



# LAMPIRAN

Lampiran 1. Grafik Akurasi Sensor

No	Sensor Arus	Sensor Tegangan
1.	<p style="text-align: center;">Grafik Akurasi Sensor Arus PV1</p>	<p style="text-align: center;">Grafik Akurasi Sensor Tegangan PV1</p>
2.	<p style="text-align: center;">Grafik Akurasi Sensor Arus PV2</p>	<p style="text-align: center;">Grafik Akurasi Sensor Tegangan PV2</p>
3.	<p style="text-align: center;">Grafik Akurasi Sensor Arus Beban</p>	<p style="text-align: center;">Grafik Akurasi Sensor Tegangan Beban</p>

Lampiran 2. Grafik Presisi Sensor

No	Sensor Arus	Sensor Tegangan
1.	<p style="text-align: center;">Grafik Presisi Sensor Arus PV1</p> <p style="text-align: right;"> <span style="color: red;">—</span> Saat 1.05 A  <span style="color: blue;">—</span> Saat 3.01 A  <span style="color: green;">—</span> Saat 4.05 A                 </p>	<p style="text-align: center;">Grafik Presisi Sensor Tegangan PV1</p> <p style="text-align: right;"> <span style="color: red;">—</span> Saat 10.09 V  <span style="color: blue;">—</span> Saat 15.09 V  <span style="color: green;">—</span> Saat 20.07 V                 </p>
2.	<p style="text-align: center;">Grafik Presisi Sensor Arus PV2</p> <p style="text-align: right;"> <span style="color: red;">—</span> Saat 1 A  <span style="color: blue;">—</span> Saat 3.03 A  <span style="color: green;">—</span> Saat 4 A                 </p>	<p style="text-align: center;">Grafik Presisi Sensor Tegangan PV2</p> <p style="text-align: right;"> <span style="color: red;">—</span> Saat 10.07 V  <span style="color: blue;">—</span> Saat 15.07 V  <span style="color: green;">—</span> Saat 20.05 V                 </p>
3.	<p style="text-align: center;">Grafik Presisi Sensor Arus Beban</p> <p style="text-align: right;"> <span style="color: red;">—</span> Saat 1.02 A  <span style="color: blue;">—</span> Saat 3.02 A  <span style="color: green;">—</span> Saat 4.01 A                 </p>	<p style="text-align: center;">Grafik Presisi Sensor Tegangan Beban</p> <p style="text-align: right;"> <span style="color: red;">—</span> Saat 10.04 V  <span style="color: blue;">—</span> Saat 15.04 V  <span style="color: green;">—</span> Saat 20.02 V                 </p>

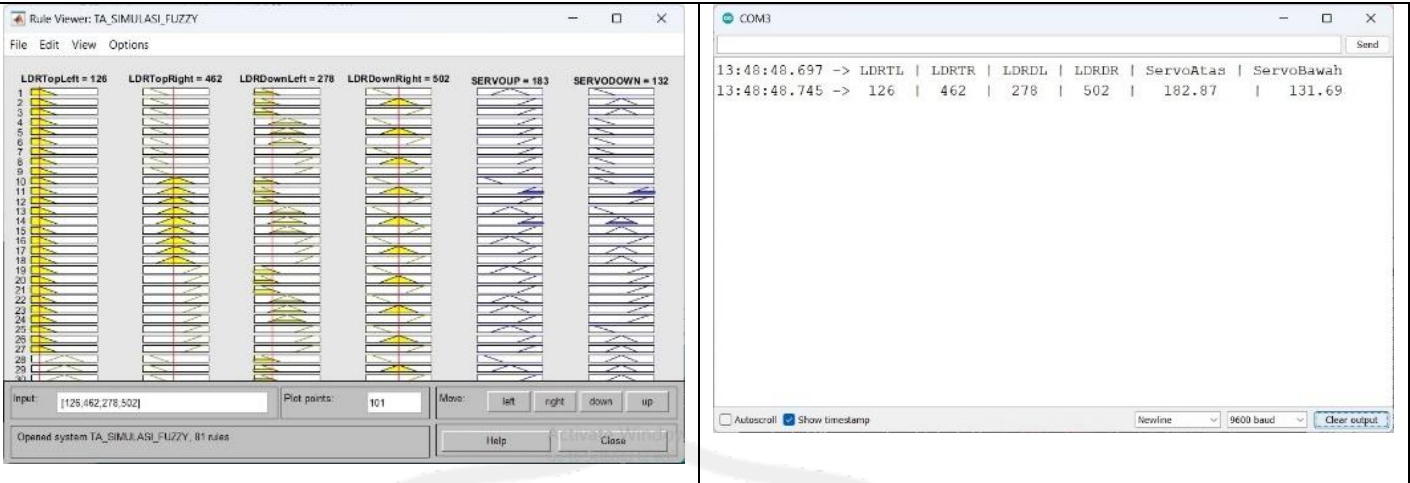
### Lampiran 3. Tabel Perbandingan Simulasi *Fuzzy Logic Controller* Dengan Pembacaan Arduino

