Pressure Measurement
Transmitters for applications with advanced requirements (Advanced)
SITRANS P320/P420

Technical description

Overview
SITRANS P320/P420 pressure transmitters are digital pressure transmitters featuring extensive user-friendliness and high accuracy. The parameter assignment is performed using input buttons or the HART interface.

The comprehensive functionality makes for precise adjustment of the pressure transmitter to the requirements of the plant. Operation is very user-friendly in spite of the numerous setting options.

Due to their advanced diagnostic functionalities according to NAMUR NE107, the SITRANS P320/P420 pressure transmitters are very suitable for use in chemical plants. Thanks to the advanced diagnostic functions and the process value storage, the SITRANS P420 is “Ready for Digitalization”.

The "Remote Safety Handling" function saves customers significant amounts of time and money, because the SIL function can be switched on and validated remotely via SIMATIC PDM. This eliminates travel times and on-site operation via the local display or keyboard.

Parameter assignment using the HART protocol is very easy and quick thanks to the innovative EDD with integrated Quick Start wizard.

The transmitters can be equipped with various types of remote seals for special applications such as the measurement of highly viscous substances.

SITRANS P320/P420 pressure transmitters are available in various versions for measuring:
- Gauge pressure
- Absolute pressure
- Differential pressure
- Level
- Volume flow
- Mass flow

Benefits
- Diagnostic functions in accordance with NAMUR recommendation NE107
- SIL devices developed according to IEC 61508
- SIL validation on the device or remotely with SIMATIC PDM
- Reduction of internal inductance for Ex applications to LI = 0
- Step response time for pressure type T63 = 105 ms and for differential pressure type 135 ms.
- Minimal conformity error
- Very low temperature influence
- Very good long-term stability
- High quality and service life
- High reliability even under extreme chemical and mechanical loads
- For corrosive and non-corrosive gases, vapors and liquids
- Extensive diagnostics and simulation functions
- Separate replacement of measuring cell and electronics without recalibration
- Wetted parts made of high-grade materials (e.g., stainless steel, alloy, gold, Monel, tantalum)
- Infinitely adjustable spans from 0.01 bar to 700 bar (0.15 psi to 10153 psi)
- Convenient parameterization over 4 input buttons and HART interface

Application
SITRANS P320/P420 pressure transmitters can be used in industrial areas with extreme chemical and mechanical loads. The pressure transmitters can be used in zone 1 or zone 0 with the corresponding Ex approval.

The transmitters can be equipped with various designs of remote seals for special applications such as the measurement of highly viscous substances.

The pressure transmitter can be operated locally over 4 input buttons or programmed externally over HART interface.

Pressure transmitter for gauge pressure
Measured variable:
- Gauge pressure of corrosive and non-corrosive gases, vapors and liquids.

Span (infinitely adjustable)
- For SITRANS P320/P420 with HART: 0.01 bar to 700 bar (0.15 psi to 10153 psi)

There are two series:
- Gauge pressure series
- Differential pressure series

Pressure transmitters for absolute pressure
Measured variable:
- Absolute pressure of corrosive and non-corrosive gases, vapors and liquids.

Span (infinitely adjustable)
- For SITRANS P320/P420 with HART: 8.3 mbar to 100 bar (0.12 to 1450 psi a)

There are two series:
- Gauge pressure series
- Differential pressure series
Pressure transmitters for differential pressure and flow

Measured variables:
- Differential pressure
- Small positive or negative overpressure
- Flow \( q \sim \sqrt{ap} \) (together with a primary differential pressure transducer (see section “Flow meters”))

Span (infinitely adjustable)
- For SITRANS P320/P420 with HART: 1 mbar to 30 bar (0.0145 to 435 psi)

Pressure transmitters for level

Measured variable:
- Level of corrosive and non-corrosive liquids in open and closed vessels.

Span (infinitely adjustable)
- For SITRANS P320/P420 with HART: 25 mbar to 5 bar (0.363 to 72.5 psi)

Type of the mounting flange:
- EN 1092-1 flanges
- ASME B16.5 flanges
- J.I.S. flanges
- Diverse range of sealing surface forms available

Design

Depending on the customer-specific order, the device comprises different parts.

