

Industrial Sensing



Sensata
Technologies

CONTENTS

Introduction	5
Where are we located	10
Technology Overview	11
PRESSURE SENSORS	
Product Selection Guide	13
2CP5/2CP50	14
112CP P+T	16
81CP/82CP	18
2HMP	20
70CP	22
60CP	24
DPS/Delta P	26
3PP8	28
PRESSURE SWITCHES	
Product Selection Guide	31
20PS	32
25PS	34
29PS	36
36PS	38
PS80	40
PS80-2x for CO2 systems	42

TEMPERATURE PRODUCTS

Product Selection Guide	45
1NT	46
3NT	50
Airpax 5024	54
Airpax 3024	56

APPLICATION NOTES

Overview	60
Airconditioning/VRF	62
Heat Pumps & Cooling Systems	63
Natural Refrigerants	64
Air Compressors	65
Pumps & Variable Speed Drives	66

WHAT'S IN A NAME?

A QUICK LOOK AT SENSATA AND ITS ORGANIZATION

The name Sensata comes from the Latin sensata, meaning “those gifted with sense”.



On average, Sensata manufactures over 16,000 different products and ships over 1 billion units a year under the familiar brand names Klixon®, Airpax®, Dimensions™, Qinex™ and Sensor-NITE. Our devices are used in automotive, appliance, aircraft, industrial, military, heavy vehicle, heating, air conditioning, data, telecommunications, recreational vehicle and marine applications.



THE SENSATA FAMILY OF BRANDS

AIRPAX

DIMENSIONS

KLIXON

Qinex™

SENSOR NITE

ABOUT SENSATA TECHNOLOGIES

Sensata Technologies is a world leader and early innovator in mission-critical sensors and controls.



Sensata Technologies Holding N.V. (NYSE: ST), a global industrial technology company, is a leader in the development, manufacture and sale of sensors and controls. We produce a wide range of customized, innovative sensors and controls for mission critical applications such as thermal circuit breakers in aircraft, pressure sensors in automotive systems, and bimetal current and temperature control devices in electric motors. Our high value-added solutions help satisfy the world's growing need for safety, energy efficiency, and a clean environment, positively affecting millions of people everyday.

COMMERCIAL JET – Up to 1,500 circuit breakers and switches

AUTOMOBILE – Up to 50 sensors and controls

U.S. HOME – 30 or more sensors, switches, and other safety devices

LARGE HVAC SYSTEM – Dozens of sensors and switches

PHOTOVOLTAIC SYSTEM – 1 TO 4 high voltage switches and fuses

RV & LARGE BOAT – Up to 60 power inverters, sensors, and protection devices

CONSTRUCTION VEHICLE – 5 to 10 sensors, switches, and circuit breakers

MOBILE PHONE SYSTEM – 300 or more circuit breakers, sensors, and switches

A BRIEF COMPANY HISTORY

People and products that make a difference.



•• HOW OUR BUSINESS IS ORGANIZED

Overall, we have two main global business units (Controls and Sensors) and worldwide global operations supported by business and product development centers and sales offices.

Controls Business Unit



Our Controls business is a major player in worldwide industrial sensing, electrical and power protection industries. Our products monitor pressure and temperature for energy efficiency and a clean environment and prevent damage from overheating and fires, protecting people from injury.

INDUSTRIAL SENSING – In the HVAC and industrial markets our pressure product portfolio serves many industrial applications – covering all sensing principles from absolute to relative and differential. Our pressure switches are designed to meet the needs in a variety of industrial applications requiring precise repeatable pressure control over a wide range of ambient conditions.

So, where might you find us?

- Where increased safety and performance are required.
- Where improved machine productivity and efficiency are needed.

Our products are found in a wide range of applications including HVAC and refrigeration, heat pumps, industrial pumps, compressors, material handling equipment, stationary equipment.

The Controls business designs and manufactures:

- Pressure sensors
- Pressure switches
- Temperature sensors
- Controls
- Protectors
- Thermostats
- Circuit breakers
- Switches
- Test devices
- Battery disconnects

for...

- Compressors
- Appliances
- Heating, ventilation and A/C
- Industrial and lighting
- Cars, boats, work trucks, RVs
- Aircraft
- Defense, security, traffic controls
- Electronic and back-up power

Sensors Business Unit



Sensata's Sensors business is a market leader in automotive and HVOR markets. Our products include a full line of pressure sensors for cars, trucks and heavy off-road vehicles - and they do everything from improving safety and performance to helping the environment by reducing emissions. Sensors and switches made by this business detect pressure, temperature, air flow, gas, humidity, speed, position and provide on/off controls used in automotive and industrial markets.

