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## LAMPIRAN

*Lampiran 1 Hasil deteksi suhu dengan kalman filter*

id	kd1	kd2	kd3	kd4	kd5	rd
1	31.8	28.94	15.98	31.49	29.15	31.8
2	31.8	30.37	21.34	31.7	30.89	31.8
3	31.8	30.91	24.05	31.76	31.46	31.8
4	31.8	31.2	25.69	31.79	31.67	31.8
5	31.8	31.38	26.8	31.79	31.75	31.8
6	31.8	31.5	27.6	31.8	31.78	31.8
7	31.8	31.58	28.21	31.8	31.79	31.8
8	31.8	31.64	28.7	31.8	31.8	31.8
9	31.8	31.68	29.09	31.8	31.8	31.8
10	31.8	31.72	29.41	31.8	31.8	31.8
11	31.8	31.74	29.69	31.8	31.8	31.8
12	31.8	31.76	29.92	31.8	31.8	31.8
13	31.8	31.77	30.13	31.8	31.8	31.8
14	31.8	31.78	30.3	31.8	31.8	31.8
15	31.8	31.78	30.46	31.8	31.8	31.8
16	31.8	31.79	30.6	31.8	31.8	31.8
17	31.8	31.79	30.72	31.8	31.8	31.8
18	31.8	31.79	30.82	31.8	31.8	31.8
19	31.8	31.8	30.92	31.8	31.8	31.8
20	31.8	31.8	31.01	31.8	31.8	31.8
21	31.8	31.8	31.15	31.8	31.8	31.8
22	31.8	31.8	31.22	31.8	31.8	31.8
23	31.8	31.8	31.27	31.8	31.8	31.8
24	31.8	31.8	31.32	31.8	31.8	31.8
25	31.8	31.8	31.37	31.8	31.8	31.8
26	31.8	31.8	31.41	31.8	31.8	31.8
27	31.8	31.8	31.45	31.8	31.8	31.8
28	31.8	31.8	31.48	31.8	31.8	31.8
29	31.8	31.8	31.51	31.8	31.8	31.8
30	31.8	31.8	31.54	31.8	31.8	31.8
31	31.8	31.8	31.56	31.8	31.8	31.8
32	31.8	31.8	31.59	31.8	31.8	31.8

33	31.8	31.8	31.61	31.8	31.8	31.8
34	31.8	31.8	31.63	31.8	31.8	31.8
35	31.8	31.8	31.66	31.8	31.8	31.8
36	31.8	31.8	31.67	31.8	31.8	31.8
37	31.8	31.8	31.68	31.8	31.8	31.8
38	31.8	31.8	31.69	31.8	31.8	31.8
39	31.8	31.8	31.7	31.8	31.8	31.8
40	31.8	31.8	31.71	31.8	31.8	31.8
41	31.8	31.8	31.72	31.8	31.8	31.8
42	31.8	31.8	31.73	31.8	31.8	31.8
43	31.8	31.8	31.74	31.8	31.8	31.8
44	31.8	31.8	31.74	31.8	31.8	31.8
45	31.8	31.8	31.75	31.8	31.8	31.8
46	31.8	31.8	31.75	31.8	31.8	31.8
47	31.8	31.8	31.76	31.8	31.8	31.8
48	31.8	31.8	31.76	31.8	31.8	31.8
49	31.8	31.8	31.76	31.8	31.8	31.8
50	31.8	31.8	31.77	31.8	31.8	31.8
51	31.8	31.8	31.77	31.8	31.8	31.8
52	31.8	31.8	31.77	31.8	31.8	31.8
53	31.8	31.8	31.78	31.8	31.8	31.8
54	31.8	31.8	31.78	31.8	31.8	31.8
55	31.8	31.8	31.78	31.8	31.8	31.8
56	31.8	31.8	31.78	31.8	31.8	31.8
57	31.8	31.8	31.78	31.8	31.8	31.8
58	31.8	31.8	31.79	31.8	31.8	31.8
59	31.8	31.8	31.79	31.8	31.8	31.8
60	31.8	31.8	31.79	31.8	31.8	31.8
61	31.8	31.8	31.79	31.8	31.8	31.8
62	31.8	31.8	31.79	31.8	31.8	31.8
63	31.8	31.8	31.79	31.8	31.8	31.8
64	31.8	31.8	31.79	31.8	31.8	31.8
65	31.8	31.8	31.79	31.8	31.8	31.8
66	31.8	31.8	31.79	31.8	31.8	31.8
67	31.8	31.8	31.79	31.8	31.8	31.8
68	31.8	31.8	31.8	31.8	31.8	31.8
69	31.8	31.8	31.8	31.8	31.8	31.8
70	31.8	31.8	31.8	31.8	31.8	31.8

