

# TEST DATA OF KHNA30F-24

Regulated DC Power Supply  
November 15, 2013

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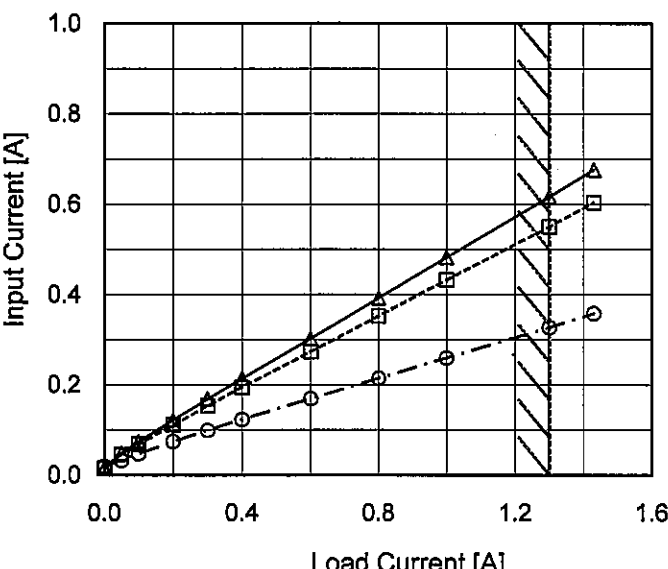
**COSEL CO.,LTD.**

## CONTENTS

|   |    |
|---|----|
| 1.Input Current (by Load Current) . . . . .                     | 1  |
| 2.Input Power (by Load Current) . . . . .                       | 2  |
| 3.Efficiency (by Input Voltage) . . . . .                       | 3  |
| 4.Efficiency (by Load Current) . . . . .                        | 4  |
| 5.Power Factor (by Input Voltage) . . . . .                     | 5  |
| 6.Power Factor (by Load Current) . . . . .                      | 6  |
| 7.Inrush Current . . . . .                                      | 7  |
| 8.Leakage Current . . . . .                                     | 8  |
| 9.Line Regulation . . . . .                                     | 9  |
| 10.Load Regulation . . . . .                                    | 10 |
| 11.Dynamic Load Response . . . . .                              | 11 |
| 12.Ripple Voltage (by Load Current) . . . . .                   | 12 |
| 13.Ripple-Noise . . . . .                                       | 13 |
| 14.Ripple Voltage (by Ambient Temperature) . . . . .            | 14 |
| 15.Ambient Temperature Drift . . . . .                          | 15 |
| 16.Output Voltage Accuracy . . . . .                            | 16 |
| 17.Time Lapse Drift . . . . .                                   | 17 |
| 18.Rise and Fall Time . . . . .                                 | 18 |
| 19.Hold-Up Time . . . . .                                       | 19 |
| 20.Instantaneous Interruption Compensation . . . . .            | 20 |
| 21.Minimum Input Voltage for Regulated Output Voltage . . . . . | 21 |
| 22.Overcurrent Protection . . . . .                             | 22 |
| 23.Oversvoltage Protection . . . . .                            | 23 |
| 24.Figure of Testing Circuitry . . . . .                        | 24 |

(Final Page 25)

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| Model  |                    | KHNA30F-24  |                    |                  |                   |  |  |                    |                    |                    |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |
|--|--------------------|---|--------------------|------------------|-------------------|--|--|--------------------|--------------------|--------------------|------|-------|-------|-------|------|-------|-------|-------|------|-------|-------|-------|------|-------|-------|-------|------|-------|-------|-------|------|-------|-------|-------|------|-------|-------|-------|------|-------|-------|-------|------|-------|-------|-------|------|-------|-------|-------|------|-------|-------|-------|
| Item   |                    | Input Current (by Load Current)   |                    |                  |                   |  |  |                    |                    |                    |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |
| Object   |                    |   |                    |                  |                   |  |  |                    |                    |                    |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |
| 1.Graph  |                    | 2.Values  |                    |                  |                   |  |  |                    |                    |                    |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |
| <div><div>—△—</div>Input Volt. 100V</div> <div><div>---□---</div>Input Volt. 115V</div> <div><div>- -○- -</div>Input Volt. 230V</div>  |                    | <table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Input Current [A]</th></tr><tr><th>Input Volt. 100[V]</th><th>Input Volt. 115[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>0.00</td><td>0.016</td><td>0.015</td><td>0.020</td></tr><tr><td>0.05</td><td>0.049</td><td>0.045</td><td>0.032</td></tr><tr><td>0.10</td><td>0.074</td><td>0.068</td><td>0.048</td></tr><tr><td>0.20</td><td>0.122</td><td>0.112</td><td>0.075</td></tr><tr><td>0.30</td><td>0.169</td><td>0.154</td><td>0.099</td></tr><tr><td>0.40</td><td>0.214</td><td>0.195</td><td>0.123</td></tr><tr><td>0.60</td><td>0.303</td><td>0.273</td><td>0.170</td></tr><tr><td>0.80</td><td>0.392</td><td>0.352</td><td>0.215</td></tr><tr><td>1.00</td><td>0.483</td><td>0.433</td><td>0.260</td></tr><tr><td>1.30</td><td>0.617</td><td>0.551</td><td>0.328</td></tr><tr><td>1.43</td><td>0.676</td><td>0.604</td><td>0.358</td></tr></table> |                    | Load Current [A] | Input Current [A] |  |  | Input Volt. 100[V] | Input Volt. 115[V] | Input Volt. 230[V] | 0.00 | 0.016 | 0.015 | 0.020 | 0.05 | 0.049 | 0.045 | 0.032 | 0.10 | 0.074 | 0.068 | 0.048 | 0.20 | 0.122 | 0.112 | 0.075 | 0.30 | 0.169 | 0.154 | 0.099 | 0.40 | 0.214 | 0.195 | 0.123 | 0.60 | 0.303 | 0.273 | 0.170 | 0.80 | 0.392 | 0.352 | 0.215 | 1.00 | 0.483 | 0.433 | 0.260 | 1.30 | 0.617 | 0.551 | 0.328 | 1.43 | 0.676 | 0.604 | 0.358 |
| Load Current [A]   | Input Current [A]  |   |                    |                  |                   |  |  |                    |                    |                    |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |
|  | Input Volt. 100[V] | Input Volt. 115[V]  | Input Volt. 230[V] |                  |                   |  |  |                    |                    |                    |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |
| 0.00   | 0.016              | 0.015   | 0.020              |                  |                   |  |  |                    |                    |                    |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |
| 0.05   | 0.049              | 0.045   | 0.032              |                  |                   |  |  |                    |                    |                    |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |
| 0.10   | 0.074              | 0.068   | 0.048              |                  |                   |  |  |                    |                    |                    |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |
| 0.20   | 0.122              | 0.112   | 0.075              |                  |                   |  |  |                    |                    |                    |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |
| 0.30   | 0.169              | 0.154   | 0.099              |                  |                   |  |  |                    |                    |                    |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |
| 0.40   | 0.214              | 0.195   | 0.123              |                  |                   |  |  |                    |                    |                    |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |
| 0.60   | 0.303              | 0.273   | 0.170              |                  |                   |  |  |                    |                    |                    |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |
| 0.80   | 0.392              | 0.352   | 0.215              |                  |                   |  |  |                    |                    |                    |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |
| 1.00   | 0.483              | 0.433   | 0.260              |                  |                   |  |  |                    |                    |                    |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |
| 1.30   | 0.617              | 0.551   | 0.328              |                  |                   |  |  |                    |                    |                    |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |
| 1.43   | 0.676              | 0.604   | 0.358              |                  |                   |  |  |                    |                    |                    |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |
| Note: Slanted line shows the range of the rated load current.  |                    |   |                    |                  |                   |  |  |                    |                    |                    |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |