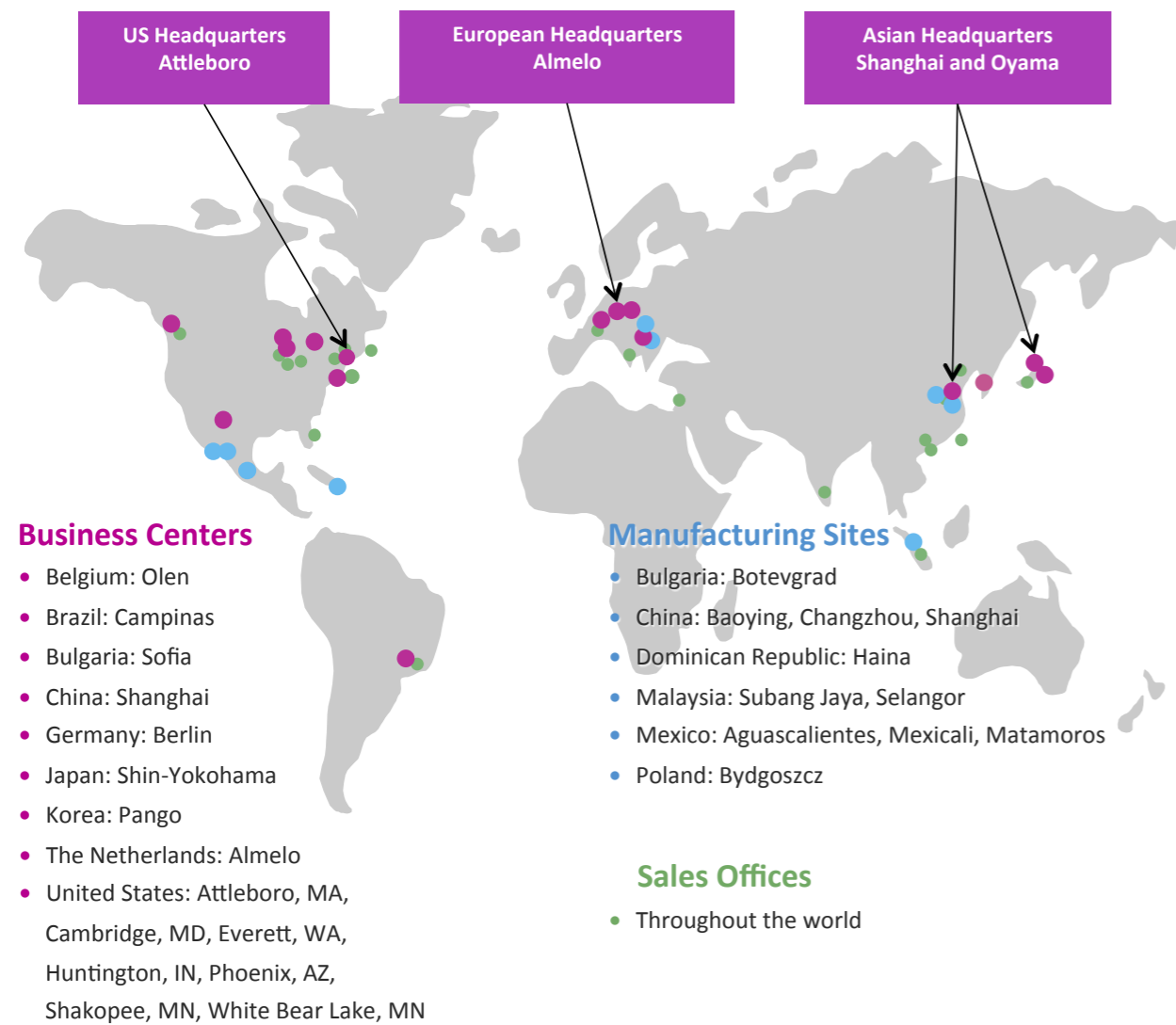
AUTOMOTIVE – Sensata has been the world leader in automotive pressure sensing since 2002. In vehicles, our components are found in air conditioning systems, power steering systems, engines, fuel emission and braking and suspension systems. A pressure switch manifold made by this business senses hydraulic pressure in automatic transmissions while our occupant classification sensors help keep air bags operating safely so they can do the job they're meant to do.

Our automotive sensors include:

- Acceleration sensors
- Transmission range sensors
- Occupant classification sensors
- Cylinder pressure sensors
- Turbo pressure sensors
- Magnetic speed and position sensors
- High temperature sensors

WHERE ARE WE LOCATED?

Business centers, manufacturing sites, and Sales offices.



INDUSTRIAL SENSORS TECHNOLOGY OVERVIEW

Providing a wide range of solutions for HVAC and Industrial Applications.



Global market leader in pressure sensing:

Ceramic Capacitive (APT)



Micro-Silicon Strain Gauge (MSG)



MEMS (DPS, OFM, MAP)



Expanded sensing portfolio through acquisition and organic development:

Force Sensors (OWS)



Magnetic Speed & Position (MSP)



Temperature Sensors



Core business in switch (temperature & pressure) and electrical protection:

Thermostats



Pressure Switch (PS)



Circuit Breakers (Controls)



PRESSURE SENSORS

A wide portfolio of pressure sensors with the configurability and high performance needed for demanding industrial applications.

- **Ceramic Capacitive (CPT):**

Highly configurable and best value pressure sensing for low to medium pressure applications

- **Oil Filled MEMS (OFM):**

Hermetic and case isolated pressure sensing with best accuracy at extreme temperatures

- **Microfused Strain Gauge (MSG):**

High pressure (up to 30,000psi) hermetic pressure sensing



Family	Product		Major Applications
CPT (Ceramic Capacitive)	2CP	Low Cost / HVAC	<ul style="list-style-type: none"> • HVAC • Refrigeration
	60CP	General Industrial	<ul style="list-style-type: none"> • Motors/Engines • Machine Tools
	70CP	General Industrial, 4-20mA	<ul style="list-style-type: none"> • Industrial Pumps • Air Compressors
OFM (MEMs)	2HMP	Hermetic Industrial	*** See 2CP/60CP/70CP Hermetic and higher accuracy as needed for demanding applications
	4HMP (In Development)	Hermetic Industrial, 4-20mA	
MSG (Strain Gauge)	3PP8	High Pressure Applications	<ul style="list-style-type: none"> • Hydraulics • High pressure refrigerants (ex. CO₂)
P+T (Pressure + Temperature)	112CP	General Industrial	<ul style="list-style-type: none"> • HVAC • Air Compressors • Motor/Engines



2CP5 & 2CP50 SERIES HVAC/REFRIGERATION PRESSURE SENSOR

DESCRIPTION

The 2CP series is ideal for demanding air conditioning and refrigeration applications where long-term reliability and accuracy is a must. The 2CP series provides proven reliability at a competitive price.

Sensata Technologies has been a leading global supplier of pressure sensors and switches for over 50 years. The 2CP has many options, consult the factory to customize a 2CP to meet your application's needs.

FEATURES

- UL recognized
- Ceramic capacitive sensor
- Durable, compact, low-cost design
- Accurate performance over wide temperatures
- Overvoltage and short circuit protected

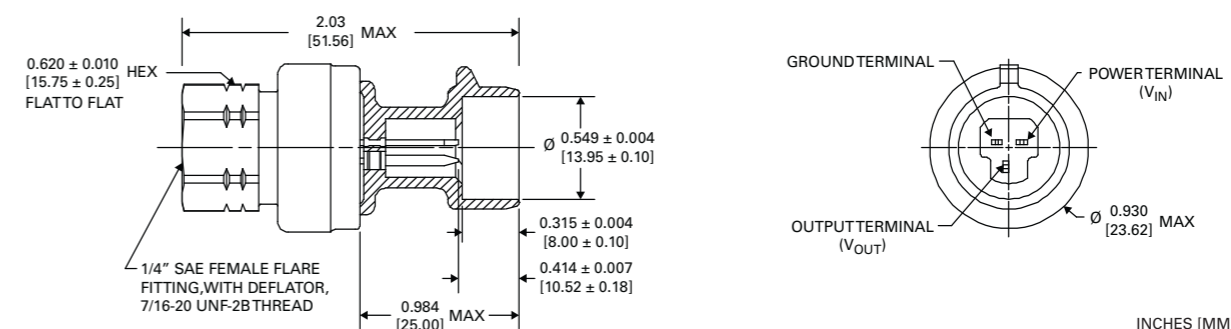
APPLICATIONS

- Discharge and suction pressure monitoring
- Subcooling and superheat calculations
- Compressor oil pressure monitoring
- Condenser fan control
- Compressor staging and unloading
- Electronic expansion valve control
- Remote systems diagnostics and trending

