

## Features

- Compensated digital output
- Ultra-low pressure sensing
- Digital I<sup>2</sup>C output
- Gauge and differential types
- For use in clean, dry air and non-corrosive gas environments
- RoHS compliant\*

## Applications

Industrial:

- HVAC systems
- Process monitoring
- Packaging automation

\*\*Medical Devices (low/medium risk):

- Diagnostic equipment
- Analysis equipment

# BPS120 Series - 12 mm Digital Low Pressure Sensor

### Electrical Characteristics

Supply Voltage (V <sub>s</sub> ) .....	2.7 V minimum, 5 V typical, 5.5 V maximum
Supply Current @ 5 V .....	1.2 mA minimum, 2 mA typical, 3.5 mA maximum

### Performance Characteristics

Operating Temperature .....	-40 °C to +85 °C (-40 °F to +185 °F)
Storage Temperature .....	-55 °C to +100 °C (-67 °C to +212 °F)
Pressure Range .....	0.15 to 1.0 psi (10.3 to 68.9 mbar; 1.03 to 6.89 KPa; 4.2 to 27.7 in H <sub>2</sub> O)
Output .....	Digital I <sup>2</sup> C (1)
Effective ADC Resolution .....	13 bit
Accuracy @ 25 °C .....	±0.25 % FS
Total Error Band over 0 °C to 60 °C (+32 °F to +140 °F) .....	± 1.5 % FS
Long Term Stability .....	± 0.5 % FS
Startup Time .....	15 ms maximum
Digital Update Time .....	8.5 ms typical
Proof Pressure .....	5X full scale pressure
Burst Pressure .....	10 psi

(1) I<sup>2</sup>C address is set to (0x28). Alternative addresses are available. Consult the factory for custom options.

### Product Characteristics

Media Compatibility .....	Non-corrosive dry gasses
Moisture Sensitivity Level .....	1
ESD Classification (HBM) .....	2 kV
Marking .....	Partial model number, media compatibility, pressure type, pressure rating, lot code
Standard Packaging .....	250 pcs./13-inch reel
Weight .....	1.307 grams (0.046 oz)

### Transfer Function Formula

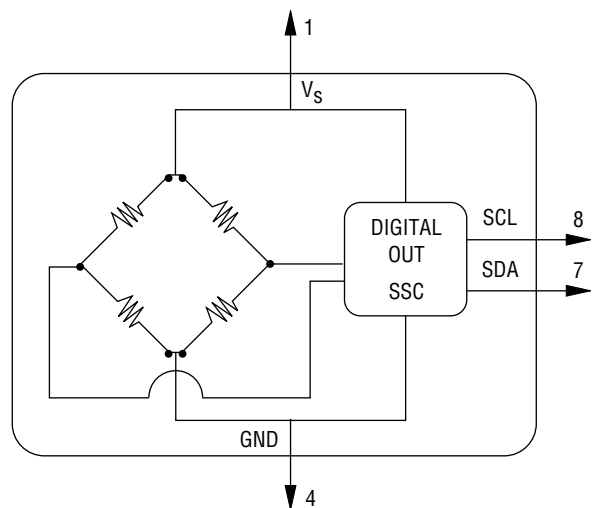
$$P_{\text{psi}} = (P_{\text{max}} - P_{\text{min}}) \cdot \left( \frac{P_{\text{counts}} - 0.1 \cdot \text{Max}}{0.8 \cdot \text{Max}} \right) + P_{\text{min}}$$

#### Where

- P<sub>psi</sub> = Measured Pressure in PSI
- P<sub>counts</sub> = Pressure Counts
- P<sub>min</sub> = Minimum Pressure
- P<sub>max</sub> = Maximum Pressure
- Max = 16384 = 14 Bits

Consult factory for custom options such as supply voltage, temperature calibration range, output range accuracy specification, and update rate.

### Basic Circuit Schematic



Note: Power supply decoupling included.

\* RoHS3 Directive 2015/863 Amendments of Annex II on March 31, 2015

\*\* Bourns® products have not been designed for and are not intended for use in "lifesaving," "life-critical" or "life-sustaining" applications nor any other applications where failure or malfunction of the Bourns® product may result in personal injury or death. See Legal Disclaimer Notice on the last page of this document, and at [www.bourns.com/docs/legal/disclaimer.pdf](http://www.bourns.com/docs/legal/disclaimer.pdf).

Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at [www.bourns.com/docs/legal/disclaimer.pdf](http://www.bourns.com/docs/legal/disclaimer.pdf).

# BPS120 Series - 12 mm Digital Low Pressure Sensor

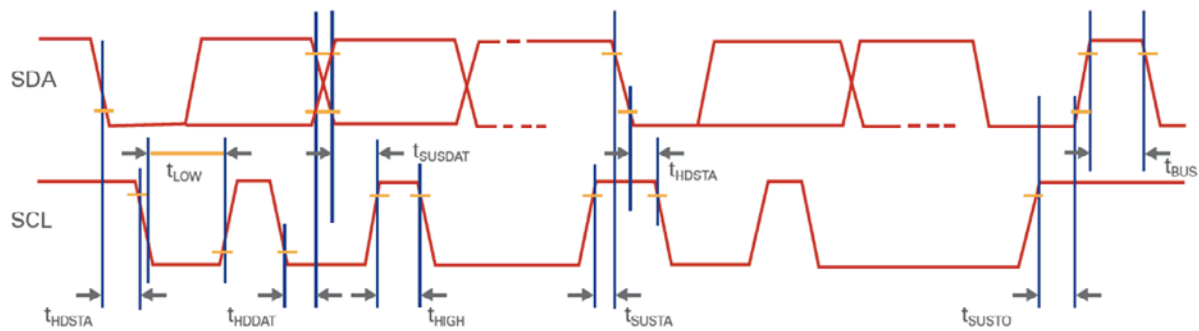


## I<sup>2</sup>C Parameters

SCL Clock Frequency $f_{SCL}$ .....	100 to 400 kHz
Start Condition Hold Time Relative to SCL Edge $t_{HDSTA}$ .....	0.1 $\mu$ s
Minimum SCL Clock Low Width <sup>1</sup> $t_{LOW}$ .....	0.6 $\mu$ s
Minimum SCL Clock High Width <sup>1</sup> $t_{HIGH}$ .....	0.6 $\mu$ s
Start Condition Setup Time Relative to SCL Edge $t_{SUSTA}$ .....	0.1 $\mu$ s
Data Hold Time on SDA Relative to SCL Edge $t_{HDDAT}$ .....	0.0 $\mu$ s
Data Setup Time on SDA Relative to SCL Edge $t_{SUDAT}$ .....	0.1 $\mu$ s
Stop Condition Setup Time on SCL $t_{SUSTO}$ .....	0.1 $\mu$ s
Bus Free Time Between Stop Condition and Start Condition $t_{BUS}$ .....	2 $\mu$ s

<sup>1</sup> Combined low and high widths must equal or exceed minimum SCLK period.

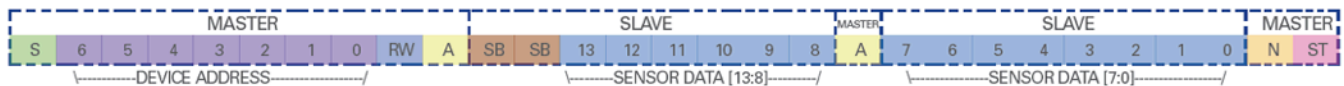
## I<sup>2</sup>C Parameters



Used by permission, ZMDI

## I<sup>2</sup>C Communication

Communication to the Model BPS120 is read only. To read the pressure counts, the master performs a read request by asserting a start condition, sending the 7-bit address of the part (0x28), and sets the read/write bit. The master then waits for an acknowledgement. The acknowledgement is sent by the pressure sensor along with 2 bits of status and bits 13:8 of the pressure counts, the master acknowledges the first 8 bits, and the pressure sensor sends the remaining 8 bits of data. The master then does not acknowledge and sends a stop condition, signaling the end of the transaction.



<b>S</b> Start Conditioning	<b>#</b> Device Slave Address	<b>#</b> Data Bit	<b>Status Bits</b>	
<b>RW</b> Read/Write Bit	<b>A</b> Acknowledge Bit	<b>N</b> No Acknowledge Bit	0 0	Normal Operation, Good Packet
<b>ST</b> Stop Condition	<b>SB</b> Status Bits		0 1	Device in Command Mode
			1 0	Stale Data
			1 1	Diagnostic Condition Exists

Specifications are subject to change without notice.

