dan Erase Device
- Connect to Wi-Fi
- Akses Web Server Microcontroller via IP Address

Lampiran 5.1 Tampilan Install Tasmota

5.2. Konfigurasi Sensor DHT11

- Klik Configuration -> Configuration Module -> Type [Generic 18]
- Pilih Pin GPIO yang sudah di integrasi dengan Sensor DHT11 Pin D4/GPIO2 -> DHT11, Save



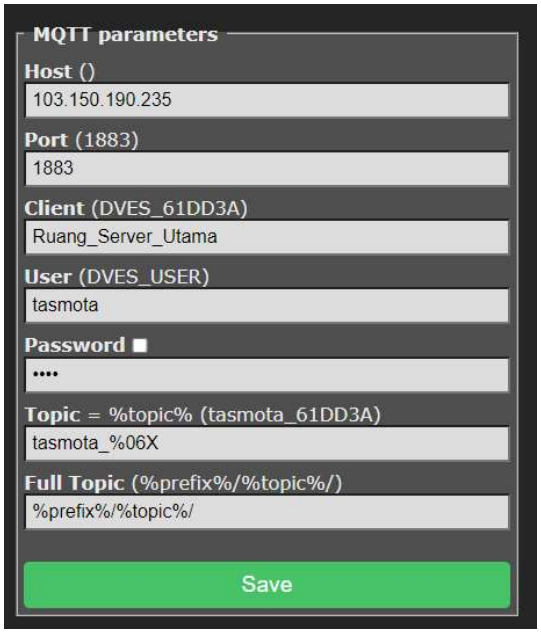
Lampiran 5.2 Tampilan Konfigurasi Sensor DHT11

5.3. Konfigurasi Alarm Buzzer

- Klik Configuration -> Configuration Module -> Type [Generic 18]
- Pilih Pin GPIO yang sudah di integrasi dengan Relay untuk Buzzer Pin D4/GPIO2 -> Relay_i, Save

5.4. Konfigurasi MQTT di Microcontroller

- Host : 192.168.x.x
- Port : 1883
- Client : Device_ID
- User : Tasmota
- Password : Tasmota



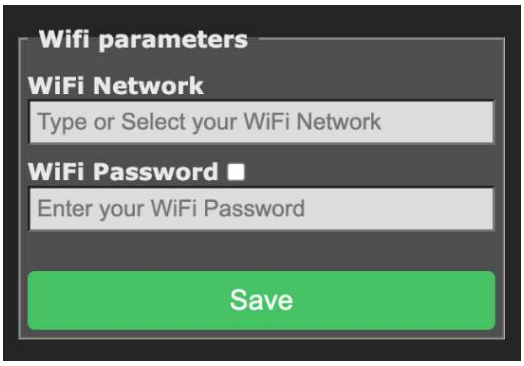
Lampiran 5.3 Tampilan Konfigurasi MQTT

5.5. Konfigurasi Other

- Device Name & Fiendly Name -> Device_Site_ID, Save

5.6. Konfigurasi WiFi

- Wifi Network : 123
- Wifi Password : 12345678
- Hostname : Device_ID



Lampiran 5.4 Tampilan Konfigurasi Wi-Fi

6. Konfigurasi Frontend Home Assistant

6.1. Integrasi Platform di Home Assistant

Settings -> Devices and Services -> Add Integration

→ Konfigurasi MQTT di Home Assistant

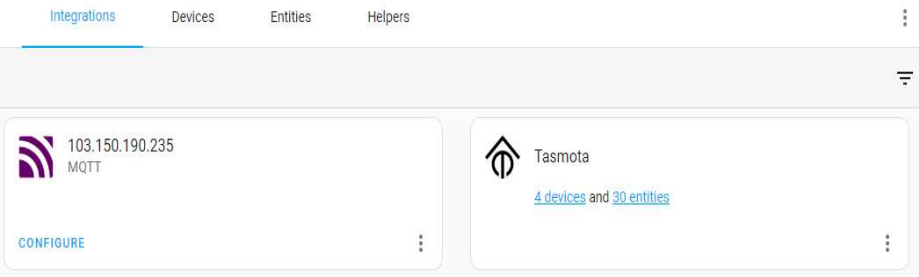
- Broker : 192.168.x.x
- Port : 1883
- Username : tasmota
- Password : tasmota