No	Simulasi	Pembacaan Arduino
1.		
2.		
3.		
4.		



<p>7.</p>	<p>Rule Viewer: TA_SIMULASI_FUZZY File Edit View Options</p> <p>LDRTopLeft = 403    LDRTopRight = 497    LDRDownLeft = 712    LDRDownRight = 978    SERVOUP = 150    SERVODOWN = 89.9</p> <p>Input: [403,497,712,978]    Plot points: 101    Move: left right down up</p> <p>Opened system TA_SIMULASI_FUZZY, 81 rules</p>	<p>COM3</p> <p>13:56:10.954 -&gt; LDRTL   LDRTL   LDRDL   LDRDR   ServoAtas   ServoBawah 13:56:11.001 -&gt; 403   497   712   978   150.00   90.28</p> <p>Autoscroll <input checked="" type="checkbox"/> Show timestamp    Newline    9600 baud    Clear output</p>
<p>8.</p>	<p>Rule Viewer: TA_SIMULASI_FUZZY File Edit View Options</p> <p>LDRTopLeft = 79    LDRTopRight = 80    LDRDownLeft = 102    LDRDownRight = 78    SERVOUP = 150    SERVODOWN = 66.9</p> <p>Input: [79,80,102,78]    Plot points: 101    Move: left right down up</p> <p>Opened system TA_SIMULASI_FUZZY, 81 rules</p>	<p>COM3</p> <p>14:00:21.228 -&gt; LDRTL   LDRTL   LDRDL   LDRDR   ServoAtas   ServoBawah 14:00:21.276 -&gt; 79   80   102   78   150.00   67.25</p> <p>Autoscroll <input checked="" type="checkbox"/> Show timestamp    Newline    9600 baud    Clear output</p>
<p>9.</p>	<p>Rule Viewer: TA_SIMULASI_FUZZY File Edit View Options</p> <p>LDRTopLeft = 213    LDRTopRight = 892    LDRDownLeft = 174    LDRDownRight = 838    SERVOUP = 181    SERVODOWN = 151</p> <p>Input: [213,892,174,838]    Plot points: 101    Move: left right down up</p> <p>Opened system TA_SIMULASI_FUZZY, 81 rules</p>	<p>COM3</p> <p>13:52:10.515 -&gt; LDRTL   LDRTL   LDRDL   LDRDR   ServoAtas   ServoBawah 13:52:10.561 -&gt; 213   892   174   838   179.87   150.54</p> <p>Autoscroll <input checked="" type="checkbox"/> Show timestamp    Newline    9600 baud    Clear output</p>

10.