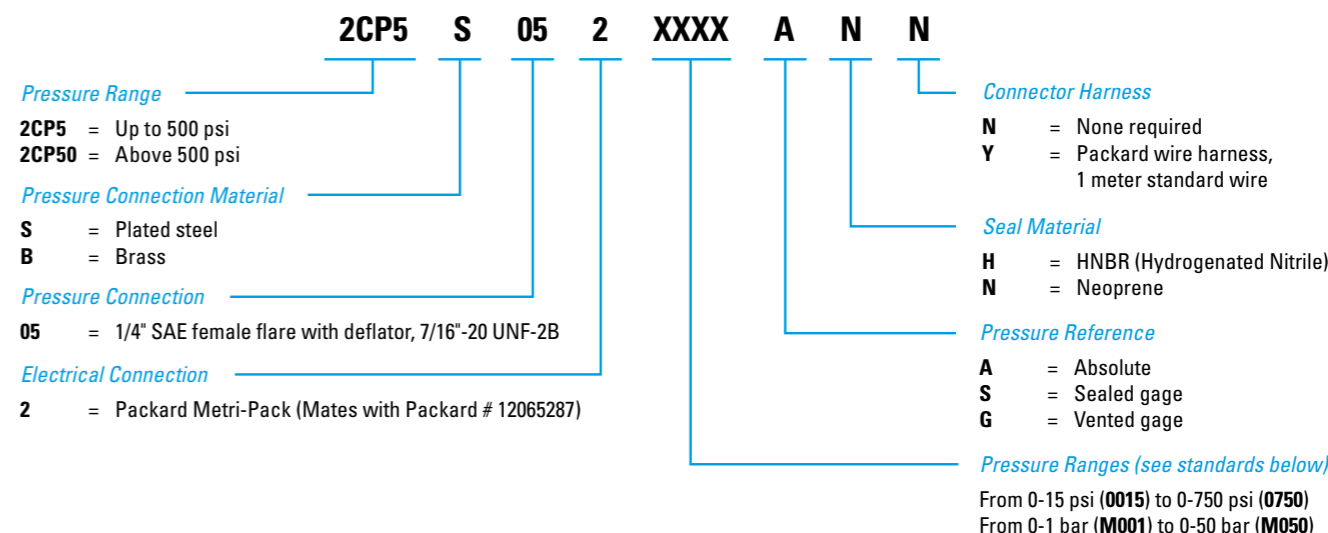
PERFORMANCE CHARACTERISTICS

Pressure Ranges	0 to 15 psi, through 0 to 750 psi
Accuracy	±0.8% F.S. (linearity, hysteresis, repeatability and calibration) Static error band @ 25°C, 5.0VDC
Total Error Band	±1.0% (-20°C to +85°C) ±1.5% (-40°C to +125°C)
Operating Temperature	-40°C to +135°C
Storage Temperature	-40°C to +150°C
Proof Pressure	5X 15 to 75 psi, 3X 100 to 300 psi, 2X 500+ psi
Burst Pressure	2CP5 - 1500 psi (brass) 2CP50 - 2500 psi (plated steel)
Cycle Life	10M F.S. cycles
Random Vibration	11g (50 to 2000 Hz)
Drop (any Axis)	1.5m
Electrical Connection	Nema 4X, IP65
Supply Voltage	4.5 to 5.5 VDC
Output Voltage	0.5 to 4.5 VDC typical
Supply Current	2.5 mA (max sinked or source)
Output Load	10K ohms typical
Output Response Time	10mS
Overvoltage Protection	16 VDC
Reverse Voltage	-14 VDC
Short Circuit Protected	Yes
EMC (512MHz to 1 GHz)	50 V/m
EMC (1 MHz to 512MHz)	100 V/m
ESD (CDF-AEC-Q100-002)	15 kV
Approvals	UL recognized file #SA995 RoHS, REACH available

DIMENSIONAL DRAWINGS



PART NUMBER DECISION TABLE



STANDARDS

Sample PN	Production PN	Description
2CP5B0520150ANN	2CP5-71-46	Brass, 0 to 150 psia
2CP5B0520200ANN	2CP5-71-49	Brass, 0 to 200 psia
2CP5B0520300SNN	2CP5-71-50	Brass, 0 to 300 psis
2CP5B0520400SNN	2CP5-71-51	Brass, 0 to 400 psis
2CP5B0520500SNN	2CP5-71-47	Brass, 0 to 500 psis
2CP5S0520500SNN	2CP5-71-48	Steel, 0 to 500 psis

SEAL MATERIALS

Material	Refrigerant Compatibility	Maximum Seal Temperature Range
HNBR (Hydrogenated Nitrile)	R134a, R404a, R407c, R410a, R507	-20°C to 135°C
Neoprene	R12, R22, R134a, R404a, R407c, R410a, R502, R507	-40°C to 120°C



112CP SERIES COMBINED PRESSURE & TEMPERATURE SENSOR

DESCRIPTION

The 112CP series combined pressure and temperature sensors delivers the benefit of both pressure and in-stream temperature sensing in a single, robust integrated package.

Sensata Technologies has been a leading global supplier of pressure sensors and switches for over 50 years.

FEATURES

- Pressure and temperature measurement in one package
- Fast, in-stream temperature measurement
- Precise superheat measurement

APPLICATIONS

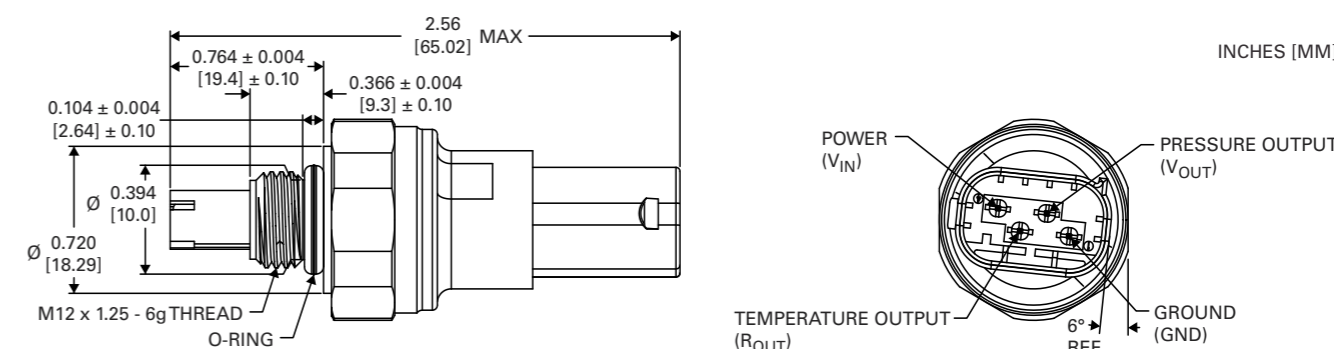
- Air conditioning & refrigeration
- Alternative energy management
- Engine controls & monitors
- Compressors & pumps