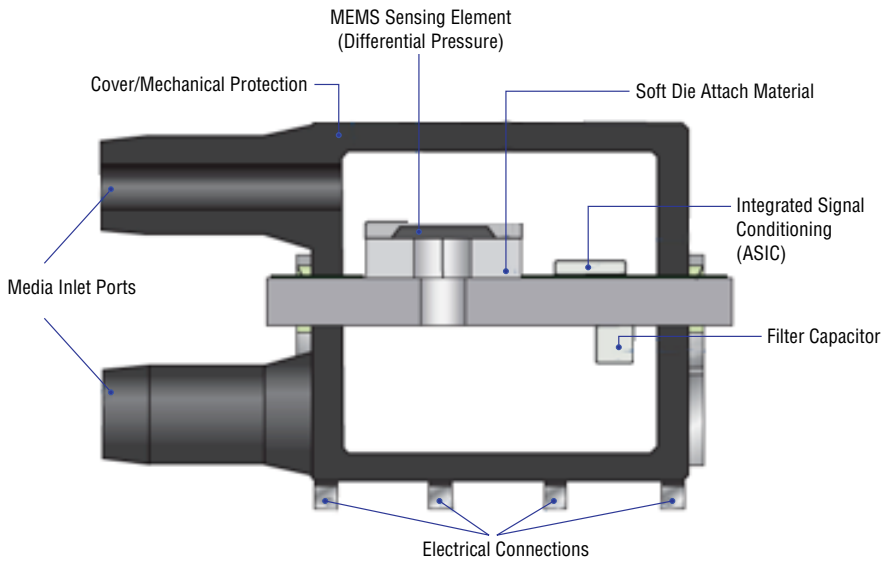
Users should verify actual device performance in their specific applications.

The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at [www.bourns.com/docs/legal/disclaimer.pdf](http://www.bourns.com/docs/legal/disclaimer.pdf).

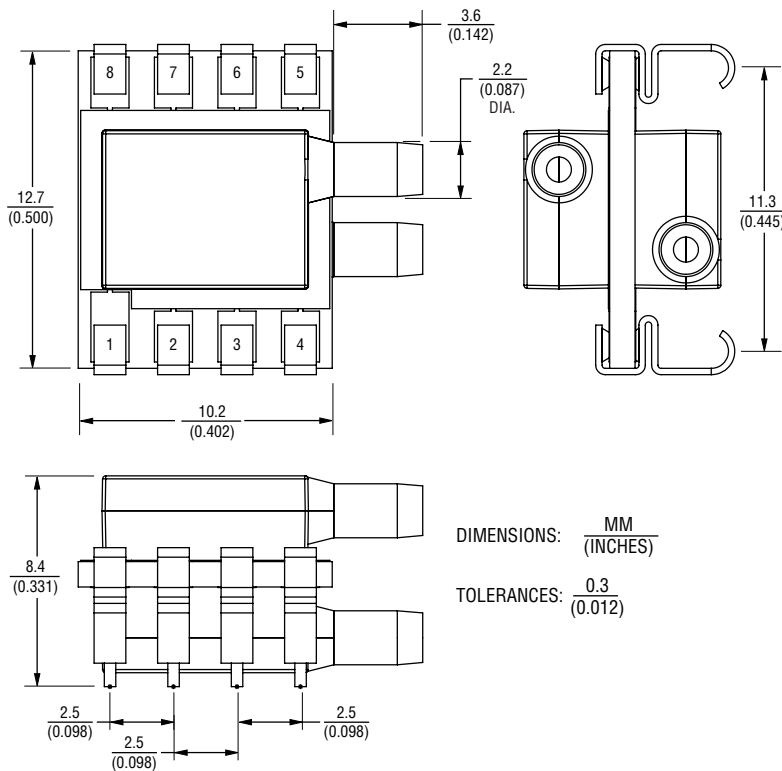
# BPS120 Series - 12 mm Digital Low Pressure Sensor

**BOURNS®**

## Cross Section



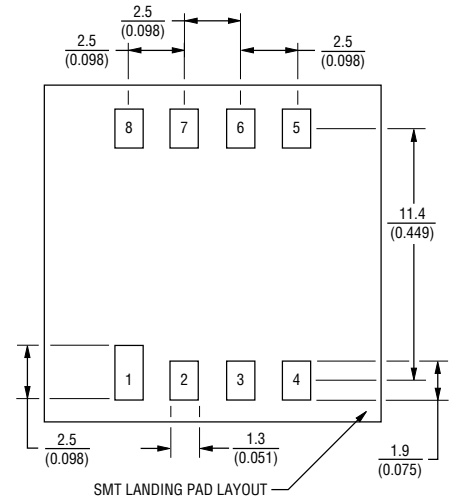
## Product Dimensions



## Terminal Assignment

DEVICE PINOUT	
P1	V <sub>s</sub>
P2	N/C
P3	N/C
P4	VSS - Ground
P5	N/C
P6	N/C
P7	SDA - I <sup>2</sup> C Data
P8	SCL - I <sup>2</sup> C Clock

## Recommended PCB Layout



Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at [www.bourns.com/docs/legal/disclaimer.pdf](http://www.bourns.com/docs/legal/disclaimer.pdf).