71	31.8	31.8	31.8	31.8	31.8	31.8
72	31.8	31.8	31.8	31.8	31.8	31.8
73	31.8	31.8	31.8	31.8	31.8	31.8
74	31.8	31.8	31.8	31.8	31.8	31.8
75	31.8	31.8	31.8	31.8	31.8	31.8
76	31.8	31.8	31.8	31.8	31.8	31.8
77	31.8	31.8	31.8	31.8	31.8	31.8
78	31.8	31.8	31.8	31.8	31.8	31.8
79	31.8	31.8	31.8	31.8	31.8	31.8
80	31.8	31.8	31.8	31.8	31.8	31.8
81	31.8	31.8	31.8	31.8	31.8	31.8
82	31.8	31.8	31.8	31.8	31.8	31.8
83	31.8	31.8	31.8	31.8	31.8	31.8
84	31.8	31.8	31.8	31.8	31.8	31.8
85	31.8	31.8	31.8	31.8	31.8	31.8
86	31.8	31.8	31.8	31.8	31.8	31.8
87	31.8	31.8	31.8	31.8	31.8	31.8
88	31.8	31.8	31.8	31.8	31.8	31.8
89	31.8	31.83	31.81	31.86	31.86	31.9
90	31.82	31.95	31.86	32.13	32.13	32.3
91	31.83	32.05	31.9	32.24	32.24	32.3
92	31.85	32.12	31.94	32.28	32.28	32.3
93	31.86	32.17	31.97	32.29	32.29	32.3
94	31.88	32.2	32	32.3	32.3	32.3
95	31.89	32.23	32.03	32.3	32.3	32.3
96	31.9	32.25	32.06	32.3	32.3	32.3
97	31.91	32.26	32.08	32.3	32.3	32.3
98	31.93	32.27	32.1	32.3	32.3	32.3
99	31.94	32.28	32.12	32.3	32.3	32.3
100	31.95	32.29	32.14	32.3	32.3	32.3

*Lampiran 2 Hasil deteksi kelembaban dengan kalman filter*

id	kd1	kd2	kd3	kd4	kd5	rd
1	50.25	45.72	25.25	49.76	46.06	50.25
2	50.25	48	33.72	50.09	48.81	50.25
3	50.25	48.84	38	50.19	49.71	50.25

