SPC1-AP6X / SPC1-AN6X

Programmable pulse or interval counter

- Direct adaptation between sensor and connecting cable
- Counting of pulses or intervals
- Simple setting by external teach-input
- No additional wiring required
- Counting range from 0 to 65535
- Switching amplifier up to 400 mA
- N.C./N.O. inverter

The SPC1 SmartPlug is a freely programmable counter for the direct adaptation to sensors with a standardized M12x1 connection.

The SPC1 SmartPlug is available in 2 versions:

- PNP input - PNP output SPC1-AP6X (for use with PNP sensors)
- NPN input - NPN output SPC1-AN6X (for use with NPN sensors)

Connection:

The SmartPlug is very easy to connect; it is plugged onto the M12x1 connector of a sensor and the connecting cable is connected to the other side of the SmartPlug. The sensor configuration has to meet the standards (1+V (BN) 3 -V (BU) 4 output (BK) ).

Setting:

The setting of the preset number is made by using the signals "teach input" and "input SmartPlug". If for example, 4 pulses have to be counted, the setting can be made as follows (operating voltage being switched on):

1. Connect teach input with +V.
2. Actuate the sensor 4 times (= 4 pulses) - The SmartPlug recognizes automatically 4 pulses at the "input SmartPlug".
3. Disconnect teach input from +V → READY.

After this setting, the output of the SmartPlug is activated every fourth pulse. The setting is maintained when the sensor is switched off.

H = input or output active; L = input or output inactive

When switching on the operating voltage, the counting procedure is reset. The initial state of the preset number is 1 (pulse counter).
### Technical Data

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Voltage</td>
<td>10-30 VDC, residual ripple of max. 10%</td>
</tr>
<tr>
<td>Own Current Consumption</td>
<td>&lt;10 mA</td>
</tr>
<tr>
<td>Input Resistance</td>
<td>&gt;10 kΩ</td>
</tr>
<tr>
<td>Max. Input Frequency</td>
<td>10 kHz</td>
</tr>
<tr>
<td>Min. Response Time</td>
<td>0.1 ms</td>
</tr>
<tr>
<td>Max. Output Current</td>
<td>400 mA short-circuit proof</td>
</tr>
<tr>
<td>Ambient Temperature Range</td>
<td>0° to +60°C (+32° to +140°F)</td>
</tr>
<tr>
<td>Storage Temperature Range</td>
<td>-20° to +60°C (-4° to +140°F)</td>
</tr>
<tr>
<td>Display</td>
<td>Red LED</td>
</tr>
<tr>
<td>Housing Material</td>
<td>Plastic PBTP/PA</td>
</tr>
<tr>
<td>Protection Standard</td>
<td>IP 67</td>
</tr>
<tr>
<td>Dimensions Inches[mm]</td>
<td>See diagram</td>
</tr>
<tr>
<td>Connection Input</td>
<td>4-pin socket M12x1</td>
</tr>
<tr>
<td>Connection Output</td>
<td>4-pin connector M12x1</td>
</tr>
<tr>
<td>Weight</td>
<td>15 g</td>
</tr>
</tbody>
</table>

### Preset to factory setting 1 pulse counter

1. Gearwheel/Divider: On a gearwheel with 100 teeth, one pulse per rotation is to be measured.
   a) A suitable sensor with standardized M12x1 connection is mounted in a way that each tooth is safely recognized.
   b) A SmartPlug SPC1 is connected between sensor and sensor connecting cable.
   c) The preset number 100 is taught into the SmartPlug, → connect "teach input" with +V, turn round the gearwheel exactly one time.
   d) Disconnect "teach input" from +V. READY
   At the output of the SmartPlug, one pulse per rotation is measured.

2. Counting parts: Bulk material is filled into cartons by means of a conveyor belt. The task is to specify the exact number of parts required to fill up the carton.
   a) A suitable sensor with standardized M12x1 connection is mounted in a way that all parts are safely recognized.
   b) A SmartPlug SPC1 is connected between sensor and sensor connecting cable.
   c) A "teach input" stays connected to +V until the desired number of parts has passed the sensor (=unit the carton is full).
   d) Disconnect "teach input" from +V. READY
   At the output of the SmartPlug, one pulse is measured when the preset quantity of parts has been recorded; the carton is full.

3. Switching amplifier: Most sensors have a maximum output current of 100 mA to 200 mA. By using a SmartPlug, the maximum output current can be increased to 400 mA.
   a) A SmartPlug SPC1 is connected between sensor and sensor connecting cable.
   b) The "teach input" stays connected to +V until the sensor has been actuated once (preset number 1).
   c) Disconnect "teach input" from +V. READY
   At the output of the SmartPlug every input pulse is measured, the output can be charged with 400 mA.

4. N.C./N.O. inverter: Teach the SmartPlug as interval counter "1". An input N.C. signal will be inverted into a N.O. signal and reverse.