Device front view:
- The electronics enclosure is made of die cast aluminum or precision cast stainless steel.
- The housing has a removable circular cover at the front and the back.
- Depending on the device version, the front cover (2) may be designed as an inspection window.
- The cable inlet (8) to the electrical terminal compartment is at the side; either the left or right-hand one can be used. The unused opening is closed with a blanking plug (15).
- The ground terminal (13) is located on the side.
- The electrical terminal compartment (11) for the auxiliary power and shield is accessible when you remove the back cover (10).
- The measuring cell with process connection (6) is located in the bottom part of the enclosure. The measuring cell is prevented from rotating by a locking screw (5).
- Thanks to the modular design of the pressure transmitter, the measuring cell and application electronics or terminal compartment can be replaced if required.
- The cover over buttons (1), under which there are 4 buttons, is located on the upper face of the enclosure. The nameplate with general information is located on the cover over the buttons.
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Nameplates

The nameplate with the article no. and other important information, such as design details and technical data, is located on the cover over the buttons.

Nameplate with approval information

The nameplate with approval information is located on the front of the enclosure.

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Measuring point label
The measuring point label is located under the front cover.

Nameplate with information on the remote seals
The nameplate with information on the remote seals is located on the back of the enclosure.

1. Diaphragm remote seals in sandwich type
2. Article No.
3. Order options
4. Serial number
5. Operating temperature
6. Negative pressure service: No, oxygen ≤ 60 °C; ≤ 50 bar
7. Nominal diameter/pressure: 100 mm TUBE LENGTH 2", CLASS 600
8. Fill fluid: Food grade oil (FDA grade)
9. Wetted parts: Diaphragm duplex, 1.4462
10. QR code to mobile website with device-specific information
11. Assembly and manufacturing location

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SITRANS P320/P420

Technical description

Function

Adjustable parameters and diagnostics
SITRANS P320/P420 with HART communication

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Input buttons</th>
<th>SITRANS P320</th>
<th>SITRANS P420</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application, measurement type</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Adjusting start of scale value/full scale value</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Setting start of scale value/full scale value</td>
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<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Electrical damping</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Zero adjustment</td>
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<td>x</td>
<td>x</td>
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<tr>
<td>Fault current</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td>Saturation limits</td>
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<td>x</td>
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<tr>
<td>Scaling of the display</td>
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<tr>
<td>Characteristic selection</td>
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<td>x</td>
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<tr>
<td>Temperature unit</td>
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<td>Key lock</td>
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<tr>
<td>Change user pin</td>
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<td>Functional safety</td>
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<td>Loop test</td>
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<tr>
<td>Start view</td>
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<td>x</td>
<td>x</td>
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<tr>
<td>Pressure reference</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Reset</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

Diagnostics and trend log

- Min/Max pointer: x
- Limit monitoring: 2
- Event counter (overflow/underflow): 2
- Trend log: 2, max. 1500 values

Available physical units of display for SITRANS P320/P420

<table>
<thead>
<tr>
<th>Physical variable</th>
<th>Physical dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure (setting can also be made in the factory)</td>
<td>Pa, MPa, kPa, hPa, bar, mbar, psi, g/cm², kglm², kglm², inH₂O, inH₂O (4 °C), ftH₂O, mmH₂O, mmH₂O (4 °C), mHg, atm, torr</td>
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<tr>
<td>Level (height data)</td>
<td>m, cm, mm, ft, in</td>
</tr>
<tr>
<td>Volumes (fill level)</td>
<td>m³, l, hl, in³, ft³, gal, gal (UK), bu, bbl, bbl (US), SCF, Nm³, Nl</td>
</tr>
<tr>
<td>Volume (flow)</td>
<td>m³/sec, m³/h, m³/d, l/sec, l/min, l/h, Ml/d, ft³/sec, ft³/h, ft³/d, SCF/min, SCF/h, Nm³/min, Nl/min, gal/sec, gal/min, gal/h, gal/d, Mgal/d, gal (UK)/sec, gal (UK)/min, gal (UK)/h, gal (UK)/d, bb/min, bbl/min, bbl/h, bbl/d,</td>
</tr>
<tr>
<td>Mass (flow)</td>
<td>Kg/sec, kg/min, kg/h, kg/d, g/sec, g/min, gh, l/min, lb, lb/sec, lb/min, lb/h, lb/d,</td>
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<tr>
<td>Temperature</td>
<td>°C, °F</td>
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<tr>
<td>Miscellaneous</td>
<td>%, mA, free text max. 12 characters</td>
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</table>

