Nokian power factor controllers provide your network with efficient reactive power compensation, measuring and supervision. The applications include automatic control of low and medium voltage capacitor banks (tuned, detuned and conventional). Improved user-friendliness due to multi-lingual user-interface, clear text and symbol messages, graphics, alarm log and communication.

Nokian Power Factor Controller offers advanced condition monitoring for your network as well as for the capacitor bank. The supervision and condition monitoring functions add to the simplified programming with intelligent self set-up ensure optimal use of reactive power compensation system.

Improvements in power factor, \( \cos \varphi \), result in:
- lower energy consumption and costs
- more power transmission capacity via network
- less power loss in network
- lower transformer losses
- stable voltage level in power distribution networks

### POWER FACTOR CONTROLLERS
N-6, N-12 AND NC-12

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**Type** | **Number of step output contacts** | **Supply voltage (V) 50/60 Hz network** | **Measuring voltage (V)**
--- | --- | --- | ---
N-6 | 6 | 110-220/240-380/415 | 110-220/380/415
N-12 | 12 | 110-220/240-380/415 | 110-220/380/415
NC-12 | 12 | 110-220/240-380/415 | 110-220/240-380/415-690

**Optional accessories**
- Communication, RS 485/Modbus, adapter for NC-12
- External temperature probe for NC-12

**Data supplied N-6/N-12 NC-12**
- \( \cos \varphi \) x x
- Connected steps x x
- Switching counter and duty cycles x x
- Network technical data: I, U, S, P, Q x x
- Temperature of the capacitor bank x x
- Total voltage harmonic distortion THD (U) x x
- Alarm log x x
- Step status (fixed, auto, disconnected) x
- Step capacitance monitoring x
- Total current harmonic distortion THD (I) x
- Capacitor overload limits x
- Voltage and current harmonic spectrum x

**Alarm Thresholds**

<table>
<thead>
<tr>
<th>Number</th>
<th>Thresholds</th>
<th>N-6/N-12</th>
<th>NC-12</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Low power factor</td>
<td>Message and alarm contact</td>
<td>x</td>
</tr>
<tr>
<td>2.</td>
<td>Hunting (unstable regulation)</td>
<td>Message and alarm contact, stops regulation for 10 minutes</td>
<td>x</td>
</tr>
<tr>
<td>3.</td>
<td>Abnormal ( \cos \varphi ) &lt; 0.6 ind or 0.8 cap</td>
<td>Message and alarm contact</td>
<td>x</td>
</tr>
<tr>
<td>4.</td>
<td>Low voltage &lt; 80 % U within 1s</td>
<td>Message and alarm contact, step disconnection</td>
<td>x</td>
</tr>
<tr>
<td>5.</td>
<td>Overcompensation</td>
<td>Message and alarm contact</td>
<td>x</td>
</tr>
<tr>
<td>6.</td>
<td>Wrong frequency</td>
<td>Message and alarm contact, stops regulation</td>
<td>x</td>
</tr>
<tr>
<td>7.</td>
<td>Overcurrent &gt; 120%</td>
<td>Message and alarm contact</td>
<td>x</td>
</tr>
<tr>
<td>8.</td>
<td>Overvoltage &gt; 110% U</td>
<td>Message and alarm contact, step disconnection</td>
<td>x</td>
</tr>
<tr>
<td>9.</td>
<td>Overtemperature &gt; 35°C (1)</td>
<td>Fan switch contact</td>
<td>x</td>
</tr>
<tr>
<td>10.</td>
<td>Voltage distortion &gt; 7% (1)</td>
<td>Message and alarm contact, step disconnection</td>
<td>x</td>
</tr>
<tr>
<td>11.</td>
<td>Capacitor overload Irms/I1 &gt; 1.3(1)</td>
<td>Message and alarm contact, step disconnection</td>
<td>x</td>
</tr>
<tr>
<td>12.</td>
<td>Capacitor output low &lt; 75% of nominal</td>
<td>Message and alarm contact, step disconnection</td>
<td>x</td>
</tr>
</tbody>
</table>