| Model   |                    | KHNA30F-24                    |                    | Temperature       |                 | 25°C     |  |                    |                    |                    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |
|---|--------------------|-------------------------------|--------------------|-------------------|-----------------|----------|--|--------------------|--------------------|--------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|-------|------|-------|-------|-------|------|-------|-------|-------|------|-------|-------|-------|------|-------|-------|-------|------|-------|-------|-------|
| Item  |                    | Input Power (by Load Current) |                    | Testing Circuitry |                 | Figure A |  |                    |                    |                    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |
| Object  |                    |                               |                    |                   |                 |          |  |                    |                    |                    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |
| 1.Graph   |                    |                               |                    | 2.Values          |                 |          |  |                    |                    |                    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |
| <div><div><div><div>—△—</div><div>Input Volt.</div><div>100V</div></div><div><div>---□---</div><div>Input Volt.</div><div>115V</div></div><div><div>---○---</div><div>Input Volt.</div><div>230V</div></div></div><div><p>Note: Slanted line shows the range of the rated load current.</p></div></div> <div><table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Input Power [W]</th></tr><tr><th>Input Volt. 100[V]</th><th>Input Volt. 115[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>0.00</td><td>0.46</td><td>0.42</td><td>0.45</td></tr><tr><td>0.05</td><td>1.94</td><td>1.95</td><td>1.90</td></tr><tr><td>0.10</td><td>3.26</td><td>3.27</td><td>3.47</td></tr><tr><td>0.20</td><td>5.90</td><td>5.89</td><td>6.29</td></tr><tr><td>0.30</td><td>8.61</td><td>8.59</td><td>8.93</td></tr><tr><td>0.40</td><td>11.31</td><td>11.28</td><td>11.59</td></tr><tr><td>0.60</td><td>16.69</td><td>16.61</td><td>16.81</td></tr><tr><td>0.80</td><td>22.12</td><td>21.97</td><td>22.00</td></tr><tr><td>1.00</td><td>27.64</td><td>27.44</td><td>27.20</td></tr><tr><td>1.30</td><td>36.01</td><td>35.65</td><td>35.10</td></tr><tr><td>1.43</td><td>39.64</td><td>39.24</td><td>38.50</td></tr></table></div> |                    |                               |                    | Load Current [A]  | Input Power [W] |          |  | Input Volt. 100[V] | Input Volt. 115[V] | Input Volt. 230[V] | 0.00 | 0.46 | 0.42 | 0.45 | 0.05 | 1.94 | 1.95 | 1.90 | 0.10 | 3.26 | 3.27 | 3.47 | 0.20 | 5.90 | 5.89 | 6.29 | 0.30 | 8.61 | 8.59 | 8.93 | 0.40 | 11.31 | 11.28 | 11.59 | 0.60 | 16.69 | 16.61 | 16.81 | 0.80 | 22.12 | 21.97 | 22.00 | 1.00 | 27.64 | 27.44 | 27.20 | 1.30 | 36.01 | 35.65 | 35.10 | 1.43 | 39.64 | 39.24 | 38.50 |
| Load Current [A]  | Input Power [W]    |                               |                    |                   |                 |          |  |                    |                    |                    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |
|   | Input Volt. 100[V] | Input Volt. 115[V]            | Input Volt. 230[V] |                   |                 |          |  |                    |                    |                    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |
| 0.00  | 0.46               | 0.42                          | 0.45               |                   |                 |          |  |                    |                    |                    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |
| 0.05  | 1.94               | 1.95                          | 1.90               |                   |                 |          |  |                    |                    |                    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |
| 0.10  | 3.26               | 3.27                          | 3.47               |                   |                 |          |  |                    |                    |                    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |
| 0.20  | 5.90               | 5.89                          | 6.29               |                   |                 |          |  |                    |                    |                    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |
| 0.30  | 8.61               | 8.59                          | 8.93               |                   |                 |          |  |                    |                    |                    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |
| 0.40  | 11.31              | 11.28                         | 11.59              |                   |                 |          |  |                    |                    |                    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |
| 0.60  | 16.69              | 16.61                         | 16.81              |                   |                 |          |  |                    |                    |                    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |
| 0.80  | 22.12              | 21.97                         | 22.00              |                   |                 |          |  |                    |                    |                    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |
| 1.00  | 27.64              | 27.44                         | 27.20              |                   |                 |          |  |                    |                    |                    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |
| 1.30  | 36.01              | 35.65                         | 35.10              |                   |                 |          |  |                    |                    |                    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |
| 1.43  | 39.64              | 39.24                         | 38.50              |                   |                 |          |  |                    |                    |                    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |

| Model   |                | KHNA30F-24  |  |                   |                |  |          |           |    |      |      |    |      |      |    |      |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |      |
|---|----------------|---|--|-------------------|----------------|--|----------|-----------|----|------|------|----|------|------|----|------|------|-----|------|------|-----|------|------|-----|------|------|-----|------|------|-----|------|------|-----|------|------|
| Item  |                | Efficiency (by Input Voltage)   |  |                   |                |  |          |           |    |      |      |    |      |      |    |      |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |      |
| Object  |                |   |  |                   |                |  |          |           |    |      |      |    |      |      |    |      |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |      |
| 1.Graph   |                | 2.Values  |  |                   |                |  |          |           |    |      |      |    |      |      |    |      |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |      |
| <div><div><div><div><div></div><div></div><div></div></div><div></div><div></div></div><div><div><div></div><div></div><div></div></div><div></div><div></div></div></div><div>Load 50%</div><div>Load 100%</div></div> <div><div><div>Efficiency [%]</div><div>100</div><div>90</div><div>80</div><div>70</div><div>60</div><div>50</div></div><div><div>50</div><div>100</div><div>150</div><div>200</div><div>250</div><div>300</div></div><div><div>Input Voltage [V]</div></div></div> |                | <table><tr><th rowspan="2">Input Voltage [V]</th><th colspan="2">Efficiency [%]</th></tr><tr><th>Load 50%</th><th>Load 100%</th></tr><tr><td>80</td><td>86.0</td><td>85.7</td></tr><tr><td>85</td><td>86.4</td><td>86.4</td></tr><tr><td>90</td><td>86.7</td><td>87.0</td></tr><tr><td>100</td><td>87.1</td><td>87.8</td></tr><tr><td>115</td><td>87.5</td><td>88.6</td></tr><tr><td>200</td><td>87.3</td><td>89.9</td></tr><tr><td>230</td><td>86.5</td><td>89.9</td></tr><tr><td>264</td><td>85.4</td><td>89.6</td></tr><tr><td>280</td><td>84.8</td><td>89.4</td></tr></table> |  | Input Voltage [V] | Efficiency [%] |  | Load 50% | Load 100% | 80 | 86.0 | 85.7 | 85 | 86.4 | 86.4 | 90 | 86.7 | 87.0 | 100 | 87.1 | 87.8 | 115 | 87.5 | 88.6 | 200 | 87.3 | 89.9 | 230 | 86.5 | 89.9 | 264 | 85.4 | 89.6 | 280 | 84.8 | 89.4 |
| Input Voltage [V]   | Efficiency [%] |   |  |                   |                |  |          |           |    |      |      |    |      |      |    |      |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |      |
|   | Load 50%       | Load 100%   |  |                   |                |  |          |           |    |      |      |    |      |      |    |      |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |      |
| 80  | 86.0           | 85.7  |  |                   |                |  |          |           |    |      |      |    |      |      |    |      |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |      |
| 85  | 86.4           | 86.4  |  |                   |                |  |          |           |    |      |      |    |      |      |    |      |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |      |
| 90  | 86.7           | 87.0  |  |                   |                |  |          |           |    |      |      |    |      |      |    |      |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |      |
| 100   | 87.1           | 87.8  |  |                   |                |  |          |           |    |      |      |    |      |      |    |      |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |      |
| 115   | 87.5           | 88.6  |  |                   |                |  |          |           |    |      |      |    |      |      |    |      |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |      |
| 200   | 87.3           | 89.9  |  |                   |                |  |          |           |    |      |      |    |      |      |    |      |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |      |
| 230   | 86.5           | 89.9  |  |                   |                |  |          |           |    |      |      |    |      |      |    |      |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |      |
| 264   | 85.4           | 89.6  |  |                   |                |  |          |           |    |      |      |    |      |      |    |      |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |      |
| 280   | 84.8           | 89.4  |  |                   |                |  |          |           |    |      |      |    |      |      |    |      |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |      |
| Note: Slanted line shows the range of the rated input voltage.  |                |   |  |                   |                |  |          |           |    |      |      |    |      |      |    |      |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |      |

# COSEL

| Model   |                    | KHNA30F-24   |                    |                  |                |  |  |                    |                    |                    |      |   |   |   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|---|--------------------|--|--------------------|------------------|----------------|--|--|--------------------|--------------------|--------------------|------|---|---|---|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Item  |                    | Efficiency (by Load Current)   |                    |                  |                |  |  |                    |                    |                    |      |   |   |   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Object  |                    |  |                    |                  |                |  |  |                    |                    |                    |      |   |   |   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1.Graph   |                    | 2.Values   |                    |                  |                |  |  |                    |                    |                    |      |   |   |   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| <div><div><div>—△—</div><div>---□---</div><div>-·-○--</div></div><div><div>Input Volt.</div><div>Input Volt.</div><div>Input Volt.</div></div><div><div>100V</div><div>115V</div><div>230V</div></div></div> <div><div>100</div><div>90</div><div>80</div><div>70</div><div>60</div><div>50</div></div> <div><div>0.0</div><div>0.4</div><div>0.8</div><div>1.2</div><div>1.6</div></div> <div><div>Efficiency [%]</div><div>Load Current [A]</div></div> <div><div>Note: Slanted line shows the range of the rated load current.</div></div> |                    | <table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Efficiency [%]</th></tr><tr><th>Input Volt. 100[V]</th><th>Input Volt. 115[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>0.00</td><td>-</td><td>-</td><td>-</td></tr><tr><td>0.05</td><td>56.1</td><td>55.3</td><td>56.6</td></tr><tr><td>0.10</td><td>70.4</td><td>70.1</td><td>66.2</td></tr><tr><td>0.20</td><td>80.1</td><td>80.3</td><td>75.2</td></tr><tr><td>0.30</td><td>83.1</td><td>83.4</td><td>80.2</td></tr><tr><td>0.40</td><td>84.8</td><td>85.0</td><td>82.7</td></tr><tr><td>0.60</td><td>86.6</td><td>87.0</td><td>86.0</td></tr><tr><td>0.80</td><td>87.3</td><td>87.9</td><td>87.8</td></tr><tr><td>1.00</td><td>87.5</td><td>88.1</td><td>88.9</td></tr><tr><td>1.30</td><td>87.8</td><td>88.6</td><td>89.9</td></tr><tr><td>1.43</td><td>87.8</td><td>88.6</td><td>89.9</td></tr></table> |                    | Load Current [A] | Efficiency [%] |  |  | Input Volt. 100[V] | Input Volt. 115[V] | Input Volt. 230[V] | 0.00 | - | - | - | 0.05 | 56.1 | 55.3 | 56.6 | 0.10 | 70.4 | 70.1 | 66.2 | 0.20 | 80.1 | 80.3 | 75.2 | 0.30 | 83.1 | 83.4 | 80.2 | 0.40 | 84.8 | 85.0 | 82.7 | 0.60 | 86.6 | 87.0 | 86.0 | 0.80 | 87.3 | 87.9 | 87.8 | 1.00 | 87.5 | 88.1 | 88.9 | 1.30 | 87.8 | 88.6 | 89.9 | 1.43 | 87.8 | 88.6 | 89.9 |
| Load Current [A]  | Efficiency [%]     |  |                    |                  |                |  |  |                    |                    |                    |      |   |   |   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|   | Input Volt. 100[V] | Input Volt. 115[V]   | Input Volt. 230[V] |                  |                |  |  |                    |                    |                    |      |   |   |   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 0.00  | -                  | -  | -                  |                  |                |  |  |                    |                    |                    |      |   |   |   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 0.05  | 56.1               | 55.3   | 56.6               |                  |                |  |  |                    |                    |                    |      |   |   |   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 0.10  | 70.4               | 70.1   | 66.2               |                  |                |  |  |                    |                    |                    |      |   |   |   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 0.20  | 80.1               | 80.3   | 75.2               |                  |                |  |  |                    |                    |                    |      |   |   |   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 0.30  | 83.1               | 83.4   | 80.2               |                  |                |  |  |                    |                    |                    |      |   |   |   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 0.40  | 84.8               | 85.0   | 82.7               |                  |                |  |  |                    |                    |                    |      |   |   |   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 0.60  | 86.6               | 87.0   | 86.0               |                  |                |  |  |                    |                    |                    |      |   |   |   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 0.80  | 87.3               | 87.9   | 87.8               |                  |                |  |  |                    |                    |                    |      |   |   |   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1.00  | 87.5               | 88.1   | 88.9               |                  |                |  |  |                    |                    |                    |      |   |   |   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1.30  | 87.8               | 88.6   | 89.9               |                  |                |  |  |                    |                    |                    |      |   |   |   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1.43  | 87.8               | 88.6   | 89.9               |                  |                |  |  |                    |                    |                    |      |   |   |   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |

| Model   |              | KHNA30F-24                      |              |  |          |           |    |       |       |    |       |       |    |       |       |     |       |       |     |       |       |     |       |       |     |       |       |     |       |       |     |       |       |  |  |
|---|--------------|---------------------------------|--------------|--|----------|-----------|----|-------|-------|----|-------|-------|----|-------|-------|-----|-------|-------|-----|-------|-------|-----|-------|-------|-----|-------|-------|-----|-------|-------|-----|-------|-------|--|--|
| Item  |              | Power Factor (by Input Voltage) |              |  |          |           |    |       |       |    |       |       |    |       |       |     |       |       |     |       |       |     |       |       |     |       |       |     |       |       |     |       |       |  |  |
| Object  |              |                                 |              |  |          |           |    |       |       |    |       |       |    |       |       |     |       |       |     |       |       |     |       |       |     |       |       |     |       |       |     |       |       |  |  |
| 1.Graph   |              | 2.Values                        |              |  |          |           |    |       |       |    |       |       |    |       |       |     |       |       |     |       |       |     |       |       |     |       |       |     |       |       |     |       |       |  |  |
| <div><div><div><div><div></div><div></div><div></div></div><div></div><div></div></div><div><div><div></div><div></div><div></div></div><div></div><div></div></div></div><div>Load 50%</div><div>Load 100%</div></div> <table><thead><tr><th rowspan="2">Input Voltage [V]</th><th colspan="2">Power Factor</th></tr><tr><th>Load 50%</th><th>Load 100%</th></tr></thead><tbody><tr><td>80</td><td>0.586</td><td>0.617</td></tr><tr><td>85</td><td>0.573</td><td>0.604</td></tr><tr><td>90</td><td>0.562</td><td>0.593</td></tr><tr><td>100</td><td>0.546</td><td>0.584</td></tr><tr><td>115</td><td>0.523</td><td>0.563</td></tr><tr><td>200</td><td>0.446</td><td>0.490</td></tr><tr><td>230</td><td>0.429</td><td>0.466</td></tr><tr><td>264</td><td>0.413</td><td>0.439</td></tr><tr><td>280</td><td>0.406</td><td>0.432</td></tr></tbody></table> |              | Input Voltage [V]               | Power Factor |  | Load 50% | Load 100% | 80 | 0.586 | 0.617 | 85 | 0.573 | 0.604 | 90 | 0.562 | 0.593 | 100 | 0.546 | 0.584 | 115 | 0.523 | 0.563 | 200 | 0.446 | 0.490 | 230 | 0.429 | 0.466 | 264 | 0.413 | 0.439 | 280 | 0.406 | 0.432 |  |  |
| Input Voltage [V]   | Power Factor |                                 |              |  |          |           |    |       |       |    |       |       |    |       |       |     |       |       |     |       |       |     |       |       |     |       |       |     |       |       |     |       |       |  |  |
|   | Load 50%     | Load 100%                       |              |  |          |           |    |       |       |    |       |       |    |       |       |     |       |       |     |       |       |     |       |       |     |       |       |     |       |       |     |       |       |  |  |
| 80  | 0.586        | 0.617                           |              |  |          |           |    |       |       |    |       |       |    |       |       |     |       |       |     |       |       |     |       |       |     |       |       |     |       |       |     |       |       |  |  |
| 85  | 0.573        | 0.604                           |              |  |          |           |    |       |       |    |       |       |    |       |       |     |       |       |     |       |       |     |       |       |     |       |       |     |       |       |     |       |       |  |  |
| 90  | 0.562        | 0.593                           |              |  |          |           |    |       |       |    |       |       |    |       |       |     |       |       |     |       |       |     |       |       |     |       |       |     |       |       |     |       |       |  |  |
| 100   | 0.546        | 0.584                           |              |  |          |           |    |       |       |    |       |       |    |       |       |     |       |       |     |       |       |     |       |       |     |       |       |     |       |       |     |       |       |  |  |
| 115   | 0.523        | 0.563                           |              |  |          |           |    |       |       |    |       |       |    |       |       |     |       |       |     |       |       |     |       |       |     |       |       |     |       |       |     |       |       |  |  |
| 200   | 0.446        | 0.490                           |              |  |          |           |    |       |       |    |       |       |    |       |       |     |       |       |     |       |       |     |       |       |     |       |       |     |       |       |     |       |       |  |  |
| 230   | 0.429        | 0.466                           |              |  |          |           |    |       |       |    |       |       |    |       |       |     |       |       |     |       |       |     |       |       |     |       |       |     |       |       |     |       |       |  |  |
| 264   | 0.413        | 0.439                           |              |  |          |           |    |       |       |    |       |       |    |       |       |     |       |       |     |       |       |     |       |       |     |       |       |     |       |       |     |       |       |  |  |
| 280   | 0.406        | 0.432                           |              |  |          |           |    |       |       |    |       |       |    |       |       |     |       |       |     |       |       |     |       |       |     |       |       |     |       |       |     |       |       |  |  |
| Note: Slanted line shows the range of the rated input voltage.  |              |                                 |              |  |          |           |    |       |       |    |       |       |    |       |       |     |       |       |     |       |       |     |       |       |     |       |       |     |       |       |     |       |       |  |  |

Model

KHNA30F-24

Item

Power Factor (by Load Current)

Object

1.Graph

—△—

Input Volt.

100V

---□---

Input Volt.

115V

---○---

Input Volt.

230V

1.0

0.8

0.6

0.4

0.2

0.0

0.0

0.4

0.8

1.2

1.6

Power Factor

Load Current [A]

Note: Slanted line shows the range of the rated load current.