4	50.25	49.3	40.59	50.23	50.04	50.25
5	50.25	49.58	42.34	50.24	50.17	50.25
6	50.25	49.77	43.61	50.25	50.22	50.25
7	50.25	49.9	44.58	50.25	50.24	50.25
8	50.25	50	45.35	50.25	50.25	50.25
9	50.25	50.07	45.97	50.25	50.25	50.25
10	50.25	50.12	46.48	50.25	50.25	50.25
11	50.25	50.18	47.29	50.25	50.25	50.25
12	50.25	50.2	47.61	50.25	50.25	50.25
13	50.25	50.21	47.89	50.25	50.25	50.25
14	50.25	50.22	48.13	50.25	50.25	50.25
15	50.25	50.23	48.35	50.25	50.25	50.25
16	50.25	50.24	48.54	50.25	50.25	50.25
17	50.25	50.24	48.71	50.25	50.25	50.25
18	50.25	50.24	48.86	50.25	50.25	50.25
19	50.25	50.24	49	50.25	50.25	50.25
20	50.25	50.25	49.12	50.25	50.25	50.25
21	50.25	50.25	49.23	50.25	50.25	50.25
22	50.25	50.25	49.33	50.25	50.25	50.25
23	50.25	50.25	49.42	50.25	50.25	50.25
24	50.25	50.25	49.5	50.25	50.25	50.25
25	50.25	50.25	49.57	50.25	50.25	50.25
26	50.25	50.25	49.64	50.25	50.25	50.25
27	50.25	50.25	49.69	50.25	50.25	50.25
28	50.25	50.25	49.75	50.25	50.25	50.25
29	50.25	50.25	49.8	50.25	50.25	50.25
30	50.25	50.25	49.84	50.25	50.25	50.25
31	50.25	50.25	49.88	50.25	50.25	50.25
32	50.25	50.25	49.91	50.25	50.25	50.25
33	50.25	50.25	49.95	50.25	50.25	50.25
34	50.25	50.25	49.97	50.25	50.25	50.25
35	50.25	50.25	50	50.25	50.25	50.25
36	50.25	50.25	50.02	50.25	50.25	50.25
37	50.25	50.25	50.05	50.25	50.25	50.25
38	50.25	50.25	50.07	50.25	50.25	50.25
39	50.25	50.25	50.08	50.25	50.25	50.25
40	50.25	50.25	50.1	50.25	50.25	50.25
41	50.25	50.25	50.11	50.25	50.25	50.25

42	50.25	50.25	50.13	50.25	50.25	50.25
43	50.25	50.25	50.14	50.25	50.25	50.25
44	50.25	50.25	50.15	50.25	50.25	50.25
45	50.25	50.25	50.16	50.25	50.25	50.25
46	50.25	50.25	50.17	50.25	50.25	50.25
47	50.25	50.25	50.17	50.25	50.25	50.25
48	50.25	50.25	50.18	50.25	50.25	50.25
49	50.25	50.25	50.19	50.25	50.25	50.25
50	50.25	50.25	50.19	50.25	50.25	50.25
51	50.25	50.25	50.2	50.25	50.25	50.25
52	50.25	50.25	50.2	50.25	50.25	50.25
53	50.25	50.25	50.21	50.25	50.25	50.25
54	50.25	50.25	50.21	50.25	50.25	50.25
55	50.25	50.25	50.22	50.25	50.25	50.25
56	50.25	50.25	50.22	50.25	50.25	50.25
57	50.25	50.25	50.22	50.25	50.25	50.25
58	50.25	50.25	50.22	50.25	50.25	50.25
59	50.25	50.25	50.23	50.25	50.25	50.25
60	50.3	50.66	50.37	51.18	51.18	51.75
61	50.37	51.15	50.57	51.99	51.99	52.5
62	50.46	51.72	50.83	52.77	52.77	53.25
63	50.53	51.93	50.99	52.6	52.6	52.5
64	50.57	51.88	51.06	52.08	52.08	51.75
65	50.61	51.85	51.13	51.87	51.87	51.75
66	50.62	51.62	51.11	51.33	51.33	51
67	50.63	51.45	51.1	51.13	51.13	51
68	50.64	51.33	51.09	51.05	51.05	51
69	50.63	51.04	51.01	50.56	50.56	50.25
70	50.62	50.82	50.94	50.37	50.37	50.25
71	50.61	50.67	50.87	50.29	50.29	50.25
72	50.6	50.56	50.82	50.27	50.27	50.25
73	50.58	50.47	50.76	50.26	50.26	50.25
74	50.57	50.41	50.71	50.25	50.25	50.25
75	50.56	50.37	50.67	50.25	50.25	50.25
76	50.55	50.34	50.63	50.25	50.25	50.25
77	50.54	50.31	50.59	50.25	50.25	50.25
78	50.53	50.3	50.56	50.25	50.25	50.25
79	50.53	50.28	50.53	50.25	50.25	50.25