(1) alarm threshold values can be configured

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**Dimensions and weight**

<table>
<thead>
<tr>
<th>Type</th>
<th>Dimensions (mm)</th>
<th>Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N-6/N-12</td>
<td>H 155 L 155 P1 70 P2 60</td>
<td>1</td>
</tr>
<tr>
<td>NC-12</td>
<td>H 160 L 155 P1 75 P2 65</td>
<td>1</td>
</tr>
</tbody>
</table>
TAKE THE STEP TOWARDS INTELLIGENT POWER FACTOR CONTROLLING

N-6 AND N-12
OPTIMIZED USER INTERFACE FOR EASY OPERATION
Backlighted alphanumeric multisymbol LCD-display and ergonomic push buttons enable:
• viewing of electrical information
• easy browsing in the menus
• multilingual usage
• alarm indications

PERFORMANCE
• intelligent stepping algorithm for optimum step utilization and fast response
• all traditional stepping sequences also available

SIMPLIFIED INSTALLATION AND SET-UP
• quick and simple mounting and wiring
• insensitive to current transformer polarity and phase rotation polarity
• a special menu allows controller self-configuration

MONITORING AND PROTECTION
Alarms
• should a disturbance occur on the network or in the capacitor bank, alarms are indicated on the screen and alarm contact closure is initiated
• the alarm message is maintained on the screen once the fault clears and until it is manually reset
• last five alarms are stored in alarm log

Protection
• if necessary, the capacitor steps are automatically disconnected to protect the equipment

N-12 CONNECTION EXAMPLES
Line-to-Line connection
Line-to-Neutral connection

NC-12
FOR MORE ADVANCED POWER FACTOR CONTROLLING
In addition to the functions of N-6/N-12, the NC-12 provides the following additional features:
• measurement of total current harmonic distortion
• graphical analysis of network harmonic currents and voltages
• possibility of a dual target cos ϕ
• possible to configure steps permanently switched off or on
• step condition monitoring
• time stamped alarm log
• on-line help menus

A COMMUNICATING MODEL
• optional communication auxiliary (RS485 Modbus)

TECHNICAL SPECIFICATION
General data
• Operating temperature: 0…60°C
• Storage temperature: -20…60°C
• Colour: RAL 7016
• Standards:
  - EMC:
    - immunity according to IEC 61000-6-2
    - emissions according to IEC 61000-6-4
  - Electrical safety and low voltage directive according to IEC 61010-1
• Mounting mechanism: panel mounting, 138mmx138mm panel cutout or mounting on 35mm DIN-rail (EN 50022)
• Protection class: IP 41 front face, IP 20 rear face
• Display type:
  - N-6 and N-12 backlit symbol LCD
  - NC-12 backlit dot matrix LCD
• Languages:
  - English, German, French, Portuguese, Spanish, Swedish, Finnish
• Alarm contact
• Separate fan relay contact
• Temperature measurement:
  - N-6 and N-12 with internal temperature probe
  - NC-12 with optional external temperature probe
• Alarm log
• Serial communication port: RS 485, industry standard buses with optional communication adapter (NC-12 type)

Inputs
• Type of connection: phase to phase or phase to neutral
• Insensitive to CT polarity
• Insensitive to phase rotation polarity
• CT ratio range: 25/5A…6000/5A (all types)
• CT ratio range: 25/1A…6000/1A (NC-12 type only)

Outputs
• potential free output contacts:
  - AC: 1A/400V, 2A/250V, 5A/120V
  - DC: 0.3A/110V, 0.6A/60V, 2A/24V

Settings and parameters
• Target cos ϕ setting: 0.85 ind...0.90 cap
• Dual target cos ϕ with external control input (NC-12 type)
• Manual or automatic setting of all controller parameters
• Stepping programs: stack, normal, circular, optimal
• Various number of step size combinations
• Reconnection delay:
  - N-6, N-12: 10…600s
  - NC-12: 10…900s
• Step configuration: fixed, auto, disconnected (NC-12 type)
• 4-quadrant generator application
• Manual stepping

N-12 CONNECTION EXAMPLES
Line-to-Line connection
Line-to-Neutral connection