Temperature

25°C

Testing Circuitry

Figure A

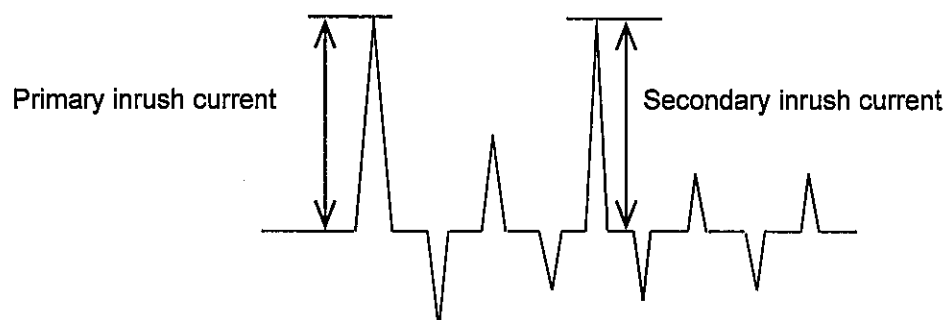
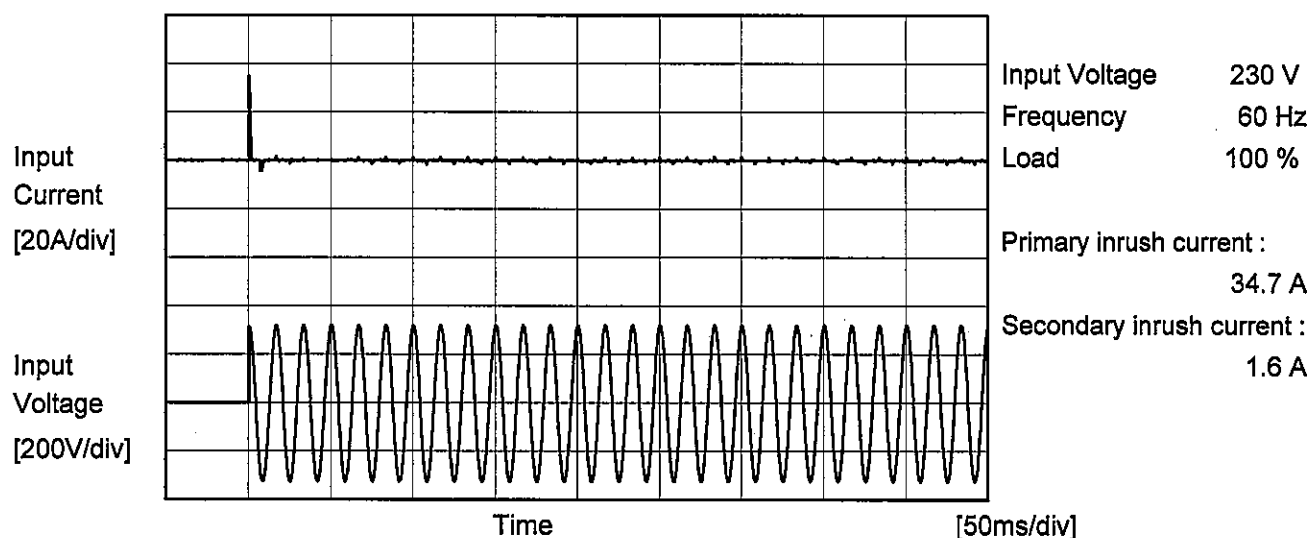
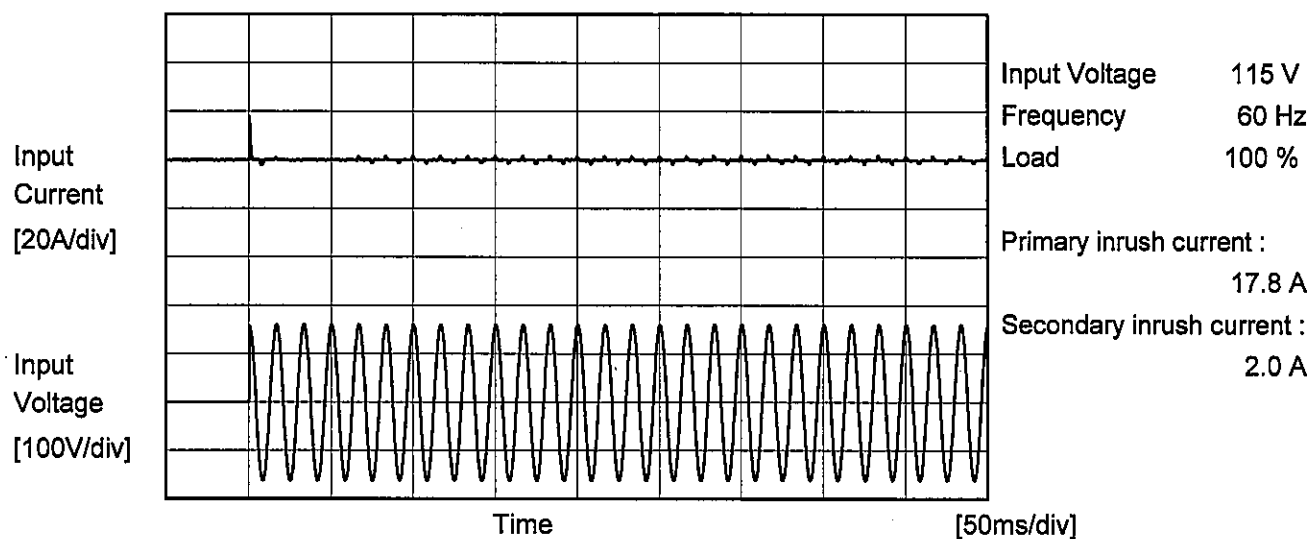
2.Values

| Load Current [A] | Power Factor       |                    |                    |
|------------------|--------------------|--------------------|--------------------|
|                  | Input Volt. 100[V] | Input Volt. 115[V] | Input Volt. 230[V] |
| 0.00             | 0.281              | 0.238              | 0.098              |
| 0.05             | 0.399              | 0.375              | 0.255              |
| 0.10             | 0.440              | 0.416              | 0.317              |
| 0.20             | 0.483              | 0.459              | 0.366              |
| 0.30             | 0.510              | 0.487              | 0.391              |
| 0.40             | 0.528              | 0.504              | 0.408              |
| 0.60             | 0.551              | 0.528              | 0.431              |
| 0.80             | 0.564              | 0.542              | 0.445              |
| 1.00             | 0.572              | 0.551              | 0.455              |
| 1.30             | 0.584              | 0.563              | 0.466              |
| 1.43             | 0.586              | 0.565              | 0.467              |



# COSEL

|        |                |  |
|--------|----------------|--|
| Model  | KHNA30F-24     |  |
| Item   | Inrush Current | Temperature 25°C<br>Testing Circuitry Figure A |
| Object |                |  |



**COSEL**

|        |                 |  |
|--------|-----------------|--|
|        |                 | Temperature 25°C<br>Testing Circuitry Figure B |
| Model  | KHNA30F-24      |  |
| Item   | Leakage Current |  |
| Object | _____           |  |

## 1.Results

[mA]

| Standards  |               | Input Volt. |         |         | Note      |
|------------|---------------|-------------|---------|---------|-----------|
|            |               | 100 [V]     | 115 [V] | 240 [V] |           |
| DEN-AN     | Both phases   | 0.13        | 0.15    | 0.32    | Operation |
|            | One of phases | 0.27        | 0.31    | 0.69    | Stand by  |
| IEC60950-1 | Both phases   | 0.20        | 0.22    | 0.46    | Operation |
|            | One of phases | 0.41        | 0.46    | 0.70    | Stand by  |

The value for "One of phases" is the reference value only.

## 2.Condition

Leakage current value is concluded after measuring both phases of AC input and by choosing the larger one.

| Model  | KHNA30F-24         |   |          |                   |                    |  |          |           |    |        |        |    |        |        |    |        |        |     |        |        |     |        |        |     |        |        |     |        |        |     |        |        |     |        |        |
|--|--------------------|---|----------|-------------------|--------------------|--|----------|-----------|----|--------|--------|----|--------|--------|----|--------|--------|-----|--------|--------|-----|--------|--------|-----|--------|--------|-----|--------|--------|-----|--------|--------|-----|--------|--------|
| Item   | Line Regulation    | Temperature   | 25°C     |                   |                    |  |          |           |    |        |        |    |        |        |    |        |        |     |        |        |     |        |        |     |        |        |     |        |        |     |        |        |     |        |        |
| Object   | +24V1.3A           | Testing Circuitry   | Figure A |                   |                    |  |          |           |    |        |        |    |        |        |    |        |        |     |        |        |     |        |        |     |        |        |     |        |        |     |        |        |     |        |        |
| 1.Graph  |                    | 2.Values  |          |                   |                    |  |          |           |    |        |        |    |        |        |    |        |        |     |        |        |     |        |        |     |        |        |     |        |        |     |        |        |     |        |        |
| <div><div><div>----</div><div>□</div><div>----</div></div><div>Load 50%</div><div><div>—</div><div>△</div><div>—</div></div><div>Load 100%</div></div> <p>Note: Slanted line shows the range of the rated input voltage.</p> |                    | <table><tr><th rowspan="2">Input Voltage [V]</th><th colspan="2">Output Voltage [V]</th></tr><tr><th>Load 50%</th><th>Load 100%</th></tr><tr><td>80</td><td>24.289</td><td>24.281</td></tr><tr><td>85</td><td>24.290</td><td>24.282</td></tr><tr><td>90</td><td>24.290</td><td>24.281</td></tr><tr><td>100</td><td>24.289</td><td>24.282</td></tr><tr><td>115</td><td>24.290</td><td>24.282</td></tr><tr><td>200</td><td>24.290</td><td>24.282</td></tr><tr><td>230</td><td>24.290</td><td>24.282</td></tr><tr><td>264</td><td>24.290</td><td>24.282</td></tr><tr><td>280</td><td>24.290</td><td>24.282</td></tr></table> |          | Input Voltage [V] | Output Voltage [V] |  | Load 50% | Load 100% | 80 | 24.289 | 24.281 | 85 | 24.290 | 24.282 | 90 | 24.290 | 24.281 | 100 | 24.289 | 24.282 | 115 | 24.290 | 24.282 | 200 | 24.290 | 24.282 | 230 | 24.290 | 24.282 | 264 | 24.290 | 24.282 | 280 | 24.290 | 24.282 |
| Input Voltage [V]  | Output Voltage [V] |   |          |                   |                    |  |          |           |    |        |        |    |        |        |    |        |        |     |        |        |     |        |        |     |        |        |     |        |        |     |        |        |     |        |        |
|  | Load 50%           | Load 100%   |          |                   |                    |  |          |           |    |        |        |    |        |        |    |        |        |     |        |        |     |        |        |     |        |        |     |        |        |     |        |        |     |        |        |
| 80   | 24.289             | 24.281  |          |                   |                    |  |          |           |    |        |        |    |        |        |    |        |        |     |        |        |     |        |        |     |        |        |     |        |        |     |        |        |     |        |        |
| 85   | 24.290             | 24.282  |          |                   |                    |  |          |           |    |        |        |    |        |        |    |        |        |     |        |        |     |        |        |     |        |        |     |        |        |     |        |        |     |        |        |
| 90   | 24.290             | 24.281  |          |                   |                    |  |          |           |    |        |        |    |        |        |    |        |        |     |        |        |     |        |        |     |        |        |     |        |        |     |        |        |     |        |        |
| 100  | 24.289             | 24.282  |          |                   |                    |  |          |           |    |        |        |    |        |        |    |        |        |     |        |        |     |        |        |     |        |        |     |        |        |     |        |        |     |        |        |
| 115  | 24.290             | 24.282  |          |                   |                    |  |          |           |    |        |        |    |        |        |    |        |        |     |        |        |     |        |        |     |        |        |     |        |        |     |        |        |     |        |        |
| 200  | 24.290             | 24.282  |          |                   |                    |  |          |           |    |        |        |    |        |        |    |        |        |     |        |        |     |        |        |     |        |        |     |        |        |     |        |        |     |        |        |
| 230  | 24.290             | 24.282  |          |                   |                    |  |          |           |    |        |        |    |        |        |    |        |        |     |        |        |     |        |        |     |        |        |     |        |        |     |        |        |     |        |        |
| 264  | 24.290             | 24.282  |          |                   |                    |  |          |           |    |        |        |    |        |        |    |        |        |     |        |        |     |        |        |     |        |        |     |        |        |     |        |        |     |        |        |
| 280  | 24.290             | 24.282  |          |                   |                    |  |          |           |    |        |        |    |        |        |    |        |        |     |        |        |     |        |        |     |        |        |     |        |        |     |        |        |     |        |        |