80	50.52	50.27	50.5	50.25	50.25	50.25
81	50.51	50.27	50.48	50.25	50.25	50.25
82	50.5	50.26	50.46	50.25	50.25	50.25
83	50.48	50.26	50.42	50.25	50.25	50.25
84	50.48	50.26	50.4	50.25	50.25	50.25
85	50.47	50.25	50.39	50.25	50.25	50.25
86	50.46	50.25	50.38	50.25	50.25	50.25
87	50.46	50.25	50.36	50.25	50.25	50.25
88	50.45	50.25	50.35	50.25	50.25	50.25
89	50.44	50.25	50.34	50.25	50.25	50.25
90	50.44	50.25	50.33	50.25	50.25	50.25
91	50.43	50.25	50.33	50.25	50.25	50.25
92	50.43	50.25	50.32	50.25	50.25	50.25
93	50.42	50.25	50.31	50.25	50.25	50.25
94	50.42	50.25	50.31	50.25	50.25	50.25
95	50.41	50.25	50.3	50.25	50.25	50.25
96	50.41	50.25	50.3	50.25	50.25	50.25
97	50.4	50.25	50.29	50.25	50.25	50.25
98	50.4	50.25	50.29	50.25	50.25	50.25
99	50.39	50.25	50.28	50.25	50.25	50.25
100	50.39	50.25	50.28	50.25	50.25	50.25

*Lampiran 3 Hasil deteksi kadar gas amonia dengan kalman filter*

id	kd1	kd2	kd3	kd4	kd5	rd
1	10.54	2.28	8.02	0.02	0.02	0
2	3.88	0.32	1.92	0.01	0.01	0.01
3	5.95	9.44	7.72	2.41	2.41	0
4	2.02	0	0.16	0	0	0
5	2.33	0.21	2.03	0	0	0
6	3.24	0.19	2.34	0	0	0
7	2.48	0.17	1.5	0	0	0
8	2.59	0.2	1.82	0	0	0
9	2.51	7.3	2.92	16.69	16.69	27.01
10	21.93	15.28	22.1	13.35	13.35	2.33
11	4.96	0.01	0.21	0	0	0
12	1.68	2.67	1.41	3.66	3.66	4.92



13	0.38	0.01	0.02	0	0	0
14	5.4	16.91	11.38	6.95	6.95	0.01
15	2.85	0.75	0.81	1.03	1.03	0.49
16	2.53	0.01	0.8	0.01	0.01	0.01
17	0.58	0.01	0.02	0	0	0
18	0.13	0.01	0.01	0.01	0.01	0
19	0.82	0.03	0.54	0.01	0.01	0.01
20	3.13	17.06	8.2	16.32	16.32	0.02
21	0.72	0.01	0.08	0	0	0.01
22	0.94	0.01	0.49	0	0	0.01
23	1.99	0.08	1.54	0	0	0
24	0.45	0	0.02	0	0	0
25	1.15	0	0.31	0	0	0
26	3.39	8.08	5.01	5.54	5.54	0
27	2.21	0.09	1.14	0	0	0
28	3.46	1.43	4	0.03	0.03	0.03
29	1.61	0.02	0.63	0	0	0
30	0.38	0	0.01	0	0	0
31	6.08	26.54	15.37	19.03	19.03	0.52
32	11.51	29.26	20.34	18.55	18.55	0.04
33	9.21	5.99	9.44	0.42	0.42	0
34	7.91	0.15	4.29	0	0	0
35	21.95	40.52	33.34	47.2	47.2	50
36	18.15	26.25	23.27	18.33	18.33	0.03
37	4.11	0.04	0.23	0.03	0.03	0
38	0.94	0	0.01	0	0	0
39	11.66	39.86	25.35	48.89	48.89	50
40	2.64	0	0.23	0	0	0
41	0.55	0	0	0	0	0
42	0.24	0	0.02	0	0	0
43	0.06	0.01	0.01	0	0	0
44	0.09	0	0.01	0	0	0
45	0.13	0	0.02	0	0	0.01
46	0.44	0	0.06	0	0	0
47	0.1	0	0	0	0	0
48	0.02	0	0	0	0	0
49	1	0	0.26	0	0	0
50	1.24	0	0.28	0	0	0