PERFORMANCE CHARACTERISTICS

Pressure Ranges	0 to 150 psi through 0 to 650 psi
Pressure Accuracy	±0.8% F.S. (linearity, hysteresis, repeatability and calibration)
Total Error Band	±1.7% F.S. (0°C to +85°C)
Proof Pressure	≥ 2X
Burst Pressure	≥ 3X
Temperature Accuracy	±1% (delta R/R)
Resistance @ 25°C	10K or 100 ohms
Operating Temperature	-40°C to 135°C
Supply Voltage (V_{cc})	4.5 to 5.5 VDC
Output Voltage	0.5 to 4.5 VDC
Supply Current	15.0 mA
Output Current	8.0 mA
Output Load Range	10K to 50K ohms
Overvoltage Protection	16 VDC
Reverse Voltage Protection	-14 VDC
Output Response Time	10mS
Cycle Life	≥ 1M cycles
Vibration	5g
Drop (any Axis)	1m
Electrical Connection	4 pin AMP Micro-Quadlok System™ connector
Weight	1.5 oz max
Approvals	RoHS, REACH available

*Refer to chart for seal compatibility
NOTE: Not compatible with water
Micro-Quadlok System is a trademark of Tyco Electronics Corporation

DIMENSIONAL DRAWINGS



STANDARD OFFERINGS

- Pressure Connections**
M12 x 1.25 - 6g plated steel
1/4" NPT male brass
- Pressure References**
Absolute
Sealed gage
- Pressure Ranges**
9.0 to 150 psia
26.8 to 500 psia
- Elastomer Seals**
See Seal Compatibility Guide

SEAL COMPATIBILITY GUIDE

Seal Material	Media Compatibility	Max Seal Temperature Range
Nitrile (BUNA-N, NBR)	Petroleum oils, lubricants, detergent solutions, helium	-20°C to 100°C
HNBR (Hydrogenated Nitrile)	Petroleum oils, lubricants, detergent solutions	-20°C to +135°C
Ethylene Propylene	Steam, soaps, polar solvents, brake fluids, acetone, Skydrol™	-40°C to +135°C
Fluorosilicone	Chlorinated solvents, oils, fuels, air	-40°C to +135°C
Neoprene	Refrigerants (freons/ammonia)	-40°C to +120°C
Fluorocarbon (Viton™)	Fertilizers, freons, butanes, oils, trichlorethylene	-35°C to +135°C

STANDARD PART NUMBERS

Part Number	Pressure	Pressure Connection	Thermistor	Internal Seal	Thread O-Ring
112CP3-4	9 to 149 psia	M12 x 1.25 - 6g plated steel	10k Ohm @ 25°C	Neoprene	Neoprene
112CP3-6	9 to 149 psia	1/4" NPT male brass	10k Ohm @ 25°C	Nitrile	—
112CP3-8	9 to 500 psia	M12 x 1.25 - 6g plated steel	10k Ohm @ 25°C	Neoprene	Neoprene
112CP3-9	9 to 500 psia	1/4" NPT male brass	10k Ohm @ 25°C	Nitrile	—



HVAC/REFRIGERATION PRESSURE SENSOR

81CP52-01, 82CP59-01, 82CP60-01 and 82CP61-01

WORLD CLASS PERFORMANCE

The 81/82CP Series is ideal for demanding Air Conditioning and Refrigeration applications where long-term reliability & accuracy is a must. This series provides proven reliability at a competitive price.

Sensata Technologies has been a leading global supplier of pressure sensors and switches for over 50 years.

Features & Benefits

- UL recognized
- Ceramic capacitive sensor
- Durable, compact design
- Low cost
- Accurate performance over wide temperatures
- Overvoltage and short circuit protected

Applications

- Discharge and suction pressure monitoring
- Subcooling and superheat calculations
- Compressor oil pressure monitoring
- Condenser fan control
- Compressor staging and unloading
- Electronic expansion valve control
- Remote systems diagnostics and trending

Technical Specifications

Pressure Ranges

0-10 Bar(a) 81CP52-01
 0-20 Bar(a) 82CP59-01
 0-35 Bar(a) 82CP60-01
 0-46 Bar(a) 82CP61-01

Performance

Accuracy ±0.6% F.S. typ.
 (linearity, hysteresis, repeatability, and calibration)
 Static Error Band @ 25°C, 5.0 VDC
 Total Error Band:
 -20°C to +85°C ±0.8% F.S. typ.
 -40°C to +125°C ±1.0% F.S. typ.
 (Values are typical. Higher accuracies are possible, consult factory.)
 Operating Temperature -40°C to 135°C
 Storage Temperature -40°C to 150°C

Physical

Proof Pressure..... 81CP52-01 3.5X
 82CP59-01 3X
 82CP60-01 2X
 82CP61-01 2X

Burst Pressure 110 Bar(a)

Cycle Life 10M F.S. cycles

Random Vibration (50-2000 Hz). 11 g

Drop (any Axis) 1.5 m

Electrical Connection ... Nema 4X, IP65

Electrical

Supply Voltage (V_{in}) 4.5 to 5.5 Vdc
 Output Voltage (V_{out}) 0.5 to 4.5 Vdc typical
 Supply Current 8 mA max
 (Max @ 5.5Vdc with no load)
 Output Current 2.5 mA
 (Max sink or source)
 Output Load 10K ohms typical
 Output Response Time 10 mS
 Overvoltage Protection 16 Vdc
 Reverse Voltage -14 Vdc
 Short Circuit Protected Yes
 EMC (512 MHz-1 GHz) 50 V/m
 EMC (1 MHz-512 MHz) 100 V/m
 ESD (CDF-AEC-Q100-002) 15kV