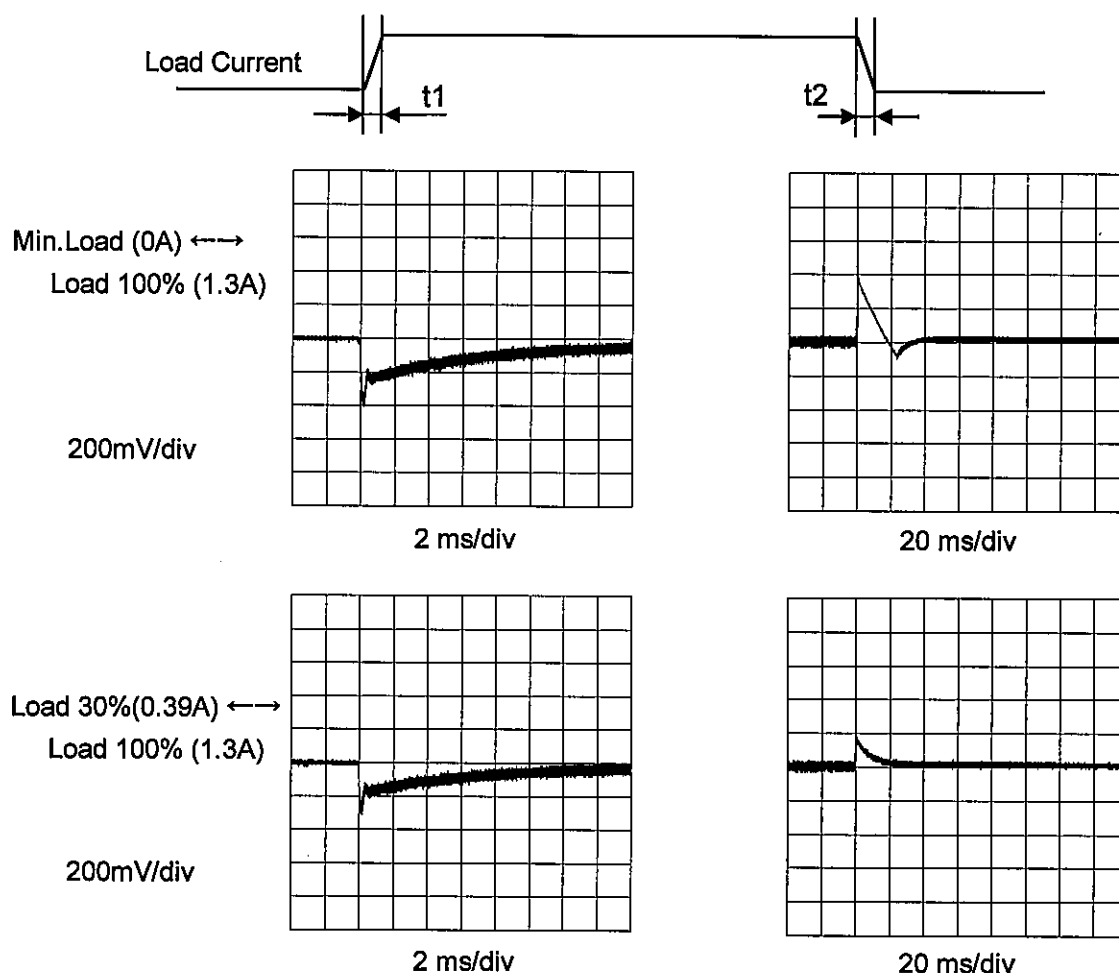
| Model  | KHNA30F-24         |   |                            |                  |                    |  |  |                    |                    |                    |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |
|--|--------------------|---|----------------------------|------------------|--------------------|--|--|--------------------|--------------------|--------------------|------|--------|--------|--------|------|--------|--------|--------|------|--------|--------|--------|------|--------|--------|--------|------|--------|--------|--------|------|--------|--------|--------|------|--------|--------|--------|------|--------|--------|--------|------|--------|--------|--------|------|--------|--------|--------|------|--------|--------|--------|
| Item   | Load Regulation    |   | Temperature 25°C           |                  |                    |  |  |                    |                    |                    |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |
| Object   | +24V1.3A           |   | Testing Circuitry Figure A |                  |                    |  |  |                    |                    |                    |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |
| 1.Graph  |                    | 2.Values  |                            |                  |                    |  |  |                    |                    |                    |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |
| <div><div><div>—△—</div><div>Input Volt.</div><div>100V</div></div><div><div>---□---</div><div>Input Volt.</div><div>115V</div></div><div><div>---○---</div><div>Input Volt.</div><div>230V</div></div></div> <p>Note: Slanted line shows the range of the rated load current.</p> |                    | <table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Output Voltage [V]</th></tr><tr><th>Input Volt. 100[V]</th><th>Input Volt. 115[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>0.00</td><td>24.296</td><td>24.296</td><td>24.297</td></tr><tr><td>0.05</td><td>24.296</td><td>24.295</td><td>24.296</td></tr><tr><td>0.10</td><td>24.295</td><td>24.295</td><td>24.295</td></tr><tr><td>0.20</td><td>24.293</td><td>24.293</td><td>24.294</td></tr><tr><td>0.30</td><td>24.292</td><td>24.292</td><td>24.293</td></tr><tr><td>0.40</td><td>24.291</td><td>24.291</td><td>24.291</td></tr><tr><td>0.60</td><td>24.289</td><td>24.289</td><td>24.289</td></tr><tr><td>0.80</td><td>24.286</td><td>24.287</td><td>24.286</td></tr><tr><td>1.00</td><td>24.284</td><td>24.284</td><td>24.284</td></tr><tr><td>1.30</td><td>24.282</td><td>24.282</td><td>24.282</td></tr><tr><td>1.43</td><td>24.278</td><td>24.279</td><td>24.279</td></tr></table> |                            | Load Current [A] | Output Voltage [V] |  |  | Input Volt. 100[V] | Input Volt. 115[V] | Input Volt. 230[V] | 0.00 | 24.296 | 24.296 | 24.297 | 0.05 | 24.296 | 24.295 | 24.296 | 0.10 | 24.295 | 24.295 | 24.295 | 0.20 | 24.293 | 24.293 | 24.294 | 0.30 | 24.292 | 24.292 | 24.293 | 0.40 | 24.291 | 24.291 | 24.291 | 0.60 | 24.289 | 24.289 | 24.289 | 0.80 | 24.286 | 24.287 | 24.286 | 1.00 | 24.284 | 24.284 | 24.284 | 1.30 | 24.282 | 24.282 | 24.282 | 1.43 | 24.278 | 24.279 | 24.279 |
| Load Current [A]   | Output Voltage [V] |   |                            |                  |                    |  |  |                    |                    |                    |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |
|  | Input Volt. 100[V] | Input Volt. 115[V]  | Input Volt. 230[V]         |                  |                    |  |  |                    |                    |                    |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |
| 0.00   | 24.296             | 24.296  | 24.297                     |                  |                    |  |  |                    |                    |                    |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |
| 0.05   | 24.296             | 24.295  | 24.296                     |                  |                    |  |  |                    |                    |                    |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |
| 0.10   | 24.295             | 24.295  | 24.295                     |                  |                    |  |  |                    |                    |                    |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |
| 0.20   | 24.293             | 24.293  | 24.294                     |                  |                    |  |  |                    |                    |                    |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |
| 0.30   | 24.292             | 24.292  | 24.293                     |                  |                    |  |  |                    |                    |                    |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |
| 0.40   | 24.291             | 24.291  | 24.291                     |                  |                    |  |  |                    |                    |                    |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |
| 0.60   | 24.289             | 24.289  | 24.289                     |                  |                    |  |  |                    |                    |                    |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |
| 0.80   | 24.286             | 24.287  | 24.286                     |                  |                    |  |  |                    |                    |                    |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |
| 1.00   | 24.284             | 24.284  | 24.284                     |                  |                    |  |  |                    |                    |                    |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |
| 1.30   | 24.282             | 24.282  | 24.282                     |                  |                    |  |  |                    |                    |                    |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |
| 1.43   | 24.278             | 24.279  | 24.279                     |                  |                    |  |  |                    |                    |                    |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |        |        |        |