→ Konfigurasi Tuya di Home Assistant

- Country : ID
- Access ID : f5wef8553fjiojgn
- Access Secret : **********
- Account : cloudiot76@gmail.com
- Password : multimedia123

→ Konfigurasi Tasmota di Home Assistant

- Setup dan Finish



Lampiran 6.1 Tampilan Integrasi MQTT dan Tasmota di Home Assistant

6.2. Otomasi di Home Assistant [Source Code]

Settings -> Devices and Services -> Automation & Scenes

→ configuration.yaml :

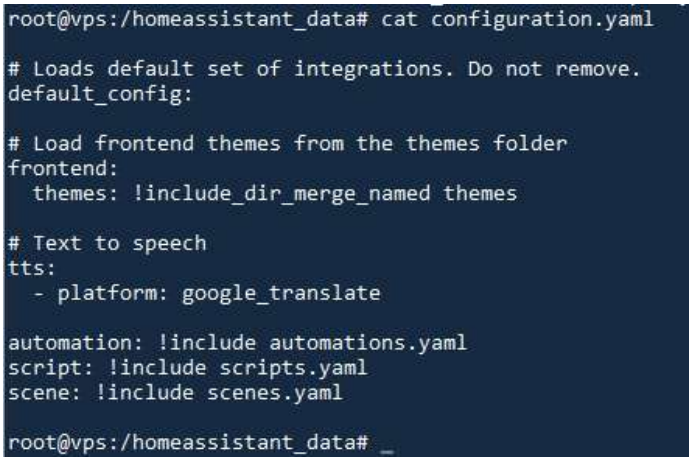
root@vps:/homeassistant_data# cat configuration.yaml

```
# Loads default set of integrations. Do not remove.
default_config:

# Load frontend themes from the themes folder
frontend:
  themes: !include_dir_merge_named themes

# Text to speech
tts:
  - platform: google_translate

automation: !include automations.yaml
script: !include scripts.yaml
scene: !include scenes.yaml
```