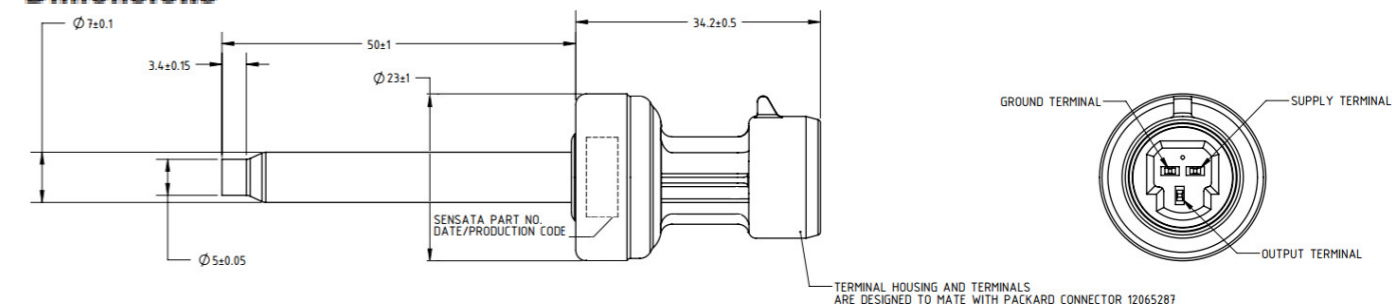
Agency

UL recognized File # SA995

ROHS

The World Depends on Sensors and Controls

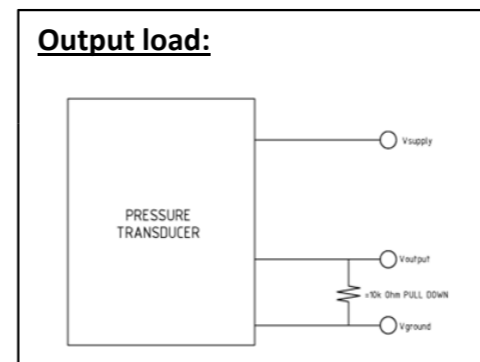
Dimensions



Material:

Housing.....Stainless Steel
 Connector.....Polyetherimide Resin (PEI) 20% Glass, Color Black
 Tube.....CDA122 Copper

Output load:



Refrigerant Compatibility	Seal Material	Maximum Seal Temperature Range
R12 R22 R134a R404a R407c R410a R502 R507	Neoprene*	-40C to 120°C
R134a R404a R407c R410a R507	HNBR (Hydrogenated Nitrile)*	-20°C to 135°C

* Seal selection also depends on oil type used.



2HMP SERIES HVAC & REFRIGERATION PRESSURE SENSOR

FEATURES

- Rugged seal ideal for outdoor environments
- Industry leading accuracy over broad temperature range
- Electrical isolation helps protect against electrical shocks or equipment damage
- Media isolation prevents abnormal operation during thermal shock
- Media and electrical isolation protects against thermal and electrical shock
- Outstanding EMC/ESD performance
- Low cost design for OEM applications
- MEMS sensing technology
- Integrated connector or flying leads
- Flexible threaded fitting or braze tube pressure connection and mounting options

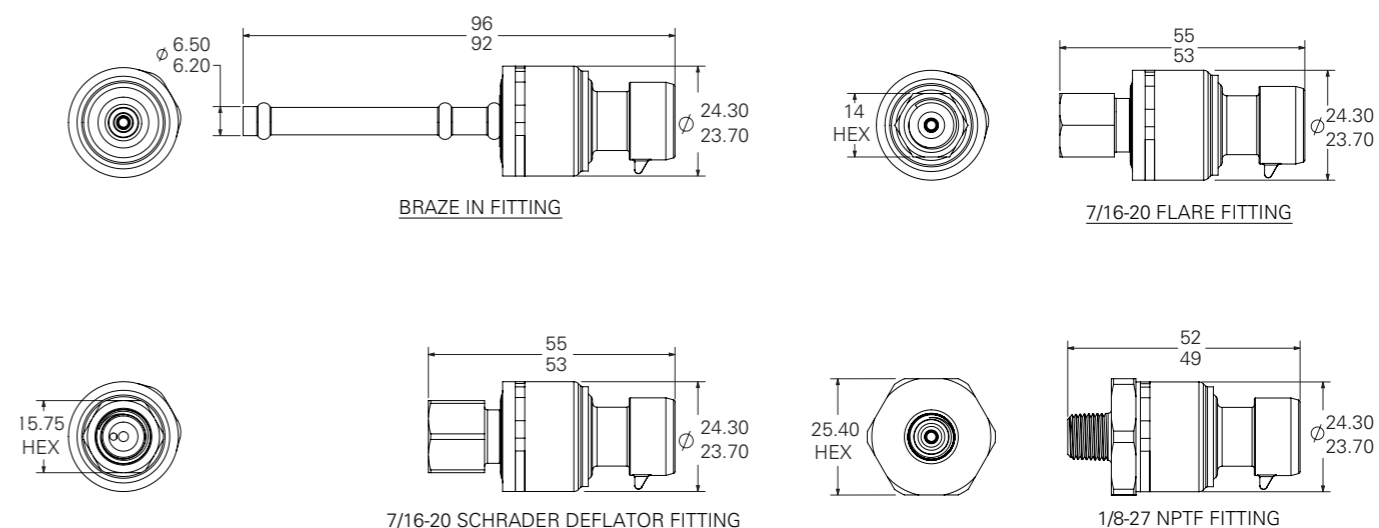
APPLICATIONS

- Commercial refrigeration
- Variable speed HVAC
- Transport refrigeration
- Chillers
- Heat pumps
- Variable refrigerant flow (VRF)

INTRODUCTION

The Sensata Technologies 2HMP series is ideal for demanding air conditioning, refrigeration and industrial applications where long-term reliability and accuracy is a must. The 2HMP provides best in class accuracy over temperature, in a reliable, hermetic design at a competitive price. Sensata Technologies has been a leading global supplier of pressure sensors and switches for over 50 years.