51	1.47	0	0.46	0	0	0
52	0.97	0	0.27	0	0	0
53	0.94	0.02	0.4	0	0	0
54	0.56	0	0.05	0	0	0
55	0.89	0	0.11	0.01	0.01	0.01
56	1.83	10.86	4.67	14.05	14.05	3.62
57	4.13	3.54	5.57	0.13	0.13	0
58	6.37	8.06	7.86	1.95	1.95	0
59	4.49	0.07	1.92	0.01	0.01	0.01
60	11.16	37.84	23.71	45.39	45.39	50
61	21.41	18.1	27.1	2.94	2.94	0
62	4.85	0	0.25	0	0	0
63	1	0	0.01	0	0	0
64	1.15	0	0.21	0	0	0
65	1.91	0.04	1.16	0	0	0
66	0.46	0.02	0.03	0	0	0
67	0.11	0	0	0	0	0
68	0.02	0	0	0	0	0
69	9.65	23.34	20.84	7.27	7.27	0.01
70	9.03	2.28	5.81	0.89	0.89	0.76
71	2.05	0.01	0.06	0.01	0.01	0.01
72	2.96	0.05	1.76	0	0	0
73	1.55	0.05	0.81	0	0	0
74	4.35	17.93	8.89	18.32	18.32	3.25
75	2.04	0.01	0.42	0.01	0.01	0.01
76	14.85	18.66	18.43	31.79	31.79	50
77	10.2	0.12	4.27	0	0	0
78	5.94	0.02	1.66	0.01	0.01	0.01
79	4.25	0.01	0.74	0.01	0.01	0
80	2.18	1.49	2.37	0.04	0.04	0
81	3.61	8.59	7.12	2.63	2.63	0.02
82	3.16	0.29	2.36	0	0	0
83	0.72	0.03	0.03	0.07	0.07	0.11
84	4.95	0.54	2.45	1.01	1.01	1.36
85	3.95	0.05	1.79	0	0	0
86	2.68	0.01	0.89	0	0	0
87	5.86	22.71	12.76	35.96	35.96	50
88	1.33	0	0.12	0	0	0

89	2.54	0.9	2.36	0.01	0.01	0.01
90	3.7	0.17	2.47	0.03	0.03	0
91	1.45	0.01	0.27	0	0	0
92	0.3	0.01	0.01	0.01	0.01	0
93	0.08	0	0.01	0	0	0
94	0.07	0.02	0.03	0.02	0.02	0.01
95	0.02	0	0	0	0	0
96	0.01	0	0	0	0	0
97	0.01	0.02	0.02	0.01	0.01	0
98	0.01	0.02	0.01	0.02	0.02	0.01
99	0.02	0	0	0	0	0
100	0.01	0	0	0	0	0