For more device information and technical specifications, refer to the individual device versions.
EU Declaration of Conformity
EU-Konformitätserklärung
EU-Déclaration de Conformité

No. A5E44320812A/002

Manufacturer: Siemens AG
Hersteller: Siemens AG
Fabricant: Siemens AG

Address: DE-76181 Karlsruhe
Adresse: DE-76181 Karlsruhe

Product description: Pressure transmitter / Druckmessumformer
Produktbezeichnung: SITRANS P320, SITRANS P420
Identifikateur: Type / Typ
7MF03a0-xxxx-5bxx-Zcde
7MF04a0-xxxxx-5bxx-Zcde

The product described above in the form as delivered is in conformity with the provisions of the following European Directives:
Das bezeichnete Produkt stimmt in der von uns in Verkehr gebrachten Ausführung mit den Vorschriften folgender Europäischer Richtlinien überein:
Le produit mentionné ci-dessus, tel qu'il est livré, est conforme aux dispositions des Directives Européennes suivantes :

Richtlinie des Europäischen Parlaments und des Rates zur Harmonisierung der Rechtsvorschriften der Mitgliedstaaten über die elektromagnetische Verträglichkeit

Richtlinie des Europäischen Parlaments und des Rates zur Harmonisierung der Rechtsvorschriften der Mitgliedstaaten für Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen

Richtlinie des Europäischen Parlaments und des Rates zur Harmonisierung der Rechtsvorschriften der Mitgliedstaaten über die Bereitstellung von Druckgeräten auf dem Markt

Richtlinie des Europäischen Parlaments und des Rates zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten

Annex A is integral part of this declaration.
Anhang A ist integraler Bestandteil dieser Erklärung.
L'annexe A fait partie intégrante de la présente déclaration.

This declaration certifies the conformity to the specified directives but contains no assurance of properties.
The safety documentation accompanying the product shall be considered in detail.
Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, ist jedoch keine Beschaffenheits- oder Haltbarkeitsgarantie nach §443 BGB.
Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.
La présente déclaration atteste la conformité aux Directives citées. Elle n’est pas assimilable à un descriptif justifiant certaines propriétés.
La documentation relative à la sécurité accompagnant le produit doit être examiné en détail.

Siemens Aktiengesellschaft: Chairman of the Supervisory Board: Jim Hagemann Snabe; Managing Board: Joe Kaeser, Chairman, President and Chief Executive Officer; Roland Busch, Lisa Davis, Klaus Helmrich, Janina Kugel, Cedrik Neike, Michael Sen, Ralf P. Thomas; Registered offices: Berlin and Munich, Germany;
Commercial registries: Berlin Charlottenburg, HRB 12300, Munich, HRB 6684; WEEE-Reg.-No. DE 23691322
EU Declaration of Conformity
EU-Konformitätserklärung
EU-Déclaration de Conformité

No. A5E44320812A/002

Karlsruhe, 20.09.2018
Siemens Aktiengesellschaft

Volker Rissland,
Research & Development / Entwicklung / Développement
(Name, function / Name, Funktion, / Nom, fonction)

Jürgen Pflaum,
Quality / Qualität / Qualité
(Name, function / Name, Funktion, / Nom, fonction)

Signature / Unterschrift / Signature

Annex A is integral part of this declaration.
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Annex A to the EU Declaration of Conformity
Anhang A zur EU-Konformitätserklärung
Annexe A de la Déclaration de conformité

No. A5E44320812A/002

Product description: Pressure transmitter / Druckmeßumformer

SITRANS P320, SITRANS P420

Type / Typ
7MF03a0-xxxxx-5bxx-Zcde
7MF04a0-xxxxx-5bxx-Zcde

Conformity to the Directives indicated on page 1 is assured through the application of the following standards (depending on versions):

Certificates included / beinhaltet alle Umgebungen / dans tout type d'environnement

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EC-type examination certificate EG-Baumusterprüfungszertifikat Certificate évaluation de type

Marking Benannte Stelle Qualitätssicherung Produktion Kennzeichnung Marquage

BVS 18 ATEX E 049 X II 1 G

07/2021/12/015/17/D/0111

Certificate: Notified Body Product Quality Assurance

Organisme notifie

No.: 0518

0045