STANDARD CONFIGURATIONS (mm)



TECHNICAL SPECIFICATIONS	
Pressure Ranges	0 to 100 psi through 0 to 750 psi, 0 to 1MPa through 0 to 5MPa
Performance Accuracy	± 1% F.S. typical over -25°C to 125°C (-13°F to 257°F)
Operating Temperature	-40°C to 125°C (-40°F to 257°F)
Storage Temperature	-40°C to 150°C (-40°F to 302°F)
Proof Pressure	1000 psi, 6.9 MPa
Burst Pressure	3600 psi, 24.8 MPa
Cycle Life	1 million F.S. cycles
Vibration	11 g (50 to 2000 Hz)
Drop (any Axis)	1 m
Electrical Connection	IP67 available
Wetted Materials	304L stainless steel brass/copper other materials available

ELECTRICAL SPECIFICATIONS	
Supply Voltage (V_{IN})	4.5 VDC to 5.5 VDC
Output Voltage (V_{OUT})	0.5 VDC to 4.5 VDC typical
Supply Current	8 mA max @ 5 VDC with no load
Output Current	2.5 mA max sink or source
Output Load	10K ohms min
Output Response Time	2 ms, additional options available
Overvoltage Protection	16 VDC
Reverse Voltage	-14 VDC
Short Circuit Protected	Yes
EMC (IEC62000-4-20)	100 V/m
ESD (IEC 61000-4-2)	8 kV contact, 15 kV air
Electrically Isolated Housing	1800VAC for 1 second
Agency Approvals	UL873 (pending), ROHS compliant

USA + CANADA
Sensata Technologies, Inc.
Name: Michael Carey
Tel: 1-508-236-1618
Fax: 1-508-236-1598
Email: klixon@sensata.com

CENTRAL + SOUTH AMERICA
Sensata Technologies, Inc.
Name: Joel Nascimento
Tel: +55 19 3754-1156
Fax: +55 19 3251-8023
Email: vendas@sensata.com

EUROPE + INDIA
Sensata Technologies Holland B.V.
Name: Diana Kuipers
Tel: +31-546-879560
Fax: +31-546-879204
Email: info-cpe@list.sensata.com

REST OF ASIA
Sensata Technologies (Singapore) Co., Ltd.
Name: SG Go
Tel: +65 6478 68 60
Fax: +65 6478 68 60
Email: sggo@sensata.com

CHINA
Sensata Technologies Baoying Co. Ltd.
Name: Joy Huang
Tel: +86-21-23073364
Fax: +86-21-6361-9122
Email: jiayi-huang@sensata.com

JAPAN
Sensata Technologies Japan Limited
Name: Hiro Tsuchiya
Tel: +81-550-77-1222
Fax: +81-550-77-1397
Email: hirotoishi@sensata.com

KOREA
Sensata Technologies Korea Limited
Name: DH Kim
Tel: +82-53-644-9684
Fax: +82-53-644-9686
Email: doho@sensata.com



70CP SERIES CERAMIC CAPACITIVE PRESSURE SENSOR

6 to 30 VDC Supply, 4 to 20 mA or Voltage Output

DESCRIPTION

The 70CP series pressure sensors are ideally suited for environmentally demanding OEM industrial applications. This series accommodates a wide range of input voltages (6 to 30 VDC) and provides several output options, including 4 to 20 mA. Housed in stainless steel, plated steel or brass, the 70CP series offers performance and economy.

Sensata Technologies has been a leading global supplier of pressure sensors and switches for over 50 years.

FEATURES

- Enhanced accuracy over wide operating range
- Housing options are compatible with most media
- EMC protection to 100 V/m
- Broad operating temperature range (-40°C to 135°C)
- Exceptional shake and vibration tolerance
- Overvoltage and reverse polarity protection
- Small size and simple installation

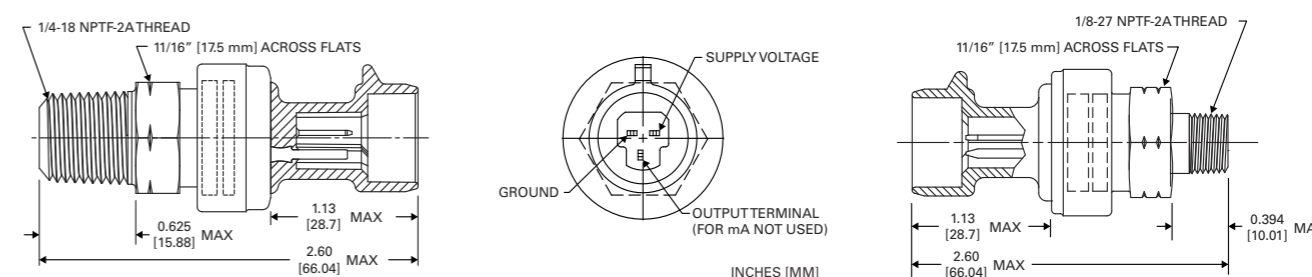
APPLICATIONS

- Compressors & pumps
- Hydraulics & pneumatics
- Agriculture & construction equipment
- Transportation & off-road vehicles
- Engine controls & monitors
- Alternative energy management
- Load management
- Process control & automation
- Medical
- Military

