Preventa™ Safety Relays
Type XPSAV, XPSATE & XPSVNE

Catalog Supplement to 9007CT0201

2009
Preventa™ safety relays

Electrical Ratings .................................................................................................................................. 2
Type XPSAV and XPSATE, for Emergency stop and switch monitoring .................................................. 3
Type XPSVNE, for zero speed detection .................................................................................................. 11
Dimensions ............................................................................................................................................... 17

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Electrical Ratings

Safety automation system solutions
Preventa™ safety relay modules

Electrical life
Electrical life ratings of safety contacts conforming to EN 60947-5-1, table C2
XP SAC, XPSTSA, XPSTSW, XPSSBA, XPSSBC, XPSCM, XPSDA, XP SOT,
XPSPVK, XPSPVT, XP SVE
XPSEC M, XPSEC P

Switching current (A)
Number of operating cycles
Switching current (A)
Number of operating cycles
Switching current (A)
Number of operating cycles
Switching current (A)
Number of operating cycles

24 V ~ version
115 V + 230 V ~ version
Switching current (A)
Number of operating cycles
Switching current (A)
Number of operating cycles
Switching current (A)
Number of operating cycles
Switching current (A)
Number of operating cycles

XPSAF, XPSAK, XPSAFL
XPSAV, XPSMP, XPSVC, XPSBF, XPSMC
XPSAR
XPSDMB, XPSDME

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
**Operating principle**

Preventa Safety relay modules types XPSAV and XPSATE are used for monitoring Emergency stop circuits conforming to standards EN/ISO 13850 and EN/IEC 60204-1 and also meet the safety requirements for the electrical monitoring of switches in protection devices conforming to standard EN 1088/ISO 14119. They provide protection for both the machine operator and the machine by immediately stopping the machine movement on receipt of a stop instruction from the operator, or on detection of an anomaly in the safety circuit itself.

In addition to the stop category 0 instantaneous opening safety outputs (3 for XPSAV and 2 for XPSATE), the modules incorporate stop category 1 time delay outputs (3 for XPSAV and 3 for XPSATE) which allow for controlled deceleration of the motor components until a complete stop is achieved (for example, motor braking by variable speed drive).

At the end of the preset delay, the supply is disconnected by opening the time delay output circuits.

For module XPSAV, the time delay of the 3 output circuits is adjustable, in 15 preset values, between 0 and 300 seconds using selector buttons.

For module XPSATE, the time delay of the 3 output circuits is adjustable between 0 and 30 seconds using a 12-position selector switch.

Module XPSAV also incorporates 3 solid-state signalling outputs for signalling to the process PLC. Module XPSATE incorporates 4 solid-state signalling outputs for signalling to the process PLC.

To aid diagnostics, the modules have LEDs which provide information on the monitoring circuit status.

The Start button monitoring function is configurable depending on the wiring.