# BPS120 Series - 12 mm Digital Low Pressure Sensor

# BOURNS®

## How To Order

BPS120 - A D 0P30 - 2 D G

Model Series \_\_\_\_\_  
Digital

Media Compatibility \_\_\_\_\_  
A = Air/Gas

Pressure Type \_\_\_\_\_  
G = Gauge  
D = Differential

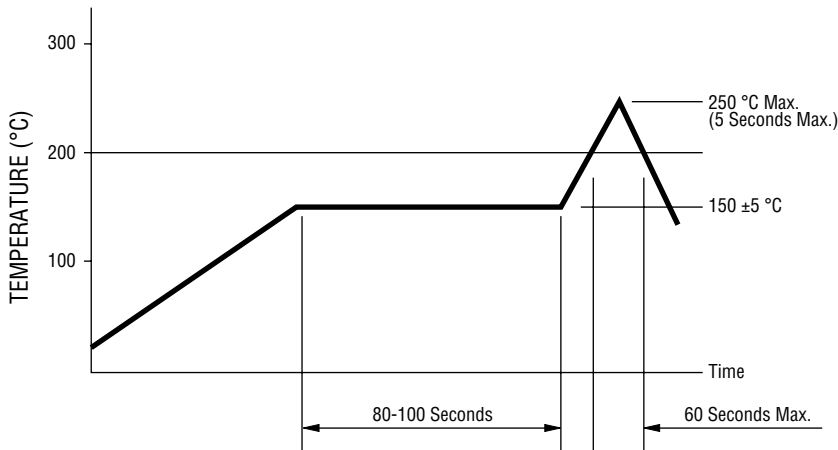
Pressure (psi) \_\_\_\_\_  
0P15 = 0.15  
0P30 = 0.30  
01P0 = 1.0

Terminal Pins \_\_\_\_\_  
2 = Surface Mount Terminals

Port Style \_\_\_\_\_  
D = Dual Port, Horizontal

Packaging Designator \_\_\_\_\_  
G = 250 pcs. per 13-inch Reel

## Solder Profile



Processing Method: Reflow soldering with infrared heat or forced air convection (only once).

### Notes:

1. No clean solder paste is recommended.
2. Aqueous wash is not recommended.
3. Use of water soluble soldering flux should be avoided due to possible corrosion.
4. Multiple passes through the soldering process is not recommended.
5. Other SMD processes and profiles should be verified by the customer.

Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

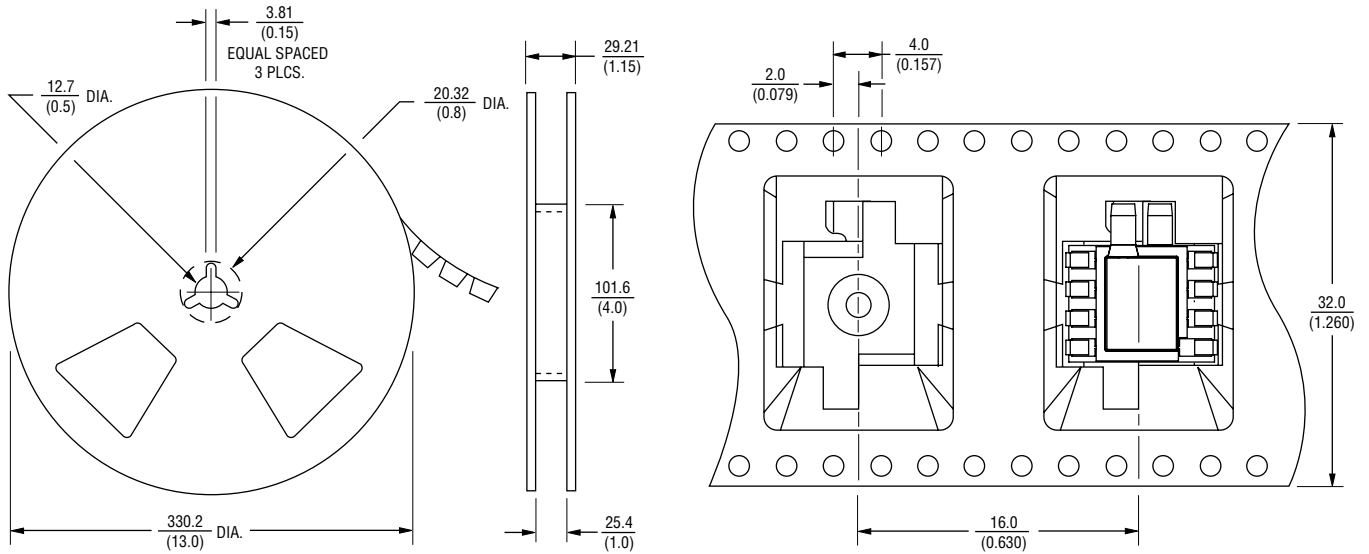
The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at [www.bourns.com/docs/legal/disclaimer.pdf](http://www.bourns.com/docs/legal/disclaimer.pdf).