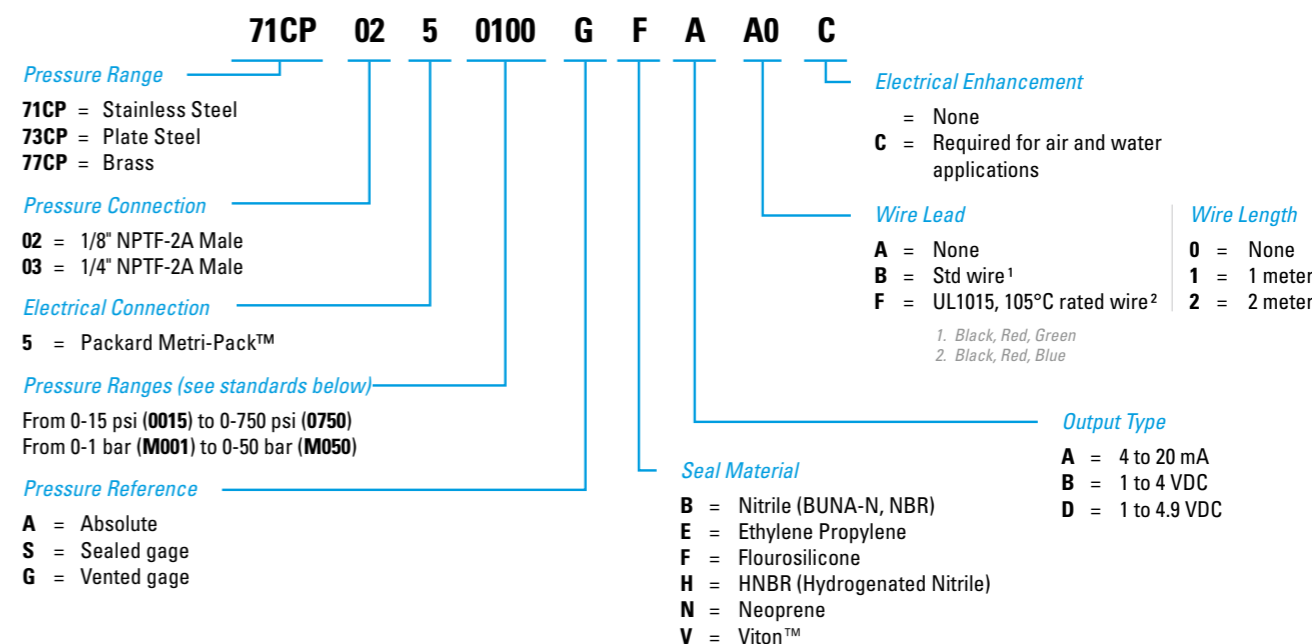
PERFORMANCE CHARACTERISTICS

Pressure Ranges	0 to 15, 50, 100, 150, 250, 500 psi 0 to 750 psi
Accuracy	±0.8% F.S. (linearity, hysteresis, repeatability and calibration)
Total Error Band	±2.0% F.S. (0°C to +85°C)
Operating Temperature	-40°C to +100°C
Storage Temperature	-40°C to +125°C
Proof Pressure	5X 15 to 75 psi, 3X 100 to 250 psi, 2X 500 psi, 1.5X 750psi
Burst Pressure	1700 psi min
Cycle Life	15 to 500 psi = 10M F.S. cycles 750 psi = 5M F.S. cycles
Random Vibration	10g (50 to 2000 Hz)
Mechanical Shock	100g (6 Hz, ½ sine)
Drop (any Axis)	1.5m
Supply Voltage	6 to 30 VDC
Output	Current Output: 4 to 20 mA Voltage Output: 1 to 4 VDC or 1 to 4.9 VDC
Output Load, Voltage Current	10K ohms
Output Load, Current Current	(Vs*-6) / 0.02 ohms
Overvoltage Protection	40 VDC
Reverse Voltage Protection	-40 VDC
Output Response Time	10mS max
Short Circuit Protected	Yes
EMC (512 MHz to 1GHz)	100 V/m
EMC (1 MHz to 512MHz)	50 V/m
4 to 20 mA Version	30 V/m
ESD (CDF-AEC-Q100-002)	15 kV
Approvals	RoHS, REACH available

DIMENSIONAL DRAWINGS (71CP03 & 77CP02)



PART NUMBER DECISION TABLE



SEAL COMPATIBILITY GUIDE

Seal Material	Media Compatibility	Max Seal Temperature Range	Seal Material	Media Compatibility	Max Seal Temperature Range
Nitrile (BUNA-N, NBR)	Petroleum oils, lubricants, detergent solutions, helium	-20°C to 100°C	Fluorosilicone	Chlorinated solvents, oils, fuels, air	-40°C to +135°C
HNBR (Hydrogenated Nitrile)	Petroleum oils, lubricants, detergent solutions	-20°C to +135°C	Neoprene	Refrigerants (freons/ammonia)	-40°C to +120°C
Ethylene Propylene	Steam, soaps, polar solvents, brake fluids, acetone, Skydrol™	-40°C to +135°C	Fluorocarbon (Viton™)	Fertilizers, freons, butanes, oils, trichlorethylene	-35°C to +135°C



60CP SERIES CERAMIC CAPACITIVE PRESSURE SENSOR

5VDC Supply, Ratiometric Output

DESCRIPTION

The 60CP series pressure sensors are ideally suited for environmentally demanding industrial applications. Using a 5.0 V excitation input, the 60 series sensors provides a .5-4.5 V signal ratiometric output proportional to pressure. This design requires no end user amplification. Several housing options are available.

Sensata Technologies has been a leading global supplier of pressure sensors and switches for over 50 years.

FEATURES

- Enhanced accuracy over wide operating range
- Housing options are compatible with most media
- EMC protection to 100 V/m
- Broad operating temperature range (-40°C to 135°C)
- Exceptional shake and vibration tolerance
- Overvoltage and reverse polarity protection
- Small size and simple installation

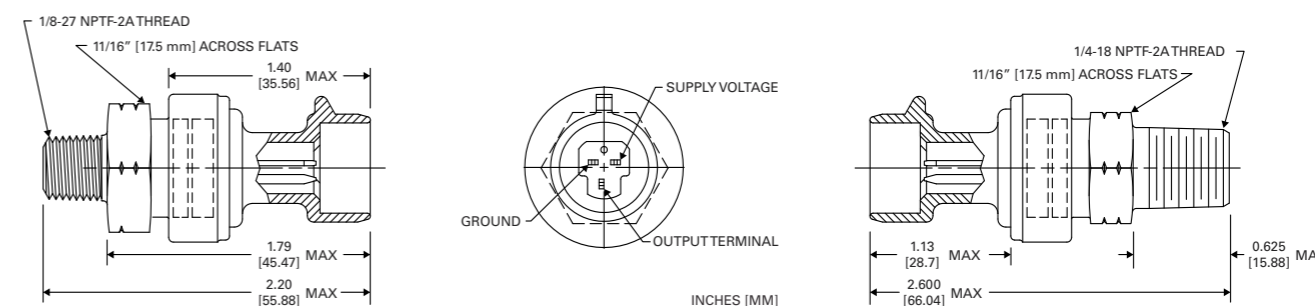
APPLICATIONS

- Compressors & pumps
- Hydraulics & pneumatics
- Agriculture & construction equipment
- Transportation & off-road vehicles
- Engine controls & monitors
- Alternative energy management
- Load management
- Process control & automation
- Medical
- Military