# COSEL

|        |                       |                                  |                   |
|--------|-----------------------|----------------------------------|-------------------|
| Model  | KHNA30F-24            | Temperature<br>Testing Circuitry | 25° C<br>Figure A |
| Item   | Dynamic Load Response |                                  |                   |
| Object | +24V1.3A              |                                  |                   |

Input Volt. 230 V  
Cycle 1000 ms

Response.  $t_1=t_2=50\mu s$ . Typ



\* The characteristic of AC115V is equal.



|         |  |                                  |  |
|---------|--|----------------------------------|--|
| Model   |  | KHNA30F-24                       |  |
| Item    |  | Ripple Voltage (by Load Current) |  |
| Object  |  | +24V1.3A                         |  |
| 1.Graph |  | 2.Values                         |  |

# COSEL

|        |  |              |  |
|--------|--|--------------|--|
| Model  |  | KHNA30F-24   |  |
| Item   |  | Ripple-Noise |  |
| Object |  | +24V1.3A     |  |

1.Graph

—△—

Input Volt. 115V

-○-

Input Volt. 230V

300

250

200

150

100

50

0

0.0

0.4

0.8

1.2

1.6

Ripple-Noise [mV]

Load Current [A]

Measured by 20 MHz Oscilloscope.

Ripple-Noise is shown as p-p in the figure below.

Note: Slanted line shows the range of the rated load current.

T1: Due to AC Input Line

T2: Due to Switching

T2

Ripple-Noise [mVp-p]

T1

Fig. Complex Ripple Wave Form

2.Values

| Load Current [A] | Ripple-Noise [mV]   |                     |
|------------------|---------------------|---------------------|
|                  | Input Volt. 115 [V] | Input Volt. 230 [V] |
| 0.00             | 25                  | 35                  |
| 0.05             | 15                  | 85                  |
| 0.10             | 15                  | 90                  |
| 0.20             | 50                  | 20                  |
| 0.30             | 45                  | 95                  |
| 0.40             | 20                  | 15                  |
| 0.60             | 20                  | 15                  |
| 0.80             | 25                  | 20                  |
| 1.00             | 30                  | 30                  |
| 1.30             | 25                  | 25                  |
| 1.43             | 40                  | 40                  |

# COSEL

<



|         |  |                           |  |
|---------|--|---------------------------|--|
| Model   |  | KHNA30F-24                |  |
| Item    |  | Ambient Temperature Drift |  |
| Object  |  | +24V1.3A                  |  |
| 1.Graph |  | 2.Values                  |  |

—△—

Input Volt. 100V

---□---

Input Volt. 115V

---○---

Input Volt. 230V

Output Voltage [V]

Ambient Temperature [°C]

Load 100%

Note: Slanted line shows the range of the rated ambient temperature.

| Ambient Temperature [°C] | Output Voltage [V] |                    |                    |
|--------------------------|--------------------|--------------------|--------------------|
|                          | Input Volt. 100[V] | Input Volt. 115[V] | Input Volt. 230[V] |
| -30                      | 24.207             | 24.207             | 24.207             |
| -20                      | 24.234             | 24.234             | 24.234             |
| -10                      | 24.247             | 24.247             | 24.247             |
| 0                        | 24.260             | 24.260             | 24.260             |
| 25                       | 24.282             | 24.282             | 24.282             |
| 60                       | 24.288             | 24.288             | 24.288             |
| 70                       | 24.288             | 24.289             | 24.289             |
| --                       | -                  | -                  | -                  |
| --                       | -                  | -                  | -                  |
| --                       | -                  | -                  | -                  |
| --                       | -                  | -                  | -                  |

# COSEL

|        |                         |                            |
|--------|-------------------------|----------------------------|
|        |                         | Testing Circuitry Figure A |
| Model  | KHNA30F-24              |                            |
| Item   | Output Voltage Accuracy |                            |
| Object | +24V1.3A                |                            |

## 1. Output Voltage Accuracy

This is defined as the value of the output voltage, regulation load, ambient temperature and input voltage varied at random in the range as specified below.

Temperature : -20 - 60°C

Input Voltage : 85 - 264V

Load Current : 0 - 1.3A

\* Output Voltage Accuracy =  $\pm(\text{Maximum of Output Voltage} - \text{Minimum of Output Voltage}) / 2$

\* Output Voltage Accuracy (Ratio) =  $\frac{\text{Output Voltage Accuracy}}{\text{Rated Output Voltage}} \times 100$

## 2. Values

| Item            | Temperature<br>[°C] | Input<br>Voltage[V] | Output     |            | Output Voltage Accuracy |           |
|-----------------|---------------------|---------------------|------------|------------|-------------------------|-----------|
|                 |                     |                     | Current[A] | Voltage[V] | Value [mV]              | Ratio [%] |
| Maximum Voltage | 60                  | 230                 | 0          | 24.315     | ±41                     | ±0.2      |
| Minimum Voltage | -20                 | 100                 | 1.3        | 24.234     |                         |           |

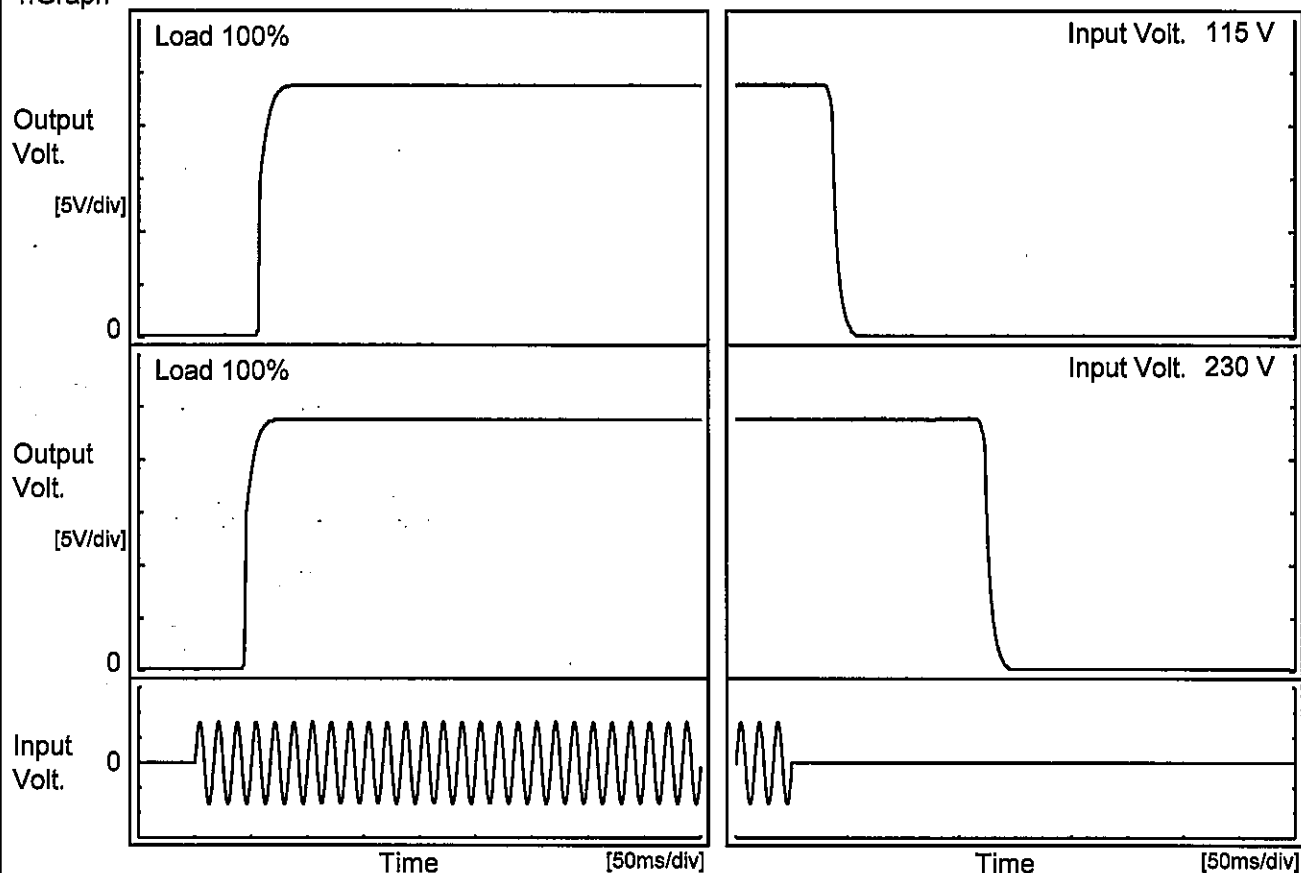


|  |                  |                   |          |
|--|------------------|-------------------|----------|
|  |                  |                   |          |
| Model  | KHNA30F-24       |                   |          |
| Item   | Time Lapse Drift | Temperature       | 25°C     |
| Object   | +24V1.3A         | Testing Circuitry | Figure A |
| 1.Graph  |                  | 2.Values          |          |
| <div><div>Output Voltage [V]</div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></di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|                  |                   |          |