**Lampiran 4. Data Perngujian Sistem Panel Surya Statis – Solar Tracker Dual Axis Fuzzy Logic Controller**

No	Time	Irradiasi (W/m <sup>2</sup> )	Tegangan PV1 (V)	Arus PV1 (A)	Daya PV1 (W)	Tegangan PV2 (V)	Arus PV2 (A)	Daya PV2 (W)	Tegangan Beban (W)	Arus Beban (A)	Daya Beban (W)
1	10:00:02	570	17.43	1.7	29.63	15.67	1.23	19.27	6.47	0.45	2.91
2	10:00:12	568	17.43	1.7	29.63	15.67	1.23	19.27	6.47	0.45	2.91
3	10:00:22	595	17.43	1.75	30.50	15.70	1.23	19.31	6.47	0.45	2.91
4	10:00:32	634	17.40	1.71	29.75	15.68	1.26	19.76	6.45	0.53	3.42
5	10:00:42	587	17.40	1.63	28.36	15.63	1.24	19.38	6.45	0.47	3.03
6	10:00:52	606	17.45	1.7	29.67	15.68	1.23	19.29	6.47	0.4	2.59
7	10:01:02	591	17.52	1.84	32.24	15.64	1.35	21.11	6.48	0.4	2.59
8	10:01:12	503	17.45	1.71	29.84	15.53	1.34	20.81	6.48	0.42	2.72
9	10:01:22	586	17.48	1.76	30.76	15.56	1.33	20.69	6.47	0.41	2.65
10	10:01:32	590	17.42	1.68	29.27	15.46	1.32	20.41	6.47	0.48	3.11
...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...
898	12:29:32	529	16.75	1.91	31.99	16.74	1.8	30.13	6.51	0.39	2.54
899	12:29:42	555	16.75	1.94	32.50	16.74	1.82	30.47	6.51	0.33	2.15
900	12:29:52	738	16.97	2.27	38.52	17.01	2.1	35.72	6.51	0.42	2.73
901	12:30:02	853	16.61	1.6	26.58	16.62	1.53	25.43	6.5	0.36	2.34
902	12:30:12	888	16.54	1.54	25.47	16.55	1.47	24.33	6.48	0.38	2.46
903	12:30:22	890	16.46	1.45	23.87	16.46	1.39	22.88	6.48	0.39	2.53
904	12:30:32	896	16.54	1.52	25.14	16.54	1.47	24.31	6.48	0.32	2.07
905	12:30:42	893	16.75	1.99	33.33	16.83	1.86	31.30	6.51	0.25	1.63



906	12:30:52	812	16.91	2.15	36.36	16.95	1.97	33.39	6.51	0.22	1.43
907	12:31:02	796	16.91	2.17	36.69	16.95	2	33.90	6.51	0.31	2.02
...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...
1791	14:58:22	95	13.84	0.62	8.58	13.83	0.48	6.64	6.39	0.55	3.51
1792	14:58:32	95	13.84	0.62	8.58	13.83	0.48	6.64	6.39	0.55	3.51
1793	14:58:42	95	13.84	0.61	8.44	13.83	0.47	6.50	6.39	0.54	3.45
1794	14:58:52	94	13.84	0.61	8.44	13.83	0.47	6.50	6.39	0.55	3.51
1795	14:59:02	94	13.84	0.61	8.44	13.73	0.47	6.45	6.39	0.55	3.51
1796	14:59:12	93.00	13.84	0.60	8.30	13.73	0.47	6.45	6.39	0.55	3.51
1797	14:59:22	93.00	13.84	0.61	8.44	13.72	0.47	6.45	6.39	0.55	3.51
1798	14:59:32	93.00	13.84	0.61	8.44	13.72	0.47	6.45	6.41	0.54	3.46
1799	14:59:42	93.00	13.84	0.61	8.44	13.72	0.47	6.45	6.41	0.55	3.53
1800	14:59:52	93.00	13.84	0.61	8.44	13.72	0.47	6.45	6.41	0.55	3.53
<b>Jumlah</b>		<b>951470.00</b>	<b>29596.05</b>	<b>2724.48</b>	<b>45211.57</b>	<b>28552.79</b>	<b>2419.15</b>	<b>38790.81</b>	<b>11638.29</b>	<b>812.27</b>	<b>5248.62</b>
<b>Rata-Rata</b>		<b>528.59</b>	<b>16.44</b>	<b>1.51</b>	<b>25.12</b>	<b>15.86</b>	<b>1.34</b>	<b>21.55</b>	<b>6.47</b>	<b>0.45</b>	<b>2.92</b>

**Lampiran 5. Data Pengujian Sistem Panel Surya Statis – Solar Tracker Dual Axis Fuzzy Logic Controller Bergerak Tidak Kontinyu**