**Characteristics**

<table>
<thead>
<tr>
<th>Module type</th>
<th>XPSAV11113 and AV11113P</th>
<th>XPSATEP and ATEP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product designed for max. use in safety related parts of control systems (conforming to EN 954-1/EN/ISO 13849-1)</td>
<td>Category 4 max.</td>
<td>Category 4 max. (instantaneous safety outputs)</td>
</tr>
<tr>
<td>Category 3 max. (time delay safety outputs)</td>
<td></td>
<td></td>
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<tr>
<td>Conformity to standards</td>
<td>EN/IEC 60204-1, DIN V VDE 801 + A1, EN/ISO 13850, EN 1088/ISO 14119, EN/IEC 60947-1 A11, EN/IEC 60947-5-1</td>
<td>EN/IEC 60204-1, EN/IEC 60947-5-1, EN/ISO 13850, EN 50082-2</td>
</tr>
<tr>
<td>Product certifications</td>
<td>UL, CSA, BIA</td>
<td>UL, CSA, BG</td>
</tr>
<tr>
<td>Supply Voltage</td>
<td>V 24</td>
<td>~ and ~ 24, ~ 115, ~ 230</td>
</tr>
<tr>
<td>Voltage limits</td>
<td>- 20...+ 20%</td>
<td>- 20...+ 10% (24 V)</td>
</tr>
<tr>
<td>Frequency Hz</td>
<td>–</td>
<td>50/60</td>
</tr>
<tr>
<td>Power consumption W</td>
<td>&lt; 5</td>
<td>&lt; 8</td>
</tr>
<tr>
<td>Module inputs fuse protection</td>
<td>Internal, electronic</td>
<td>Internal, electronic</td>
</tr>
<tr>
<td>Adjustable time delay s</td>
<td>0...300</td>
<td>0...30</td>
</tr>
<tr>
<td>Start button monitoring</td>
<td>Yes/No (configurable by terminal connections)</td>
<td>Yes/No (configurable by terminal connections)</td>
</tr>
<tr>
<td>Control unit voltage (at nominal supply voltage)</td>
<td>Between input terminals S21-S22, S31-S32 or S11-S12</td>
<td>Between input terminals S11-S12, S21-S22 or S11-B1</td>
</tr>
<tr>
<td>24 V version</td>
<td>V 24</td>
<td>24</td>
</tr>
<tr>
<td>115 V, 230 V version</td>
<td>V –</td>
<td>48</td>
</tr>
<tr>
<td>Calculation of wiring resistance RL between input terminals</td>
<td>100 max. Maximum cable length: 6562 ft. (2000 m)</td>
<td>RL max. = U int - U min. / I min.</td>
</tr>
<tr>
<td>Ue = true voltage applied to terminals A1-A2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>U int (terminals S11-S21) = supply voltage Ue - 3 V (24 V version)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>U int between 42 V and 45 V, with typical value = 45 V (115 V, 230 V version)</td>
<td></td>
<td></td>
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<tr>
<td>Calculated max. RL must be equal to or greater than the true value</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**References:** page 5

**Wiring Diagrams:** page 6

**Dimensions:** page 17

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**Operating principle, characteristics**

**Safety automation system solutions**

**Preventa™ safety relay modules types XPSAV, XPSATE**

**For Emergency stop and switch monitoring**

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### Characteristics (continued)