# BPS120 Series - 12 mm Digital Low Pressure Sensor

**BOURNS®**

## Packaging Specification

250 pieces per 13-inch reel.  
Meets specifications of EIA-481-1 or EIA-481-2.



DIMENSIONS:  $\frac{\text{MM}}{\text{(INCHES)}}$

TOLERANCES:  $\frac{0.25}{(0.010)}$

**BOURNS®**

**Asia-Pacific:** Tel: +886-2 2562-4117 • Email: asiacus@bourns.com

**EMEA:** Tel: +36 88 885 877 • Email: eurocus@bourns.com

**The Americas:** Tel: +1-951 781-5500 • Email: americus@bourns.com

[www.bourns.com](http://www.bourns.com)

REV. 04/19

Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at [www.bourns.com/docs/legal/disclaimer.pdf](http://www.bourns.com/docs/legal/disclaimer.pdf).

This legal disclaimer applies to purchasers and users of Bourns® products manufactured by or on behalf of Bourns, Inc. and its affiliates (collectively, "Bourns").

Unless otherwise expressly indicated in writing, Bourns® products and data sheets relating thereto are subject to change without notice. Users should check for and obtain the latest relevant information and verify that such information is current and complete before placing orders for Bourns® products.

The characteristics and parameters of a Bourns® product set forth in its data sheet are based on laboratory conditions, and statements regarding the suitability of products for certain types of applications are based on Bourns' knowledge of typical requirements in generic applications. The characteristics and parameters of a Bourns® product in a user application may vary from the data sheet characteristics and parameters due to (i) the combination of the Bourns® product with other components in the user's application, or (ii) the environment of the user application itself. The characteristics and parameters of a Bourns® product also can and do vary in different applications and actual performance may vary over time. Users should always verify the actual performance of the Bourns® product in their specific devices and applications, and make their own independent judgments regarding the amount of additional test margin to design into their device or application to compensate for differences between laboratory and real world conditions.

Unless Bourns has explicitly designated an individual Bourns® product as meeting the requirements of a particular industry standard (e.g., ISO/TS 16949) or a particular qualification (e.g., UL listed or recognized), Bourns is not responsible for any failure of an individual Bourns® product to meet the requirements of such industry standard or particular qualification. Users of Bourns® products are responsible for ensuring compliance with safety-related requirements and standards applicable to their devices or applications.

Bourns® products are not recommended, authorized or intended for use in nuclear, lifesaving, life-critical or life-sustaining applications, nor in any other applications where failure or malfunction may result in personal injury, death, or severe property or environmental damage. Unless expressly and specifically approved in writing by two authorized Bourns representatives on a case-by-case basis, use of any Bourns® products in such unauthorized applications might not be safe and thus is at the user's sole risk. Life-critical applications include devices identified by the U.S. Food and Drug Administration as Class III devices and generally equivalent classifications outside of the United States.