# COSEL

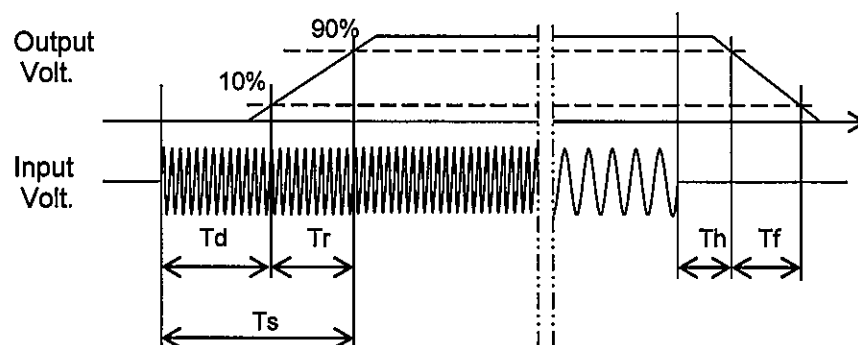
|        |                    |  |
|--------|--------------------|--|
| Model  | KHNA30F-24         |  |
| Item   | Rise and Fall Time | Temperature 25°C<br>Testing Circuitry Figure A |
| Object | +24V1.3A           |  |

## 1. Graph



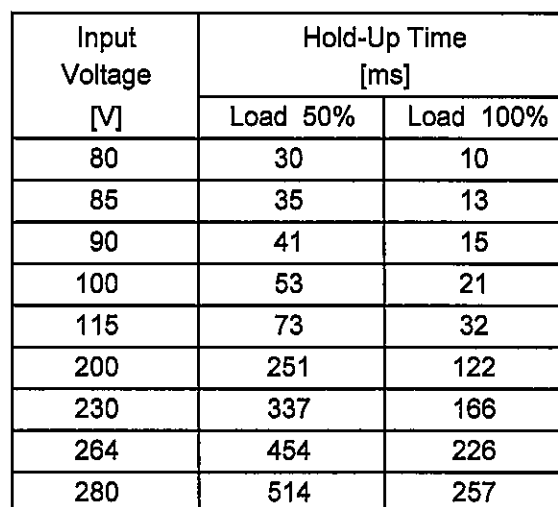
## 2. Values

|             |      | [ms] |      |      |       |      |
|-------------|------|------|------|------|-------|------|
| Input Volt. | Time | Td   | Tr   | Ts   | Th    | Tf   |
| 115 V       |      | 56.5 | 11.5 | 68.0 | 36.3  | 11.0 |
| 230 V       |      | 44.3 | 11.5 | 55.8 | 172.3 | 11.0 |



Temperature 25°C  
Testing Circuitry Figure A

## 2.Values



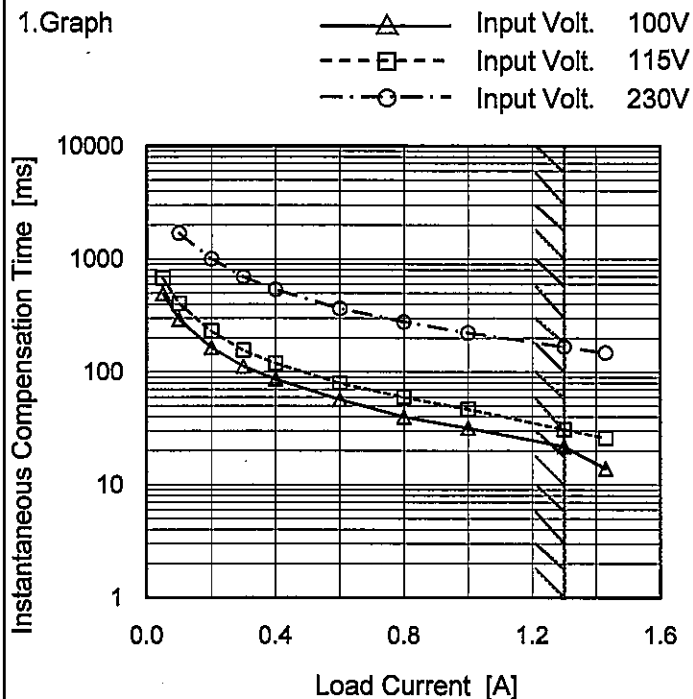
This duration covers from Shut-off of input voltage to the moment when output voltage descends to the rated range of voltage accuracy. Note: Slanted line shows the range of the rated input voltage.

Model KHNA30F-24

Item Instantaneous Interruption Compensation

Object +24V1.3A

Temperature 25°C  
Testing Circuitry Figure A

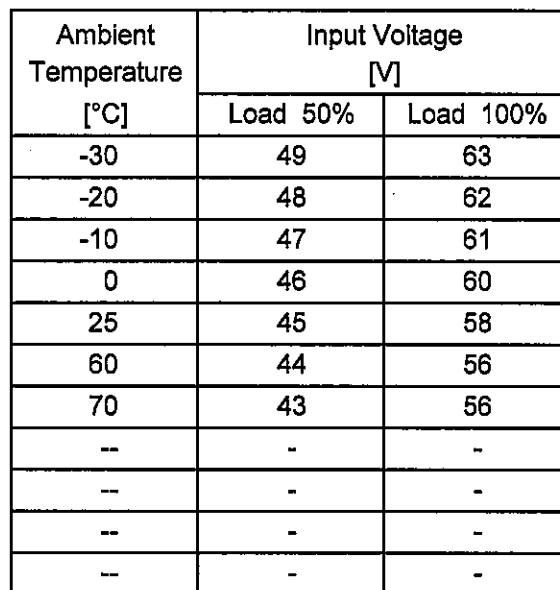


## 2. Values

| Load Current [A] | Time [ms]          |                    |                    |
|------------------|--------------------|--------------------|--------------------|
|                  | Input Volt. 100[V] | Input Volt. 115[V] | Input Volt. 230[V] |
| 0.00             | -                  | -                  | -                  |
| 0.05             | 496                | 679                | -                  |
| 0.10             | 293                | 404                | 1695               |
| 0.20             | 165                | 230                | 1006               |
| 0.30             | 113                | 156                | 698                |
| 0.40             | 87                 | 120                | 539                |
| 0.60             | 57                 | 80                 | 366                |
| 0.80             | 40                 | 60                 | 278                |
| 1.00             | 32                 | 47                 | 223                |
| 1.30             | 22                 | 31                 | 168                |
| 1.43             | 14                 | 26                 | 149                |

Testing Circuitry Figure A

## 2.Values



- 21 -

| Model  | KHNA30F-24             |   |                            |                    |                  |  |                    |                    |      |      |      |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |
|--|------------------------|---|----------------------------|--------------------|------------------|--|--------------------|--------------------|------|------|------|----|---|---|----|---|---|----|---|---|----|---|---|----|---|---|----|---|---|----|---|---|----|---|---|----|---|---|----|---|---|----|---|---|----|---|---|----|---|---|
| Item   | Overcurrent Protection |   | Temperature 25°C           |                    |                  |  |                    |                    |      |      |      |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |
| Object   | +24V1.3A               |   | Testing Circuitry Figure A |                    |                  |  |                    |                    |      |      |      |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |
| 1.Graph  |                        | 2.Values  |                            |                    |                  |  |                    |                    |      |      |      |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |
| <div><div><div><div></div><div>○</div><div>Input Volt. 115V</div></div><div><div></div><div>□</div><div>Input Volt. 230V</div></div></div><div><div><div>30</div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div>0</div></div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div>0.0</div><div>1.0</div><div>2.0</div><div>3.0</div></div></div><div><div>Output Voltage [V]</div><div>Load Current [A]</div></div></div> <div><div>Note: Slanted line shows the range of the rated load current.</div><div>Intermittent operation occurs when overcurrent protection is activated.</div></div> |                        | <table><tr><th rowspan="2">Output Voltage [V]</th><th colspan="2">Load Current [A]</th></tr><tr><th>Input Volt. 115[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>24.3</td><td>1.80</td><td>1.98</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></table> |                            | Output Voltage [V] | Load Current [A] |  | Input Volt. 115[V] | Input Volt. 230[V] | 24.3 | 1.80 | 1.98 | -- | - | - | -- | - | - | -- | - | - | -- | - | - | -- | - | - | -- | - | - | -- | - | - | -- | - | - | -- | - | - | -- | - | - | -- | - | - | -- | - | - | -- | - | - |
| Output Voltage [V]   | Load Current [A]       |   |                            |                    |                  |  |                    |                    |      |      |      |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |
|  | Input Volt. 115[V]     | Input Volt. 230[V]  |                            |                    |                  |  |                    |                    |      |      |      |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |
| 24.3   | 1.80                   | 1.98  |                            |                    |                  |  |                    |                    |      |      |      |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |
| --   | -                      | -   |                            |                    |                  |  |                    |                    |      |      |      |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |
| --   | -                      | -   |                            |                    |                  |  |                    |                    |      |      |      |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |
| --   | -                      | -   |                            |                    |                  |  |                    |                    |      |      |      |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |
| --   | -                      | -   |                            |                    |                  |  |                    |                    |      |      |      |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |
| --   | -                      | -   |                            |                    |                  |  |                    |                    |      |      |      |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |
| --   | -                      | -   |                            |                    |                  |  |                    |                    |      |      |      |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |
| --   | -                      | -   |                            |                    |                  |  |                    |                    |      |      |      |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |
| --   | -                      | -   |                            |                    |                  |  |                    |                    |      |      |      |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |
| --   | -                      | -   |                            |                    |                  |  |                    |                    |      |      |      |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |
| --   | -                      | -   |                            |                    |                  |  |                    |                    |      |      |      |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |
| --   | -                      | -   |                            |                    |                  |  |                    |                    |      |      |      |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |
| --   | -                      | -   |                            |                    |                  |  |                    |                    |      |      |      |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |
| --   | -                      | -   |                            |                    |                  |  |                    |                    |      |      |      |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |    |   |   |



|         |  |                        |  |
|---------|--|------------------------|--|
| Model   |  | KHNA30F-24             |  |
| Item    |  | Overvoltage Protection |  |
| Object  |  | +24V1.3A               |  |
| 1.Graph |  | 2.Values               |  |