#### Preventa™ safety relay modules types XPSAV, XPSATE

For Emergency stop and switch monitoring

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Module type</th>
<th>XPSAV11113</th>
<th>XPSAV11113P</th>
<th>XPSATE****</th>
<th>ATE******P</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Synchronization time between inputs</strong></td>
<td>s</td>
<td>For guard: 1.5</td>
<td>For Emergency stop: unlimited</td>
<td>Approx. 0.075</td>
<td>For automatic start, terminals S33-Y2 and Y3-Y4 linked</td>
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<tr>
<td>Outputs</td>
<td>Voltage reference</td>
<td>Relay hard contacts</td>
<td>Relay hard contacts</td>
<td></td>
<td></td>
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<tr>
<td>Number and type of instantaneous opening safety circuits</td>
<td>3 N.O. (03-04, 13-14, 23-24)</td>
<td>2 N.O. (13-14, 23-24, 33-34)</td>
<td></td>
<td></td>
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<tr>
<td>Number and type of time delay opening safety circuits</td>
<td>3 N.O. (37-48, 57-58)</td>
<td>3 N.O. (57-68, 77-78)</td>
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<td></td>
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<tr>
<td>Number and type of additional circuits</td>
<td>3 solid-state</td>
<td>4 solid-state</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breaking capacity in AC-15</td>
<td>Instantaneous outputs</td>
<td>VA</td>
<td>C300: inrush 1800, maintained 180</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time delay outputs</td>
<td>VA</td>
<td>C300: inrush 1800, maintained 180</td>
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<td></td>
<td></td>
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<tr>
<td>Breaking capacity in DC-13</td>
<td>Instantaneous outputs</td>
<td>24 V/1.25 A L/R = 50 ms</td>
<td>24 V/1.0 A L/R = 50 ms</td>
<td></td>
<td></td>
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<tr>
<td>Time delay outputs</td>
<td>24 V/1.25 A L/R = 50 ms</td>
<td>24 V/1.0 A L/R = 50 ms</td>
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<tr>
<td>Breaking capacity of solid-state outputs</td>
<td>24 V/20 mA</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Max. thermal current (Ith)</td>
<td>Instantaneous outputs</td>
<td>A</td>
<td>3.3 for all 3, or 6 for 1 and 2 for 2, or 4 for 2 and 2 for 1</td>
<td></td>
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<tr>
<td>Time delay outputs</td>
<td>A</td>
<td>3.3 for all 3, or 6 for 1 and 2 for 2, or 4 for 2 and 2 for 1</td>
<td></td>
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<tr>
<td>Output fuse protection, using fuses conforming to EN/IEC 60947-5-1, DIN VDE 0110 part 200</td>
<td>Instantaneous outputs</td>
<td>A</td>
<td>4 gG or 6 fast acting</td>
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<td></td>
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<tr>
<td>Time delay outputs</td>
<td>A</td>
<td>4 gG or 6 fast acting</td>
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<td></td>
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<tr>
<td>Minimum current</td>
<td>mA</td>
<td>10</td>
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<tr>
<td>Minimum voltage</td>
<td>V</td>
<td>17</td>
<td></td>
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<tr>
<td><strong>Electrical life</strong></td>
<td>See page 2</td>
<td></td>
<td></td>
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<tr>
<td><strong>Response time on instantaneous opening inputs</strong></td>
<td>ms</td>
<td>&lt; 30</td>
<td></td>
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<tr>
<td><strong>Rated insulation voltage (Ui)</strong></td>
<td>V</td>
<td>300 (degree of pollution 2 conforming to EN/IEC 60947-5-1, DIN VDE 0110 parts 1 and 2)</td>
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<tr>
<td><strong>Rated impulse withstand voltage (Uimp)</strong></td>
<td>kV</td>
<td>4 (overvoltage category III, conforming to EN/IEC 60947-5-1, DIN VDE 0110 parts 1 and 2)</td>
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<td></td>
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<tr>
<td><strong>LED display</strong></td>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Operating temperature</strong></td>
<td>°F (°C)</td>
<td>+ 14...+ 131 (- 10...+ 55)</td>
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<tr>
<td><strong>Storage temperature</strong></td>
<td>°F (°C)</td>
<td>- 13...+ 267.8 (- 25...+ 85)</td>
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<tr>
<td><strong>Degree of protection conforming to IEC/EN 60529</strong></td>
<td>Terminals</td>
<td>IP 20</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Enclosure</td>
<td>IP 40</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Connections</strong></td>
<td>Type</td>
<td>Captive screw clamp terminals, removable terminal block</td>
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</tr>
<tr>
<td><strong>1-wire connection Without cable end</strong></td>
<td>Solid or flexible cable: 26-14 AWG (0.14 - 2.5 mm²)</td>
<td>Solid or flexible cable: 24-14 AWG (0.20 - 2.5 mm²)</td>
<td>Solid or flexible cable: 26-14 AWG (0.14 - 2.5 mm²)</td>
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<td></td>
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<tr>
<td><strong>With cable end</strong></td>
<td>Without bezel, flexible cable: 24-14 AWG (0.25 - 2.5 mm²)</td>
<td>Without bezel, flexible cable: 24-14 AWG (0.25 - 2.5 mm²)</td>
<td>Without bezel, flexible cable: 24-14 AWG (0.25 - 2.5 mm²)</td>
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<tr>
<td><strong>2-wire connection Without cable end</strong></td>
<td>Solid or flexible cable: 26-20 AWG (0.14 - 0.75 mm²)</td>
<td>Solid cable: 24-14 AWG (0.2 - 1.0 mm²)</td>
<td>Flexible cable: 24-16 AWG (0.20 - 1.5 mm²)</td>
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<tr>
<td><strong>With cable end</strong></td>
<td>Without bezel, flexible cable: 24-14 AWG (0.25 - 1.0 mm²)</td>
<td>Double, with bezel, flexible cable: 22-14 AWG (0.5 - 1.5 mm²)</td>
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**Breaking capacity of solid-state outputs**