Lampiran 4 perbandingan data pembacaan suhu dan kelembaban DHT11 dan HTC-1

HTC-1		DHT11		Persentase Kesalahan	
Suhu	Kelembaban	Suhu	Kelembaban	Suhu	Kelembaban
29.4	55	29.39	49.82	0.03	9.42
29.4	55	32.24	54.64	9.66	0.65
29.4	55	32.3	54.75	9.86	0.45
29.4	55	32.3	54.75	9.86	0.45
29.4	55	32.3	54.75	9.86	0.45
29.4	55	32.3	54.75	9.86	0.45
29.4	55	32.3	54.75	9.86	0.45
29.4	55	32.3	54.75	9.86	0.45
29.4	55	32.3	54.75	9.86	0.45
29.4	55	32.3	54.75	9.86	0.45
29.4	55	32.3	54.75	9.86	0.45
29.4	55	32.3	54.75	9.86	0.45
29.4	55	32.3	54.75	9.86	0.45
29.4	55	32.3	54.29	9.86	1.29
29.4	55	32.3	54.01	9.86	1.80
29.4	58	32.3	54	9.86	6.90
29.4	58	32.3	54	9.86	6.90
29.4	58	32.3	54	9.86	6.90
29.4	58	32.3	54	9.86	6.90
29.5	58	32.3	54	9.49	6.90
29.5	58	32.3	54	9.49	6.90
29.5	58	32.3	54	9.49	6.90

29.5	58	32.3	54	9.49	6.90
29.5	58	32.3	54	9.49	6.90
29.5	58	32.3	54	9.49	6.90
29.5	58	32.37	53.65	9.73	7.50
29.5	58	32.43	53.39	9.93	7.95
29.5	58	32.5	53.26	10.17	8.17
29.5	58	32.8	53.25	11.19	8.19
29.5	58	32.8	53.25	11.19	8.19
Rata- rata				9.55	4.24

*Lampiran 5 data perbandingan hasil respon actuator lampu node dengan matlab*

lampu		
matlab	Actuator Node	Error
86.3	86	0.35
86.3	86	0.35
86.3	86	0.35
86.3	86	0.35
86.3	86	0.35
86.3	86	0.35
13.7	14	2.19
13.7	14	2.19
13.7	14	2.19
13.7	14	2.19
50	45	10.00
50	45	10.00
13.7	14	2.19
13.7	14	2.19
13.7	14	2.19
13.7	14	2.19
13.7	14	2.19
13.7	14	2.19

*Lampiran 6 data perbandingan hasil respon kipas node dengan matlab*

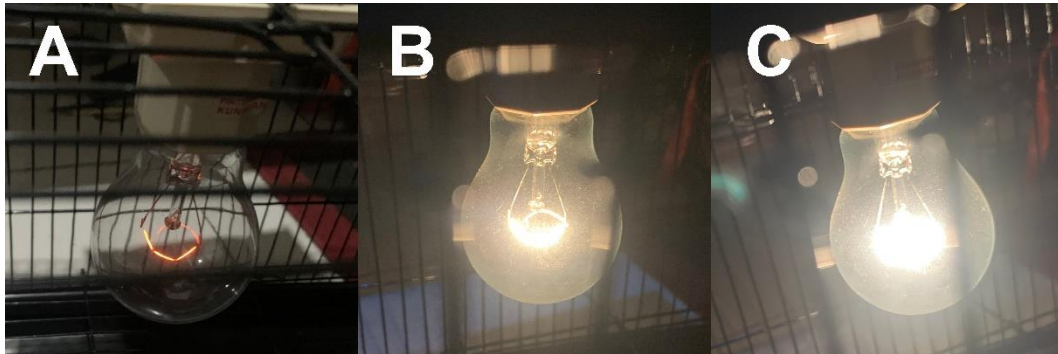
kipas		
matlab	Actuator Node	error
74.9	74.67	0.31
74.9	74.67	0.31
25.1	25.33	0.92
74.9	74.67	0.31
25.1	25.33	0.92
74.9	74.67	0.31
74.9	74.67	0.31
74.9	74.67	0.31
25.1	42.85	70.72
74.9	74.67	0.31
25.1	42.85	70.72
74.9	74.67	0.31
74.9	74.67	0.31
74.9	74.67	0.31
74.9	74.67	0.31
74.9	74.67	0.31
74.9	74.67	0.31
74.9	74.67	0.31
74.9	74.67	0.31
74.9	74.67	0.31