Lampiran 6.2 Tampilan Konfigurasi Backend Home Assistant

→ scripts.yaml :

```
root@vps:/homeassistant_data# cat scripts.yaml
notify_humidity_ruang_server_utama:
  alias: Notification High Humidity - Ruang Server Utama
  sequence:
    - service: notify.notify
      data:
        message: Please Check Server Room, Humidity Current is {{ states('sensor.ruang_server_utama_kampus_menanggal_gedung_pgsd_lt_2_dht11_humidity',
          with_unit=True) }}
        title: High Humidity - Ruang Server Utama
    - service: notify.persistent_notification
      data:
        message: Please Check Server Room, Humidity Current is {{ states('sensor.ruang_server_utama_kampus_menanggal_gedung_pgsd_lt_2_dht11_humidity',
          with_unit=True) }}
        title: High Humidity - Ruang Server Utama
    - type: turn_on
      device_id: 7a7009edc9ae690332a1559b52f62e7c
      entity_id: switch.tasmota
      domain: switch
  mode: single
  icon: mdi:bell
notify_temperature_ruang_server_utama:
  alias: 'Notification High Temperature - Ruang Server Utama '
  sequence:
  - service: notify.notify
    data:
```

```
      message: Please Check Server Room, Temperature
Current is {{
states('sensor.ruang_server_utama_kampus_menanggal
_gedung_pgsd_lt_2_dht11_temperature',
       with_unit=True) }}
      title: High Temperature - Ruang Server Utama
  - service: notify.persistent_notification
    data:
      message: Please Check Server Room, Temperature
Current is {{
states('sensor.ruang_server_utama_kampus_menanggal
_gedung_pgsd_lt_2_dht11_temperature',
       with_unit=True) }}
      title: High Temperature - Ruang Server Utama
  - type: turn_on
    device_id: 7a7009edc9ae690332a1559b52f62e7c
    entity_id: switch.tasmota
    domain: switch
  mode: single
  icon: mdi:bell
notification_low_humidity_ruang_server_utama:
  alias: Notification Low Humidity - Ruang Server
Utama
  sequence:
  - service: notify.notify
    data:
      message: Please Check Server Room, Humidity
Current is {{
states('sensor.ruang_server_utama_kampus_menanggal
_gedung_pgsd_lt_2_dht11_humidity',
       with_unit=True) }}
      title: Low Humidity - Ruang Server Utama
  - service: notify.persistent_notification
    data:
      message: Please Check Server Room, Humidity
Current is {{
states('sensor.ruang_server_utama_kampus_menanggal
_gedung_pgsd_lt_2_dht11_humidity',
       with_unit=True) }}
      title: Low Humidity - Ruang Server Utama
  - type: turn_on
    device_id: 7a7009edc9ae690332a1559b52f62e7c
    entity_id: switch.tasmota
    domain: switch
  mode: single
  icon: mdi:bell-outline
notification_high_temperature_ruang_server_utama_du
plicate:
```

```
  alias: 'Notification Low Temperature - Ruang Server
Utama '
  sequence:
  - service: notify.notify
    data:
      message: Please Check Server Room, Temperature
Current                    is                    {{
states('sensor.ruang_server_utama_kampus_menanggal
_gedung_pgsd_lt_2_dht11_temperature',
       with_unit=True) }}
      title: Low Temperature - Ruang Server Utama
  - service: notify.persistent_notification
    data:
      message: Please Check Server Room, Temperature
Current                    is                    {{
states('sensor.ruang_server_utama_kampus_menanggal
_gedung_pgsd_lt_2_dht11_temperature',
       with_unit=True) }}
      title: Low Temperature - Ruang Server Utama
  - type: turn_on
    device_id: 7a7009edc9ae690332a1559b52f62e7c
    entity_id: switch.tasmota
    domain: switch
  mode: single
  icon: mdi:bell-outline
```

→ automation.yaml :

```
root@vps:/homeassistant_data# cat automations.yaml
        - id: '1685605111775'
          alias: High Temperature - Ruang Server Utama
          description: High Temperature Sensor DHT11
          trigger:
          - type: temperature
            platform: device
            device_id: 2c7e46e3af45df0179c1a75706f246b7
            entity_id:
          sensor.ruang_server_utama_kampus_menanggal_ged
          ung_pgsd_lt_2_dht11_temperature
            domain: sensor
            above: 25
          condition: []
          action:
          -                                          service:
          script.notify_temperature_ruang_server_utama
            data: {}
          mode: single
        - id: '1685605237999'
          alias: High Humidity - Ruang Server Utama
```

```
  description: High Humidity Sensor DHT11
  trigger:
  - type: humidity
    platform: device
    device_id: 2c7e46e3af45df0179c1a75706f246b7
    entity_id:
sensor.ruang_server_utama_kampus_menanggal_ged
ung_pgsd_lt_2_dht11_humidity
    domain: sensor
    above: 55
  condition: []
  action:
  -                                                service:
script.notify_humidity_ruang_server_utama
    data: {}
  mode: single
- id: '1685607519619'
  alias: Low Humidity - Ruang Server Utama
  description: Low Humidity Sensor DHT11
  trigger:
  - type: humidity
    platform: device
    device_id: 2c7e46e3af45df0179c1a75706f246b7
    entity_id:
sensor.ruang_server_utama_kampus_menanggal_ged
ung_pgsd_lt_2_dht11_humidity
    domain: sensor
    below: 40
  condition: []
  action:
  -                                                service:
script.notification_low_humidity_ruang_server_utam
a
    data: {}
  mode: single
- id: '1685607629580'
  alias: Low Temperature - Ruang Server Utama
  description: Low Temperature Sensor DHT11
  trigger:
  - type: temperature
    platform: device
    device_id: 2c7e46e3af45df0179c1a75706f246b7
    entity_id:
sensor.ruang_server_utama_kampus_menanggal_ged
ung_pgsd_lt_2_dht11_temperature
    domain: sensor
    below: 20
  condition: []
```

```
  action:
  - service:
script.notification_high_temperature_ruang_server_ut
ama_duplicate
    data: {}
  mode: single
```