- **AC-15**:
  - Instantaneous outputs: 300 VA, inrush 1800, maintained 180 VA
  - Time delay outputs: 24 V/1.25 A L/R = 50 ms, 24 V/1.0 A L/R = 50 ms

- **DC-13**:
  - Instantaneous outputs: 24 V/1.25 A L/R = 50 ms, 24 V/1.0 A L/R = 50 ms

**Breaking capacity of solid-state outputs**

- **AC-15**:
  - Instantaneous outputs: 6 gG or 4 fast acting
  - Time delay outputs: 4 gG or 6 fast acting

- **DC-13**:
  - Instantaneous outputs: 6 gG or 4 fast acting
  - Time delay outputs: 4 gG or 6 fast acting

**Output fuse protection**, using fuses conforming to EN/IEC 60947-5-1, DIN VDE 0110 parts 1 and 2:

- **Instantaneous outputs**: 4 gG or 6 fast acting
- **Time delay outputs**: 4 gG or 6 fast acting

**Minimum current**

- **AC-15**: 10 mA
- **DC-13**: 17 mA

**Minimum voltage**

- **AC-15**: 10 V
- **DC-13**: 17 V

**Electrical life**

- See page 2

**Response time on instantaneous opening inputs**

- < 30 ms

**Rated insulation voltage (Ui)**

- 300 (degree of pollution 2 conforming to EN/IEC 60947-5-1, DIN VDE 0110 parts 1 and 2)

**Rated impulse withstand voltage (Uimp)**

- 4 (overvoltage category III, conforming to EN/IEC 60947-5-1, DIN VDE 0110 parts 1 and 2)

**LED display**

- 11

**Operating temperature**

- + 14...+ 131 (- 10...+ 55)

**Storage temperature**

- - 13...+ 267.8 (- 25...+ 85)

**Degree of protection conforming to IEC/EN 60529**

- Terminals: IP 20
- Enclosure: IP 40

**Connections**

- **Type**: Captive screw clamp terminals, removable terminal block

**1-wire connection Without cable end**

- Solid or flexible cable: 26-14 AWG (0.14 - 2.5 mm²)
- Solid or flexible cable: 24-14 AWG (0.20 - 2.5 mm²)
- Solid or flexible cable: 26-14 AWG (0.14 - 2.5 mm²)

**With cable end**

- Without bezel, flexible cable: 24-14 AWG (0.25 - 2.5 mm²)
- With bezel, flexible cable: 24-14 AWG (0.25 - 2.5 mm²)
- With bezel, flexible cable: 24-14 AWG (0.25 - 2.5 mm²)

**2-wire connection Without cable end**

- Solid or flexible cable: 26-20 AWG (0.14 - 0.75 mm²)
- Solid cable: 24-14 AWG (0.2 - 1.0 mm²)
- Flexible cable: 24-16 AWG (0.20 - 1.5 mm²)

**With cable end**

- Without bezel, flexible cable: 24-14 AWG (0.25 - 1.0 mm²)
- Double, with bezel, flexible cable: 22-14 AWG (0.5 - 1.5 mm²)
### References