*Lampiran 7 data perbandingan hasil respon fogger node dengan matlab*

fogger		
matlab	Actuator Node	error
74.9	74.67	0.31
74.9	74.67	0.31
25.1	25.33	0.92
25.1	25.33	0.92
25.1	25.33	0.92
25.1	25.33	0.92
25.1	25.33	0.92
74.9	74.67	0.31
74.9	74.67	0.31
25.1	25.33	0.92
25.1	25.33	0.92
25.1	25.33	0.92
25.1	25.33	0.92

74.9	74.67	0.31
74.9	74.67	0.31
25.1	25.33	0.92
25.1	25.33	0.92
25.1	25.33	0.92
25.1	25.33	0.92

Lampiran 8 gambar aksi komponen aktuator lampu



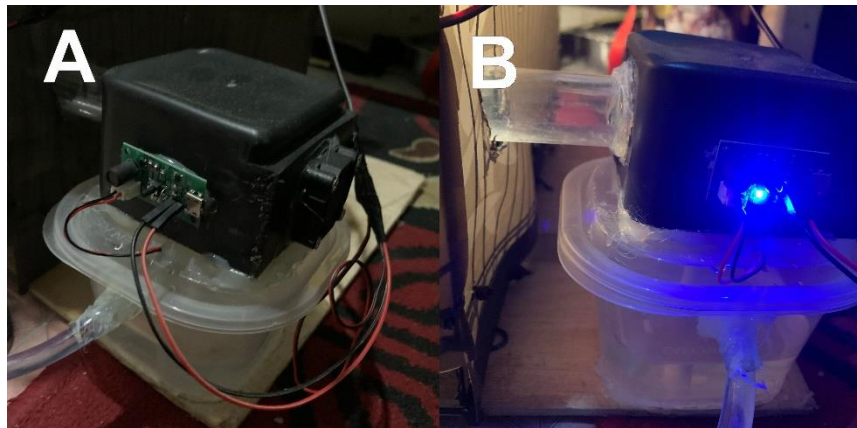
- A = keluaran redup
- B = keluaran sedang
- C = keluaran terang

Lampiran 9 gambar aksi komponen aktuator kipas



- A1 = Kipas A untuk keluaran padam
- A2 = Kipas A untuk keluaran aktif
- B1 = Kipas B untuk keluaran padam
- B2 = Kipas B untuk keluaran aktif

*Lampiran 10 gambar aksi komponen aktuator fogger*



A = Fogger untuk keluaran padam

B = Fogger untuk keluaran aktif

*Lampiran 11 Gambar Prototipe kandang*





## LEMBAR PERBAIKAN SKRIPSI

**“ANALISIS DAN IMPLEMENTASI LOGIKA FUZZY DAN KALMAN  
FILTER PADA SISTEM MONITORING KONDISI LINGKUNGAN  
KANDANG AYAM PETELUR BERBASIS INTERNET OF THINGS”**



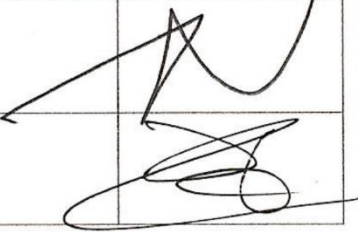
**OLEH:**

**A. MUH. IRSYAD BASO  
D121171325**



Skripsi ini telah dipertahankan pada Ujian Akhir Sarjana tanggal 13 Juli 2022.

Telah dilakukan perbaikan penulisan dan isi skripsi berdasarkan usulan dari penguji dan pembimbing skripsi.

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Persetujuan Perbaikan oleh pembimbing:

Pembimbing	Nama	Tanda Tangan
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II	Ir. Christoforus Yohannes, M.T.	

## DAFTAR PERBAIKAN

A. Muh. Irsyad Baso – D121171325

Analisis dan Implementasi Kalman Filter dan Logika Fuzzy Pada Sistem Monitoring Kondisi Lingkungan Kandang Ayam Petelur Berbasis *Internet of Things*.

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