Bourns expressly identifies those Bourns® standard products that are suitable for use in automotive applications on such products' data sheets in the section entitled "Applications." Unless expressly and specifically approved in writing by two authorized Bourns representatives on a case-by-case basis, use of any other Bourns® standard products in an automotive application might not be safe and thus is not recommended, authorized or intended and is at the user's sole risk. If Bourns expressly identifies a sub-category of automotive application in the data sheet for its standard products (such as infotainment or lighting), such identification means that Bourns has reviewed its standard product and has determined that if such Bourns® standard product is considered for potential use in automotive applications, it should only be used in such sub-category of automotive applications. Any reference to Bourns® standard product in the data sheet as compliant with the AEC-Q standard or "automotive grade" does not by itself mean that Bourns has approved such product for use in an automotive application.

Bourns® standard products are not tested to comply with United States Federal Aviation Administration standards generally or any other generally equivalent governmental organization standard applicable to products designed or manufactured for use in aircraft or space applications. Bourns expressly identifies Bourns® standard products that are suitable for use in aircraft or space applications on such products' data sheets in the section entitled "Applications." Unless expressly and specifically approved in writing by two authorized Bourns representatives on a case-by-case basis, use of any other Bourns® standard product in an aircraft or space application might not be safe and thus is not recommended, authorized or intended and is at the user's sole risk.

The use and level of testing applicable to Bourns® custom products shall be negotiated on a case-by-case basis by Bourns and the user for which such Bourns® custom products are specially designed. Absent a written agreement between Bourns and the user regarding the use and level of such testing, the above provisions applicable to Bourns® standard products shall also apply to such Bourns® custom products.

Users shall not sell, transfer, export or re-export any Bourns® products or technology for use in activities which involve the design, development, production, use or stockpiling of nuclear, chemical or biological weapons or missiles, nor shall they use Bourns® products or technology in any facility which engages in activities relating to such devices. The foregoing restrictions apply to all uses and applications that violate national or international prohibitions, including embargos or international regulations. Further, Bourns® products and Bourns technology and technical data may not under any circumstance be exported or re-exported to countries subject to international sanctions or embargoes. Bourns® products may not, without prior authorization from Bourns and/or the U.S. Government, be resold, transferred, or re-exported to any party not eligible to receive U.S. commodities, software, and technical data.

To the maximum extent permitted by applicable law, Bourns disclaims (i) any and all liability for special, punitive, consequential, incidental or indirect damages or lost revenues or lost profits, and (ii) any and all implied warranties, including implied warranties of fitness for particular purpose, non-infringement and merchantability.

*For your convenience, copies of this Legal Disclaimer Notice with German, Spanish, Japanese, Traditional Chinese and Simplified Chinese bilingual versions are available at:*

*Web Page:* <http://www.bourns.com/legal/disclaimers-terms-and-policies>

*PDF:* <http://www.bourns.com/docs/Legal/disclaimer.pdf>

## X-ON Electronics

Largest Supplier of Electrical and Electronic Components

*Click to view similar products for [Board Mount Pressure Sensors](#) category:*

*Click to view products by [Bourns](#) manufacturer:*

Other Similar products are found below :

[80527-25.0H2-05](#) [80541-B00000150-01](#) [80541-B00000200-05](#) [80554-00700100-05](#) [80568-00300050-01](#) [81618-B00000040-01](#) [81739-B00000900-01](#) [81807-B00000020-01](#) [81808-B00000150-14](#) [82903-B00000020-01](#) [93.631.4253.0](#) [93.731.4353.0](#) [93.932.4553.0](#) [136PC150G2](#) [136PC15A1](#) [142PC95AW71](#) [142PC05DW70](#) [MPXV2202DPT1](#) [15PSI-G-4V](#) [1805-01A-L0N-B](#) [2000317-1](#) [26PCBKT](#) [26PCCFA6D26](#) [26PCCFS2G](#) [26PCCVA6D](#) [93.632.7353.0](#) [93.731.3653.0](#) [93.931.4853.0](#) [93.932.4853.0](#) [SCDA120-XSC05DC](#) [SP370-23-156-0](#) [185PC30DH](#) [192992-0059](#) [20INCH-G-MV-MINI](#) [26PCAFJ3G](#) [26PCAFS2G54](#) [26PCCEP5G24](#) [26PCJEU5G19](#) [30INCH-D1-MV-MINI](#) [ASCX15AN-90](#) [TSCSAAN001PDUCV](#) [DCAL401DN](#) [DCAL401GN](#) [XZ202798SSC](#) [XZ203676HSC](#) [SP370-25-116-0](#) [81717-00000050-05](#) [81794-B00001200-01](#) [HSCDLNN100PGAA5](#) [81618-B00000040-05](#)