**Preventa™ safety relay modules types XPSAV, XPSATE**

**For Emergency stop and switch monitoring**

<table>
<thead>
<tr>
<th>Description</th>
<th>Number of safety circuits</th>
<th>Additional outputs</th>
<th>Supply</th>
<th>Type of terminal block connection</th>
<th>Reference</th>
<th>Weight oz (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety modules for Emergency stop and switch monitoring</td>
<td>6 N.O.</td>
<td>3 solid-state</td>
<td>24 V</td>
<td>Integrated in module</td>
<td>XPSAV11113</td>
<td>11.288 (0.320)</td>
</tr>
<tr>
<td></td>
<td>(3 N.O. time delay)</td>
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<td></td>
</tr>
<tr>
<td>Safety modules for Emergency stop and switch monitoring</td>
<td>6 N.O.</td>
<td>3 solid-state</td>
<td>24 V</td>
<td>Removable from module</td>
<td>XPSAV11113P</td>
<td>11.288 (0.320)</td>
</tr>
<tr>
<td></td>
<td>(3 N.O. time delay)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety modules for Emergency stop and switch monitoring</td>
<td>5 N.O.</td>
<td>4 solid-state</td>
<td>~24 V</td>
<td>Integrated in module</td>
<td>XPSATE5110</td>
<td>9.877 (0.280)</td>
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<td></td>
<td>(3 N.O. time delay)</td>
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<tr>
<td>Safety modules for Emergency stop and switch monitoring</td>
<td>~115 V</td>
<td>Integrated in module</td>
<td></td>
<td></td>
<td>XPSATE3410</td>
<td>13.404 (0.380)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Safety modules for Emergency stop and switch monitoring</td>
<td>~230 V</td>
<td>Integrated in module</td>
<td></td>
<td></td>
<td>XPSATE3710</td>
<td>13.404 (0.380)</td>
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</tbody>
</table>

XPSAV safety relays are suitable for use in circuits through Category 4 per EN 954-1 and ISO 13849-1.

XPSAT safety relays are suitable for use in circuits through Category 4 per EN 954-1 and ISO 13849-1 when instantaneous break contacts are used.

XPSAT safety relays are suitable for use in circuits through Category 3 per EN 954-1 and ISO 13849-1 when time delay break contacts are used.
Wiring diagrams

Safety automation system solutions
Preventa™ safety relay modules type XPSAV
For Emergency stop and switch monitoring

XPSAV
Module XPSAV associated with an Emergency stop button with 1 N.C. contact, automatic start or unmonitored start

(1) Jumper for automatic start.
(2) Instantaneous opening safety outputs (stop category 0).
(3) Time delay opening safety outputs (stop category 1).
ESC = External start conditions.

Functional diagrams

Automatic start
There is no start contact or it is jumpered (wiring between terminals S13 - S14).
Note: Automatic start function is not available on the XPSAV with 2 channel wiring on the inputs. Automatic start function is only available on single channel wiring on the inputs.

Unmonitored start
The output is activated on closing of the start contact (wiring between terminals S13 - S14).

Monitored start
The start input is monitored so that there is no start-up in the event of the start contact being jumpered or the start circuit being closed for more than 10 seconds. Start-up is triggered following activation of the start button (push-release function) on opening of the contact (wiring between terminals S33 - S34).
Safety automation system solutions
Preventa™ safety relay modules type XPSAV
For Emergency stop and switch monitoring

XPSAV
Module XPSAV associated with an Emergency stop button with 2 N.C. contacts, monitored start

(1) Instantaneous opening safety outputs (stop category 0).
(2) Time delay opening safety outputs (stop category 1).
ESC = External start conditions.
Note: Automatic start function is not available on the XPSAV with 2 channel wiring on the inputs. Automatic start function is only available on single channel wiring on the inputs.

Functional diagram
Monitored start

Emergency stop monitoring function configuration
1-channel wiring
2-channel wiring, with short-circuit detection

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Safety automation system solutions
Prevena™ safety relay modules type XPSAV
For Emergency stop and switch monitoring

XPSAV
Monitoring of a movable guard associated with 2 switches
Automatic start (diagram shown for guard closed)

(1) Instantaneous opening safety outputs (stop category 0).
(2) Time delay opening safety outputs (stop category 1).
ESC = External start conditions.