—△—

Input Volt. 115V

---□---

Input Volt. 230V

Operating Point [V]

Ambient Temperature [°C]

Load 0%

Note: Slanted line shows the range of the rated ambient temperature.

| Ambient Temperature [°C] | Operating Point [V] |                    |
|--------------------------|---------------------|--------------------|
|                          | Input Volt. 115[V]  | Input Volt. 230[V] |
| -30                      | 31.23               | 31.14              |
| -20                      | 31.42               | 31.33              |
| -10                      | 31.71               | 31.62              |
| 0                        | 31.89               | 31.80              |
| 25                       | 32.52               | 32.43              |
| 60                       | 33.42               | 33.33              |
| 70                       | 33.71               | 33.62              |
| --                       | -                   | -                  |
| --                       | -                   | -                  |
| --                       | -                   | -                  |
| --                       | -                   | -                  |

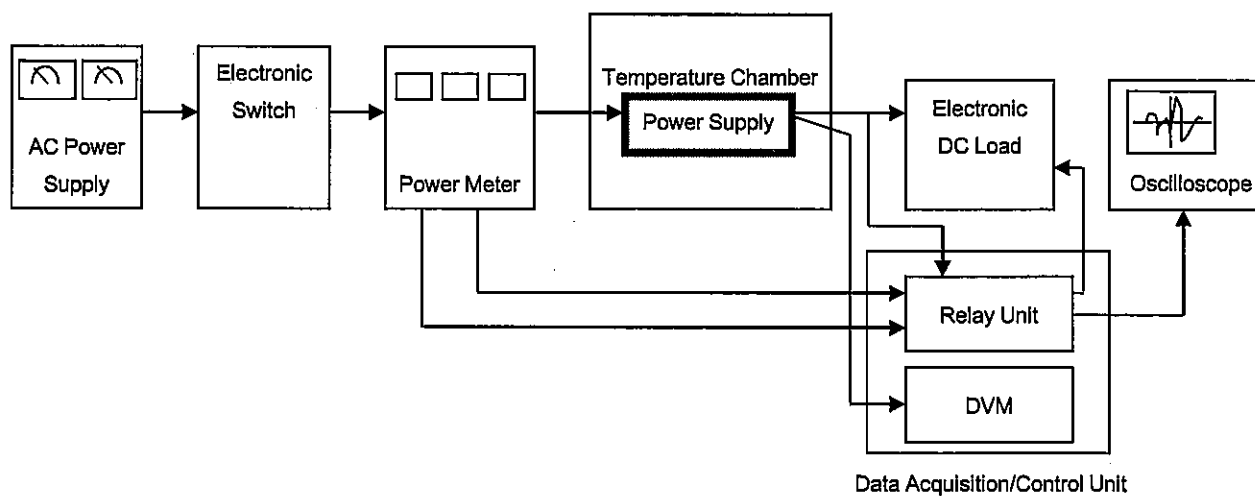


Figure A

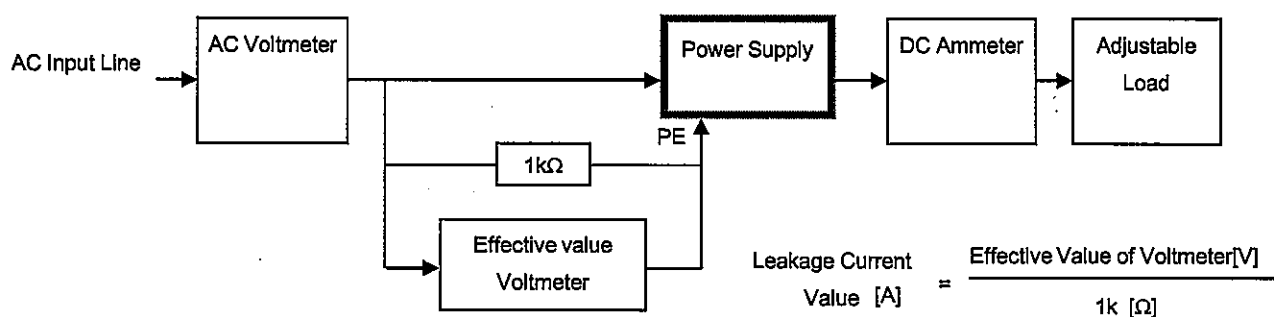


Figure B ( DEN-AN )

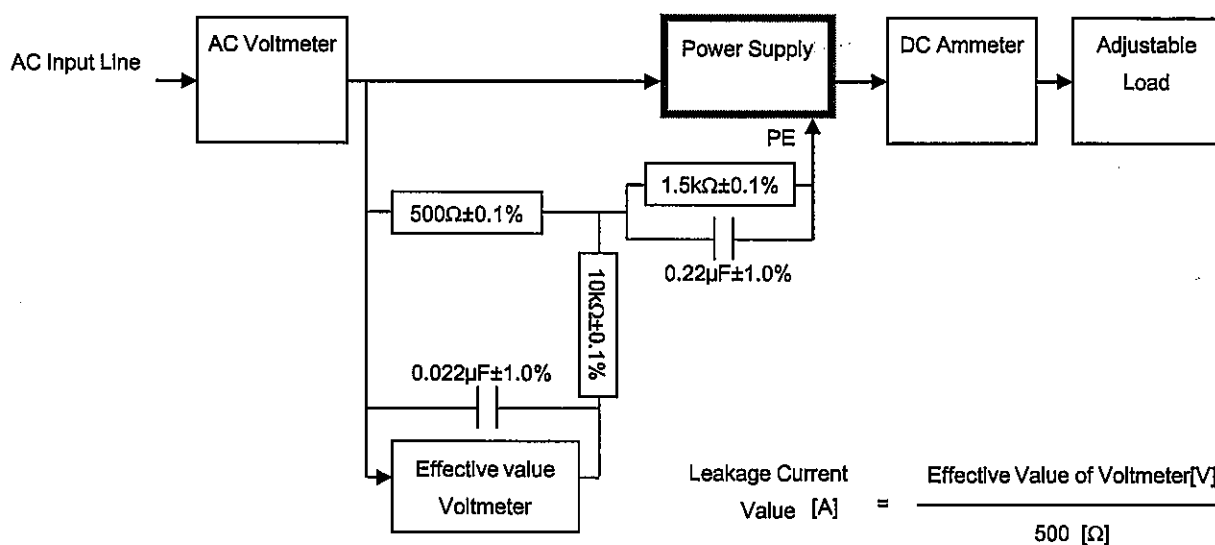


Figure B ( IEC60950-1 )

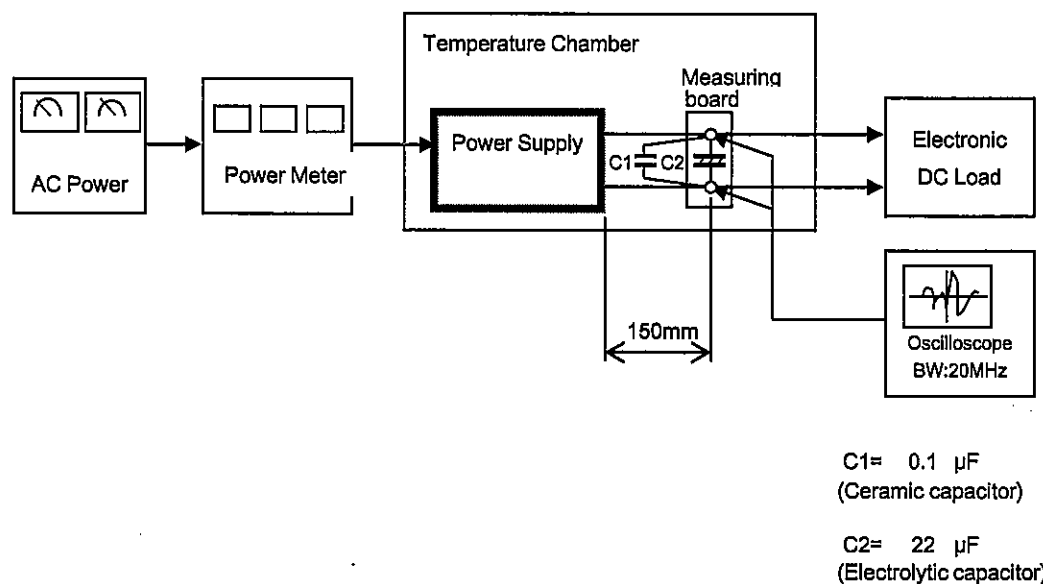


Figure C