No	Time	Irradiasi (W/m <sup>2</sup> )	Tegangan PV1 (V)	Arus PV1 (A)	Daya PV1 (W)	Tegangan PV2 (V)	Arus PV2 (A)	Daya PV2 (W)	Tegangan Beban (V)	Arus Beban (A)	Daya Beban (W)
1	10:00:06	665	16.96	1.87	31.72	14.89	1.11	16.53	6.5	0.03	0.20
2	10:00:16	667	16.93	2.06	34.88	14.86	1.11	16.49	6.48	0.36	2.33
3	10:00:26	669	16.96	2.04	34.60	14.89	1.08	16.08	6.5	0.59	3.84
4	10:00:36	667	16.93	2.06	34.88	14.86	1.11	16.49	6.48	0.67	4.34
5	10:00:46	667	16.93	2.06	34.88	14.86	1.11	16.49	6.48	3.46	22.42
6	10:00:56	626	16.98	1.86	31.58	14.91	1.12	16.70	6.5	2.34	15.21
7	10:01:06	658	17.51	1.71	29.94	14.34	1.01	14.48	6.45	0.87	5.61
8	10:01:16	658	17.51	1.71	29.94	14.34	1.01	14.48	6.45	0.87	5.61
9	10:01:26	655	17.46	1.64	28.63	14.30	0.94	13.44	6.45	0.87	5.61
10	10:01:36	656	17.51	1.71	29.94	14.34	1.01	14.48	6.45	0.87	5.61
...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...
898	12:29:36	200	14.67	1.01	14.82	14.12	0.71	10.03	6.45	0.02	0.13
899	12:29:46	200	14.69	1.02	14.98	14.13	0.72	10.17	6.45	0.02	0.13
900	12:29:56	200	14.69	1.02	14.98	14.13	0.72	10.17	6.45	0.02	0.13
901	12:30:06	200	14.69	1.02	14.98	14.13	0.72	10.17	6.45	0.02	0.13
902	12:30:16	198	14.67	1.01	14.82	14.12	0.71	10.03	6.45	0.02	0.13
903	12:30:26	196	14.59	0.97	14.15	14.08	0.7	9.86	6.45	0.02	0.13
904	12:30:36	197	14.61	0.98	14.32	14.09	0.7	9.86	6.45	0.02	0.13
905	12:30:46	197	14.63	0.99	14.48	14.1	0.7	9.87	6.45	0.02	0.13

906	12:30:56	198	14.67	1.01	14.82	14.12	0.71	10.03	6.45	0.02	0.13
907	12:31:06	198	14.67	1.01	14.82	14.12	0.71	10.03	6.45	0.02	0.13
...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...
1791	14:58:26	183	14.65	0.88	12.86	11.71	0.81	9.44	6.39	0.03	0.19
1792	14:58:36	183	14.65	0.88	12.86	11.71	0.81	9.44	6.39	0.03	0.19
1793	14:58:46	183	14.65	0.88	12.86	11.71	0.81	9.44	6.39	0.03	0.19
1794	14:58:56	182	14.64	0.87	12.78	11.71	0.80	9.41	6.39	0.01	0.06
1795	14:59:06	182	14.64	0.87	12.78	11.71	0.80	9.41	6.39	0.03	0.19
1796	14:59:16	180.00	14.58	0.84	12.29	11.71	0.79	9.27	6.39	0.03	0.19
1797	14:59:26	180.00	14.58	0.84	12.29	11.71	0.79	9.27	6.39	0.01	0.06
1798	14:59:36	177.00	14.56	0.84	12.20	11.71	0.79	9.25	6.39	0.02	0.13
1799	14:59:46	173.00	14.55	0.83	12.12	11.71	0.79	9.23	6.39	0.02	0.13
1800	14:59:56	172.00	14.54	0.83	12.04	11.71	0.79	9.20	6.39	0.02	0.13
<b>Jumlah</b>		<b>775272.00</b>	<b>28578.25</b>	<b>2563.50</b>	<b>41495.58</b>	<b>27163.81</b>	<b>2328.40</b>	<b>36082.51</b>	<b>11694.32</b>	<b>138.60</b>	<b>898.577</b>
<b>Rata-Rata</b>		<b>430.71</b>	<b>15.88</b>	<b>1.42</b>	<b>23.05</b>	<b>15.09</b>	<b>1.29</b>	<b>20.05</b>	<b>6.50</b>	<b>0.08</b>	<b>0.50</b>