Functional diagram

LED details

1. S12 input status.
2. S22 input status.
3. S32 input status.
4. S34 input status.
5. S14 input status.
6. Y40 input status (time delay stop).
10. Fault.
11. Configuration mode
Module XPSATE associated with an Emergency stop button

S1: Emergency stop button with 2 N.C. contacts (recommended application).

S2: Start button.

ESC: External start conditions.

Y1 (S33) - Y2: Feedback loop.

F1: 4 A max.

(1) With start button monitoring.

(2) Without start button monitoring.

(3) The outputs must be fuse protected. Technical characteristics for maximum rating of fuses, see page 4.

(4) 115/230 V only.

(5) For automatic start, jumper S2 (N.O. start button between terminals S33-Y1). This is only feasible when configured without start button monitoring (Y3 and Y4 jumped). If S2 is jumped and the module is configured for start button monitoring (Y3 and Y5 jumped), the N.O. safety contacts will not close.

Functional diagram of module XPSATE with Emergency stop button monitoring

1 With start button monitoring (Y3-Y5 connection).
2 Without start button monitoring (Y3-Y4 connection).
3 Without start button (connection Y3-Y4 and S33-Y1).

Tv: adjustable time.

Description of LEDs

1 Supply voltage A1-A2, internal electronic fuse status.
2 S12 (A) input status.
3 S22 (B) input status.
4 Stop category 1 outputs closed.
Safety automation system solutions
Preventa™ safety relay modules type XPSATE
For Emergency stop and switch monitoring

Wiring diagrams (continued)

XPSATE

Example of a safety circuit combining an Emergency stop module with a variable speed drive

S1: Emergency stop button with 2 N.C. contacts (recommended application).
S2: Start button
(1) With start button monitoring.
(2) Technical characteristics for maximum rating of fuses, see page 4.

Connection with 1 Emergency stop button

Both input channels are supplied at the same potential.
S1: Emergency stop button with 2 N.C. contacts.
A short-circuit between the 2 inputs is not detected.

Configuration with start button monitoring
(functional diagram for Start button 1,
see page 9)

(1) Auxiliary terminal (to be used to separate the feedback loop from the wiring to the start button).

Configuration without start button monitoring
(functional diagram for Start button 2,
see page 9)

(1) Auxiliary terminal (to be used to separate the feedback loop from the wiring to the start button).

Connection with multiple Emergency stop buttons

The 2 input channels are supplied at different potentials.
A short-circuit between the 2 inputs is detected.

Monitoring an Emergency stop button with 1 N.C. contact

S1: Emergency stop button with 1 N.C. contact.
Not all faults are detected: a short-circuit on the Emergency stop button is not detected.
Preventa™ safety relay modules type XPSVNE for zero speed detection are used to detect the stop condition of electric motors. Their most common applications include: providing the unlock signal for electrically interlocked sliding or removable machine guards, controlling rotation direction signals for reversing motors and engaging locking brakes after a motor has come to a standstill.

As electric motors run down, a remanent voltage is produced in the windings of the motor due to residual magnetism. This voltage is proportional to the speed of the motor and, therefore, decreases as the motor comes to a standstill. This remanent voltage is measured in a redundant manner so as to detect the stop condition of the motor. The cabling between the motor windings and the inputs of the XPSVNE module is also monitored to prevent a cabling breakage or anomaly being seen as a stopped motor.

A transformer should not be used to connect the motor to terminals Z1, Z2 and Z3 since there is no monitoring of the connection with the motor winding via the resistance monitoring.

Modules XPSVNE are suitable for detecting the stop condition of all types of a.c. or d.c. motor driven machines which, when the motor runs down, produce a remanent voltage in the windings due to residual magnetism. These machines can be controlled by electronic devices, such as variable speed drives or d.c. injection brakes.

The input filters for standard XPSVNE modules are designed for a frequency of up to 60 Hz. For motors operating at a frequency higher than 60 Hz, which therefore produce a high frequency remanent voltage, special modules XPSVNEHS should be used.