6.3. Tampilan di Home Assistant

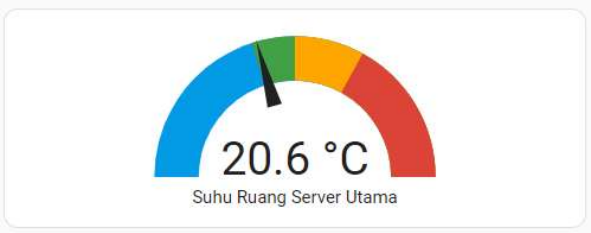
Overview -> Edit

Vertical Stack Card Configuration

```
type: vertical-stack
cards:
      - type: entities
        entities:
          - switch.alarm_buzzer
        title: Ruang Server Utama
        state_color: true
```

Lampiran 6.3 Tampilan Alarm Buzzer pada Dashboard Home Assistant

```
      - type: gauge
        name: Suhu Ruang Server Utama
                entity: >-
                sensor.ruang_server_utama_kampus_menanggal_ge
    dung_pgsd_lt_2_dht11_temperature
        needle: true
        min: 0
        max: 50
        severity:
          green: 20
          yellow: 25
          red: 33
```

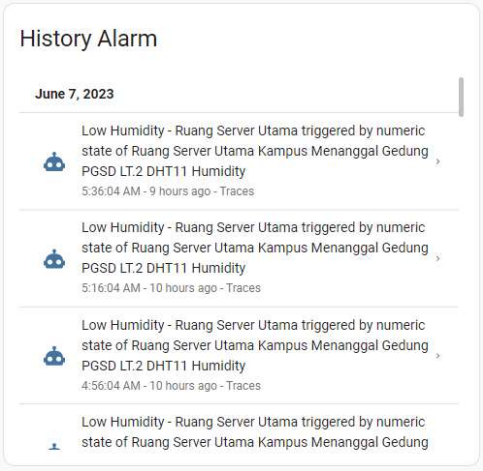


Lampiran 6.4 Tampilan Bar Suhu pada Dashboard Home Assistant

```
- type: gauge
  name: Kelembaban Ruang Server Utama
    entity: >-
            sensor.ruang_server_utama_kampus_menanggal_ge
dung_pgsd_lt_2_dht11_humidity
  needle: true
  severity:
    green: 40
    yellow: 55
    red: 70
  max: 100
  min: 0
```

Lampiran 6.5 Tampilan Bar Kelembaban pada Dashboard Home Assistant

```
- type: logbook
      entities:
        - switch.alarm_buzzer
        - automation.alarm_test
        - automation.high_temperature_ruang_server_utama
        - automation.high_humidity_ruang_server_utama
        - automation.low_humidity_ruang_server_utama
        - automation.low_temperature_ruang_server_utama
  title: History Alarm
show_header_toggle: true
```



Lampiran 6.6 Tampilan History Alarm pada Dashboard Home Assistant

7. Rancang Bangun Alat

7.1. Prototype Alat Pendeteksi Suhu dan Kelembaban

Lampiran 7.1 Dibagian Dalam Alat Pendeteksi Suhu dan Kelembaban

Lampiran 7.2 Desain Box Alat Pendeteksi Suhu dan Kelembaban

7.2. Prototype Alarm Buzzer

Lampiran 7.3 Dibagian Dalam Alarm Buzzer

Lampiran 7.4 Desain Box Alarm Buzzer

8. Pengambilan Data

Lampiran 8.1 Pengambilan Data Sensor Suhu dan Kelembaban

Lampiran 8.2 Pengambilan Data di Ruang Server

Lampiran 8.3 Pengambilan Data di Ruang TI dan Data