**Lampiran 6. Data Perngujian Sistem Panel Surya Statis – Solar Tracker Dual Axis Tanpa Fuzzy Logic Controller**

No	Time	Irradiasi (W/m <sup>2</sup> )	Tegangan PV1 (V)	Arus PV1 (A)	Daya PV1 (W)	Tegangan PV2 (V)	Arus PV2 (A)	Daya PV2 (W)	Tegangan Beban (W)	Arus Beban (A)	Daya Beban (W)
1	10:00:04	280	15.57	1.11	17.28	14.73	0.87	12.82	6.47	0.63	4.08
2	10:00:14	283	15.97	1.34	21.40	15.14	0.9	13.63	6.47	0.83	5.37
3	10:00:24	304	16.75	1.22	20.44	15.96	0.99	15.80	6.5	0.61	3.97
4	10:00:34	332	16.83	1.2	20.20	16.02	0.97	15.54	6.5	0.59	3.84
5	10:00:44	323	16.89	1.44	24.32	16.1	1	16.10	6.5	0.82	5.33
6	10:00:54	344	16.89	1.44	24.32	16.1	1	16.10	6.5	0.82	5.33
7	10:01:04	402	17.23	1.39	23.95	16.53	1.17	19.34	6.51	0.58	3.78
8	10:01:14	414	17.25	1.38	23.81	16.54	1.16	19.19	6.51	2.53	16.47
9	10:01:24	561	17.68	2	35.36	17.15	1.58	27.10	6.56	1.65	10.82
10	10:01:34	450	16.78	1.13	18.96	15.93	0.9	14.34	6.48	0.82	5.31
...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...
898	12:29:34	721	16.89	1.69	28.54	17.43	1.57	27.37	6.57	0.33	2.17
899	12:29:44	713	16.84	1.87	31.49	17.37	1.57	27.27	6.57	0.56	3.68
900	12:29:54	699	16.84	1.66	27.95	17.37	1.54	26.75	6.57	0.34	2.23
901	12:30:04	716	16.83	1.65	27.77	17.34	1.63	28.26	6.57	0.3	1.97
902	12:30:14	719	16.81	1.85	31.10	17.32	1.65	28.58	6.57	0.56	3.68
903	12:30:24	715	16.81	1.64	27.57	17.31	1.62	28.04	6.57	0.35	2.30
904	12:30:34	703	16.83	1.66	27.94	17.35	1.63	28.28	6.57	0.35	2.30
905	12:30:44	682	16.83	1.66	27.94	17.35	1.63	28.28	6.57	0.35	2.30

906	12:30:54	663	16.84	1.65	27.79	17.34	1.63	28.26	6.57	0.3	1.97
907	12:31:04	659	16.8	1.83	30.74	17.29	1.63	28.18	6.56	0.52	3.41
...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...
1791	14:58:24	108	14.11	0.72	10.16	13.1	0.57	7.47	6.41	0.78	5.00
1792	14:58:34	107	14.11	0.72	10.16	13.09	0.56	7.33	6.41	0.78	5.00
1793	14:58:44	108	14.11	0.72	10.16	13.09	0.56	7.33	6.41	0.83	5.32
1794	14:58:54	107	14.11	0.72	10.16	13.09	0.56	7.33	6.41	0.78	5.00
1795	14:59:04	108	14.11	0.71	10.02	13.08	0.56	7.32	6.41	0.8	5.13
1796	14:59:14	107	14.11	0.72	10.16	13.09	0.56	7.33	6.41	0.78	5.00
1797	14:59:24	109	14.13	0.97	13.71	13.09	0.8	10.47	6.41	1.02	6.54
1798	14:59:34	108	14.13	0.97	13.71	13.11	0.78	10.23	6.41	1.03	6.60
1799	14:59:44	107	14.13	0.97	13.71	13.1	0.82	10.74	6.41	1.04	6.67
1800	14:59:54	107	14.13	0.97	13.71	13.1	0.82	10.74	6.41	1.04	6.67
<b>Jumlah</b>		<b>1041610</b>	<b>29308.07</b>	<b>2896.31</b>	<b>47982.02</b>	<b>28952.5</b>	<b>2443.07</b>	<b>40460.77</b>	<b>11768.37</b>	<b>1106.28</b>	<b>7203.99</b>
<b>Rata-Rata</b>		<b>578.67</b>	<b>16.28</b>	<b>1.61</b>	<b>26.66</b>	<b>16.08</b>	<b>1.36</b>	<b>22.48</b>	<b>6.54</b>	<b>0.61</b>	<b>4.00</b>