The XPSVN is not compatible with Wound Rotor Motors. These motors are typically used in high HP (1000+) low speed applications, where the additional windings (required for these types of motors) pay for themselves. If power is removed from the stator, but rotor is left energized, then transformer coupling between the two could create a small voltage across the stator. This could make the XPSVN think the motor is still turning, which means the safety outputs would never energize or change state. These motors do not have residual magnetism in the rotor that can act as a source of flux for generator effect, in which case the XPSVN may think the motor is at zero speed, and could energize the safety outputs while the motor is still running. Wound Rotor motors are not in common use today, and very rare.

The XPVN is not designed to detect locked rotor conditions. Here the motor still has voltage applied to it, but in essence has zero speed. Generally, a locked rotor condition is not a safe state for machinery nor the operators. The XPVN will sense voltage applied to the windings, and will not indicate the motor’s “apparent” zero speed. The outputs of the XPVN will not change state, the gates or guards will not be unlocked, and operators will not be allowed access to the unsafe area.

Modules XPSVNE have 2 potentiometers mounted on the front cover of the module which allow independent adjustment of the switching threshold for each input circuit. This allows adjustment for different types of motors and application requirements.

To aid diagnostics, modules XPSVNE have 4 LEDs and 2 solid-state outputs to provide information on the status of the zero speed detection circuit.
Characteristics,
references

Preventa™ safety relay modules type XPSVNE
For zero speed detection

Characteristics

<table>
<thead>
<tr>
<th>Module type</th>
<th>XPSVNE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product designed for max. use in safety related parts of control systems (conforming to EN 954-1/ISO 13849-1)</td>
<td>Category 3 max.</td>
</tr>
<tr>
<td>Conformity to standards</td>
<td>EN 60204-1, EN/IEC 60947-5-1, EN 50082-2</td>
</tr>
<tr>
<td>Product certifications</td>
<td>UL, CSA, BG</td>
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<tr>
<td>Supply Voltage</td>
<td>V</td>
</tr>
<tr>
<td>Voltage limits</td>
<td>-15...+10% (~24 V)</td>
</tr>
<tr>
<td>Frequency</td>
<td>Hz</td>
</tr>
<tr>
<td>Power consumption</td>
<td>W</td>
</tr>
<tr>
<td>Frequency of motor power supply</td>
<td>Hz</td>
</tr>
<tr>
<td>Inputs Maximum voltage between terminals Z1 - Z2 - Z3</td>
<td>V</td>
</tr>
<tr>
<td>Detection threshold</td>
<td>V</td>
</tr>
<tr>
<td>Outputs Voltage reference</td>
<td>Hard contacts</td>
</tr>
<tr>
<td>Number and type of safety circuits</td>
<td>1 N.O. (13-14), 1 N.C. (21-22)</td>
</tr>
<tr>
<td>Number and type of additional circuits</td>
<td>2 solid-state</td>
</tr>
<tr>
<td>Breaking capacity in AC-15</td>
<td>300 (inrush: 1800 VA/maintained: 180 VA)</td>
</tr>
<tr>
<td>Breaking capacity in DC-13</td>
<td>24 V/1.5 A - L/R = 50 ms (contact 13-14)</td>
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<tr>
<td>Breaking capacity of solid-state outputs</td>
<td>24 V/20 mA, 48 V/10 mA</td>
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<tr>
<td>Max. thermal current (Ithc)</td>
<td>A</td>
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<tr>
<td>Output fuse protection</td>
<td>A</td>
</tr>
<tr>
<td>Minimum current (volt-free contact)</td>
<td>mA</td>
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<tr>
<td>Minimum voltage (volt-free contact)</td>
<td>V</td>
</tr>
<tr>
<td>Electrical life</td>
<td>See page 2</td>
</tr>
<tr>
<td>Rated insulation voltage</td>
<td>V</td>
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<tr>
<td>Rated impulse withstand voltage</td>
<td>kV</td>
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<tr>
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<tr>
<td>Operating temperature</td>
<td>°F (°C)</td>
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<tr>
<td>Storage temperature</td>
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<tr>
<td>Degree of protection Conforming to IEC 60529</td>
<td>Terminals</td>
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<tr>
<td>Connection Type</td>
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<tr>
<td>1-wire connection</td>
<td>Without cable end</td>
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<tr>
<td>2-wire connection</td>
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References

