PRESSURE TRANSDUCER IN (COMMERCIAL) ESPRESSO MACHINES

Background
Water pressure measurement in professional coffee machines is required in the boiler and brewing loops. Pressure instruments must be accurate, able to withstand the temperatures and stresses generated by cleaning processes and have specialized wetted parts. For assurance of safe food production, pressure instrumentation are also certified for drinking water and food application.

To guarantee the espresso quality, brew (pump outlet) pressure must be stable. Espresso machine manufacturers install an over pressure valve (OPV) at the pump outlet side in order to achieve this pressure stability. An OPV can be adjusted with a screw driver but is not always accessible without dismantling the machine. As manufacturers are constantly improving their technology and considering easy-to-use consumer requirements, modern coffee machines allow regulation of the brew pressure with a single button, which is easily accessible from outside the machine. In this case, an OPV is substituted by a proportional valve and a pressure transducer, installed behind the valve.

Professional coffee and vending machines can be table top or free standing.

Working principles:
• Water is pumped into the machine by connected plumbing or by manually filling the tank
• Water is heated up to 95°C in the boiler
• Pressure in the boiler controls the temperature of water
• Pressure switch is in the boiler loop
• Pressure transducer is in brewing loop (in combination with proportional valve)
• SSR controls steam, hot water and brew boilers (heating elements).

Solution
This pressure transducer can be used to monitor the brewing pressure (usually around 9 bar) either in the cold-water piping, where the sensor is connected to the pump outlet, or in the hot water piping, behind the boiler (closer to the end-product). The sensor is connected to the power source, where the system pressure change will result in the output signal (voltage) change.
Sensata Technologies, Inc. (“Sensata”) datasheets are solely intended to assist designers (“Buyers”) who are developing systems that incorporate Sensata products (also referred to herein as “components”). Buyer understands and agrees that Buyer remains responsible for using its independent analysis, valuation, and judgment in designing Buyer’s systems and products. Sensata datasheets have been created using standard laboratory conditions and engineering practices. Sensata has not conducted any testing other than that specifically described in the published documentation for a particular datasheet. Sensata may make corrections, enhancements, improvements, and other changes to its datasheets or components without notice. Buyers are authorized to use Sensata datasheets with the Sensata component(s) identified in each particular datasheet. HOWEVER, NO OTHER LICENSE, EXPRESS OR IMPLIED, BY ESTOPPEL OTHERWISE TO ANY OTHER SENSATA INTELLECTUAL PROPERTY RIGHT, AND NO LICENSE TO ANY THIRD PARTY TECHNOLOGY OR INTELLECTUAL PROPERTY RIGHT, IS GRANTED HEREIN. SENSATA DATASHEETS ARE PROVIDED “AS IS”. SENSATA MAKES NO WARRANTIES OR REPRESENTATIONS WITH REGARD TO THE DATASHEETS OR USE OF THE DATASHEETS, EXPRESS, IMPLIED, OR STATUTORY, INCLUDING ACCURACY OR COMPLETENESS. SENSATA DISCLAIMS ANY WARRANTY OF TITLE AND ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, QUIET ENJOYMENT, QUIET POSSESSION, AND NON-INFRINGEMENT OF ANY THIRD PARTY INTELLECTUAL PROPERTY RIGHTS WITH REGARD TO SENSATA DATASHEETS OR USE THEREOF.

All products are sold subject to Sensata’s terms and conditions of sale supplied at www.sensata.com. SENSATA ASSUMES NO LIABILITY FOR APPLICATIONS ASSISTANCE OR THE DESIGN OF BUYERS’ PRODUCTS. BUYER ACKNOWLEDGES AND AGREES THAT IT IS SOLELY RESPONSIBLE FOR COMPLIANCE WITH ALL LEGAL, REGULATORY, AND SAFETY-ELATED REQUIREMENTS CONCERNING ITS PRODUCTS, AND ANY USE OF SENSATA COMPONENTS IN ITS APPLICATIONS, NOTWITHSTANDING ANY APPLICATIONS-RELATED INFORMATION OR SUPPORT THAT MAY BE PROVIDED BY SENSATA.

Mailing Address: Sensata Technologies, Inc., 529 Pleasant Street, Attleboro, MA 02703, USA

Copyright © 2023 Sensata Technologies, Inc.

CONTACT US

Americas
+1 (800) 350 2727
sensors@sensata.com
switches@sensata.com

Europe, Middle East & Africa
+359 (2) 809 1826
pressure-info.eu@sensata.com

Asia Pacific
sales.ap siaasia@sensata.com
China +86 (21) 2306 1500
Japan +81 (45) 277 7117
Korea +82 (31) 601 2004
India +91 (80) 67920890
Rest of Asia +886 (2) 27802006

ext 2808

www.sensata.com

### RECOMMENDED PRODUCTS

<table>
<thead>
<tr>
<th>Reference on Diagram</th>
<th>Product</th>
<th>Features</th>
<th>Function</th>
<th>Brand</th>
</tr>
</thead>
</table>
| 1                    | 116CP/117CP, 156CP/157CP, 113D2/114D2, 153D2/154D2 | • Operating pressure range: 0-60 to 0-230 PSI (0-4 to 0-16 Bar)
• Supply voltage: 5VDC ratiometric or 8-30VDC voltage regulated
• Output: 0-3.5VDC, 0-4.5VDC, or 4-20mA
• Pressure port: Quick Connect, G1/4, G3/8
• Electrical connection: RAST 2.5 | Monitoring of the pump outlet pressure / heated water supply pressure | Sensata Technologies |
| 2                    | 60CP/70CP, 81CP, 100CP, 35CP | • Operating pressure range: 0-15 to 0-750 PSI (0-1 to 0-50 Bar)
• Supply voltage: 5VDC ratiometric or 8-30VDC voltage regulated
• Output: 0-4.5VDC or 4-20 mA
• Pressure port: 1/8” NPTF-2A male, 1/4” NPTF-2A male, G1/8, G3/8
• Drinking water certified options available | Monitoring of the pump outlet pressure / heated water supply pressure | Sensata Technologies |

### DIAGRAM

[Diagram showing water tank, pump, heating element, etc.]