**Lampiran 7. Data Perngujian Sistem Panel Surya Statis – Solar Tracker Dual Axis Tanpa Fuzzy Bergerak Tidak Kontinyu**

No	Time	Irradiasi (W/m <sup>2</sup> )	Tegangan PV1 (V)	Arus PV1 (A)	Daya PV1 (W)	Tegangan PV2 (V)	Arus PV2 (A)	Daya PV2 (W)	Tegangan Beban (W)	Arus Beban (A)	Daya Beban (W)
1	10:00:07	760	17.29	1.81	31.29	16.39	1.77	29.01	6.56	0.01	0.07
2	10:00:17	757	17.29	1.81	31.29	16.39	1.77	29.01	6.56	0.03	0.20
3	10:00:27	755	17.29	1.81	31.29	16.39	1.77	29.01	6.57	0.98	6.44
4	10:00:37	744	17.29	1.8	31.12	16.38	1.75	28.67	6.57	4.58	30.09
5	10:00:47	757	17.29	1.81	31.29	16.39	1.77	29.01	6.56	3.2	20.99
6	10:00:57	759	17.29	1.82	31.47	16.4	1.79	29.36	6.55	3.3	21.62
7	10:01:07	761	17.29	1.82	31.47	16.4	1.79	29.36	6.55	3.18	20.83
8	10:01:17	760	17.29	1.82	31.47	16.4	1.79	29.36	6.55	3.04	19.91
9	10:01:27	759	17.29	1.82	31.47	16.4	1.79	29.36	6.55	1.34	8.78
10	10:01:37	757	17.29	1.81	31.29	16.39	1.77	29.01	6.56	1.3	8.53
...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...
898	12:29:37	847	17.07	2.29	39.09	17.07	1.73	29.53	6.6	0.02	0.13
899	12:29:47	847	17.07	2.29	39.09	17.07	1.73	29.53	6.6	0.02	0.13
900	12:29:57	852	17.07	2.29	39.09	17.07	1.73	29.53	6.6	0.02	0.13
901	12:30:07	855	17.04	2.36	40.21	16.51	1.74	28.73	6.55	0.02	0.13
902	12:30:17	858	17.04	2.36	40.21	16.51	1.74	28.73	6.55	0.02	0.13
903	12:30:27	859	17.04	2.36	40.21	16.51	1.74	28.73	6.55	0.02	0.13
904	12:30:37	851	17.04	2.36	40.21	16.51	1.74	28.73	6.55	0.01	0.07
905	12:30:47	858	17.07	2.29	39.09	17.07	1.73	29.53	6.6	0.03	0.20

906	12:30:57	859	17.03	2.41	41.04	16.25	1.76	28.60	6.53	0.03	0.20
907	12:31:07	859	17.03	2.36	40.19	16.51	1.74	28.73	6.55	0.03	0.20
...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...
1791	14:58:27	136	14.4	0.92	13.25	13.48	0.85	11.46	6.54	0.03	0.20
1792	14:58:37	135	14.44	0.93	13.43	13.53	0.87	11.77	6.54	0.03	0.20
1793	14:58:47	135	14.4	0.92	13.25	13.48	0.85	11.46	6.54	0.03	0.20
1794	14:58:57	134	14.44	0.93	13.43	13.53	0.87	11.77	6.54	0.01	0.07
1795	14:59:07	133	14.44	0.93	13.43	13.53	0.87	11.77	6.54	0.01	0.07
1796	14:59:17	133	14.4	0.92	13.25	13.48	0.85	11.46	6.54	0.03	0.20
1797	14:59:27	134	14.44	0.91	13.14	13.52	0.85	11.49	6.54	0.01	0.07
1798	14:59:37	133	14.48	0.9	13.03	13.56	0.85	11.53	6.54	0.02	0.13
1799	14:59:47	133	14.52	0.89	12.92	13.6	0.85	11.56	6.54	0.02	0.13
1800	14:59:57	133	14.56	0.88	12.81	13.64	0.85	11.59	6.53	0.02	0.13
<b>Jumlah</b>		<b>1211722.00</b>	<b>30888.00</b>	<b>3486.09</b>	<b>59821.23</b>	<b>29556.00</b>	<b>3220.40</b>	<b>52878.97</b>	<b>11790.00</b>	<b>256.71</b>	<b>1681.46</b>
<b>Rata-Rata</b>		<b>673.18</b>	<b>17.16</b>	<b>1.94</b>	<b>33.23</b>	<b>16.42</b>	<b>1.79</b>	<b>29.38</b>	<b>6.55</b>	<b>0.14</b>	<b>0.93</b>