<table>
<thead>
<tr>
<th>Description</th>
<th>Number of safety circuits</th>
<th>Solid-state outputs for PLC</th>
<th>Supply</th>
<th>Frequency of motor power supply</th>
<th>Reference</th>
<th>Weight</th>
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<tr>
<td>Safety modules for zero speed detection</td>
<td>2</td>
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<td>24 V</td>
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<td>XPSVNE1142P</td>
<td>17.637 (0.500)</td>
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<td>&gt;60 Hz</td>
<td>XPSVNE1142HSP</td>
<td>17.637 (0.500)</td>
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<td>~115 V</td>
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<td>21.164 (0.600)</td>
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<td>&gt;60 Hz</td>
<td>XPSVNE3442HSP</td>
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<td>&gt;60 Hz</td>
<td>XPSVNE3742HSP</td>
<td>21.164 (0.600)</td>
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References:

- Description Number
- Solid-state outputs for PLC
- Supply Frequency of motor power supply Reference Weight oz (kg)

Safety automation system solutions

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Safety automation system solutions
Preventa™ safety relay modules type XPSVNE
For zero speed detection

XPSVNE
Wiring diagram

(1) Technical characteristics for establishing maximum rating of fuses, see page 12.
(2) Contacts are open when motor is running, closed when motor is stopped.
(3) Contacts are closed when motor is running, open when motor is stopped.
F1 = 2 A

Functional diagram of module XPSVNE

Key 0 - 1
The voltages at terminals Z1, Z2 and Z3 are indicated solely for the purposes of schematic diagram representation.

LED details

1 Supply voltage A1-A2.
2 Stop detected by channel 1.
3 Stop detected by channel 2.
4 Motor stop condition detected by both channels within time window.

Wiring diagrams

References:
page 12

Principles:
page 11

Characteristics:
page 12

Wiring Diagrams:
page 13

Dimensions:
page 17
Safety automation system solutions
Preventa™ safety relay modules type XPSVNE
For zero speed detection

Module XPSVNE associated with a d.c. motor

Module XPSVNE associated with a 3-phase motor

Module XPSVNE associated with a 3-phase motor + variable speed drive

Module XPSVNE associated with a 3-phase motor with start-delta starting

F1 = 2 A

KM1: Fast rotation speed
KM2: Slow rotation speed
KM3: Star

The "Star" contactor (KM3) must be closed after the motor is de-energized, in order to allow detection of zero speed.
Module XPSVNE associated with a 3-phase motor with variable number of poles and star-delta starting

F1 = 2 A
KM1: Fast rotation speed
KM2: Slow rotation speed
KM3: Star
KM4: Delta

Module XPSVNE associated with a star-delta motor starter and guard switch type XCS E

Wiring diagrams (continued)
Safety automation system solutions
Preventa™ safety relay modules type XPSVNE
For zero speed detection

Association of safety modules XPSVNE and XPSAK

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Principles: page 11
Characteristics: page 12
References: page 12
Wiring Diagrams: page 13
Dimensions: page 17
### Dimensions

#### Safety automation system solutions

**Preventa™ safety modules**

**AM1 DP200 rail mounting**

<table>
<thead>
<tr>
<th>Dimensions</th>
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<th>XPSBC, XPSDA</th>
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<td><strong>XPSAK, XPSAV, XPSCM, XPSDME, XPSATE, XPSAKE, XPSAVE, XPSCME, XPSDAK, XPSVNE</strong></td>
<td><img src="dimensions7.png" alt="Dimensions" /></td>
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Dual Dimensions: **INCHES**, **Millimeters**

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