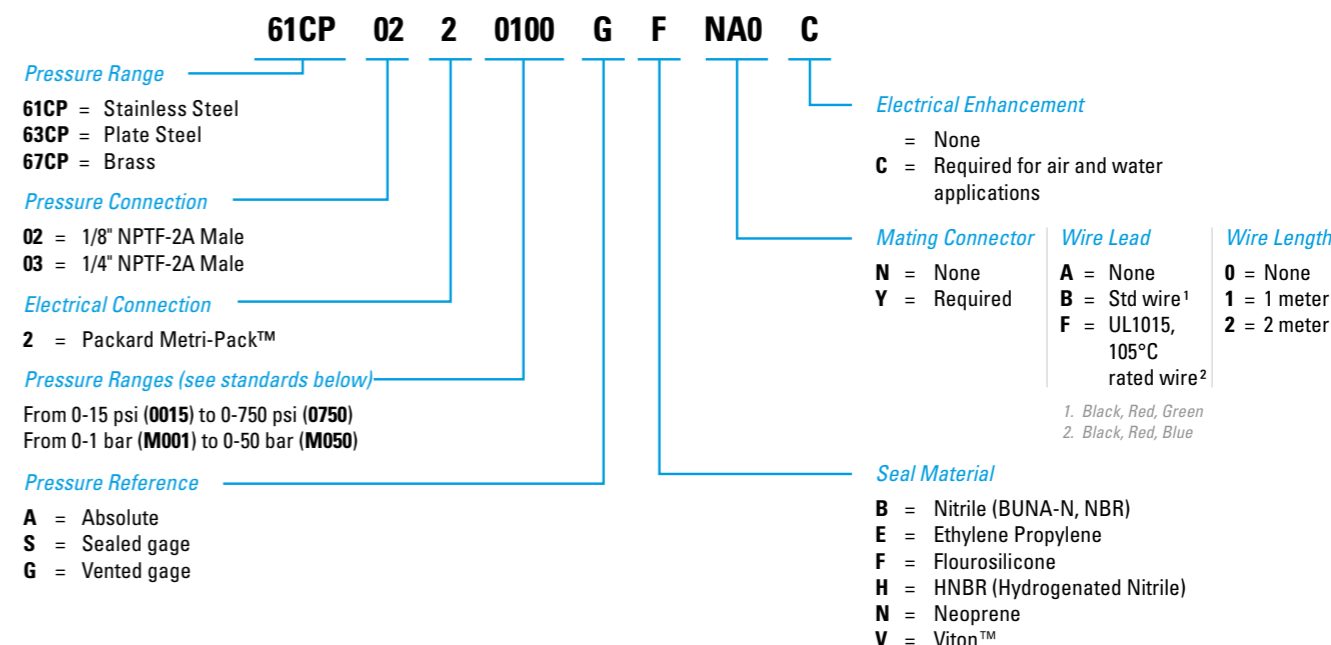
PERFORMANCE CHARACTERISTICS

Pressure Ranges	0 to 15, 50, 100, 150, 250, 500 psi 0 to 750 psi
Accuracy	±0.8% F.S. (linearity, hysteresis, repeatability and calibration) Static error band @ 25°C, 5.0VDC
Total Error Band	±1.0% (-20°C to +85°C) ±1.5% (-40°C to +125°C)
Operating Temperature	-40°C to +135°C
Storage Temperature	-40°C to +150°C
Proof Pressure	5X 15 to 75 psi, 3X 100 to 300 psi, 2X 500 psi, 1.5X 750psi
Burst Pressure	1700 psi min
Cycle Life	15 to 500 psi = 10M F.S. cycles 750 psi = 5M F.S. cycles
Random Vibration	11g (50 to 2000 Hz)
Mechanical Shock	100g (6 Hz, ½ sine)
Drop (any Axis)	1.5m
Electrical Connection	Nema 4X, IP65
Supply Voltage	4.5 to 5.5 VDC
Output Voltage	0.5 to 4.5 VDC
Supply Current	7 mA (max @ 5.5 VDC no load)
Output Current	2.5 mA (max sinked or source)
Output Load	2K ohms minimum
Output Response Time	10mS max
Overvoltage Protection	16.5 VDC
Reverse Voltage	-14 VDC
Short Circuit Protected	Yes
EMC (1 MHz to 1GHz)	100 V/m
ESD (CDF-AEC-Q100-002)	15 kV
Approvals	RoHS, REACH available

DIMENSIONAL DRAWINGS (61CP02 & 67CP03)



PART NUMBER DECISION TABLE



SEAL COMPATIBILITY GUIDE

Seal Material	Media Compatibility	Max Seal Temperature Range	Seal Material	Media Compatibility	Max Seal Temperature Range
Nitrile (BUNA-N, NBR)	Petroleum oils, lubricants, detergent solutions, helium	-20°C to 100°C	Fluorosilicone	Chlorinated solvents, oils, fuels, air	-40°C to +135°C
HNBR (Hydrogenated Nitrile)	Petroleum oils, lubricants, detergent solutions	-20°C to +135°C	Neoprene	Refrigerants (freons/ammonia)	-40°C to +120°C
Ethylene Propylene	Steam, soaps, polar solvents, brake fluids, acetone, Skydrol™	-40°C to +135°C	Fluorocarbon (Viton™)	Fertilizers, freons, butanes, oils, trichlorethylene	-35°C to +135°C



DPS SERIES MEMS PIEZORESISTIVE DIFFERENTIAL PRESSURE SENSOR

Voltage Output, High Accuracy, Hermetic

WORLD CLASS PERFORMANCE

The Sensata DPS Series pressure sensors are ideally suited for environmentally demanding industrial, automotive and heavy vehicle/off road applications. Using a 5V excitation input, the DPS series sensors provide a .5-4.5V output signal proportional to the differential pressure across two points in the medium. This design requires no end user amplification. Custom packaging options are available.

Sensata Technologies has been a leading global supplier of pressure sensors and switches for over 50 years.

Features & Benefits

- Linear output ratiometric with supply
- Total error band ±2% full scale
- Broad operating temperature range (-40°C to +135°C)
- EMC protection to >200 V/m
- EEPROM calibration and serialization
- On board error diagnostics
- Custom packages available

Product Technology

The DPS Series transducer employs a pressure sensitive silicon MEMS diaphragm with embedded piezoresistors connected in a four terminal bridge. Deformation of the diaphragm changes the resistance of the elements and bridge output voltage. The integrated MEMS construction enables high signal output, low hysteresis, and rapid response time. Proprietary noble metal conductors, gel encapsulation, ceramic PCB mount, and isolation of signal conditioning electronics, permit reliable operation in severe media. The transducer operates on a 5 Vdc supply, and provides a linear voltage output. With the added benefits of digital temperature compensation, EEPROM memory, and self diagnostic capability, it is ideal for applications demanding premium accuracy and reliable performance.

Technical Specifications

Pressure Ranges Available 0-18, 35,100 kPaD	Electrical Supply Voltage 4.75 to 5.25 Vdc Output range 0.5 to 4.5 Vdc Supply Current 10 mA max Overvoltage Protection +16 V Reverse Voltage Protection -14 V EMC (to 1 GHz) 100 V/m ESD 15 kV
Performance Accuracy..... ±2% F.S. typ (Total Error Band) Thermal Effect on Offset ±0.008% F.S./°C (-15°C to 100°C) Thermal Effect on Span ±0.003% F.S./°C (-15°C to 100°C) Operating Temperature -40°C to +135°C Storage temperature -40°C to +140°C	Physical Proof Pressure > 2x F.S. Burst Pressure > 3x F.S. Drop (any axis) 1m Random Vibration (20-2000 Hz) 16Grms

Custom packaging available

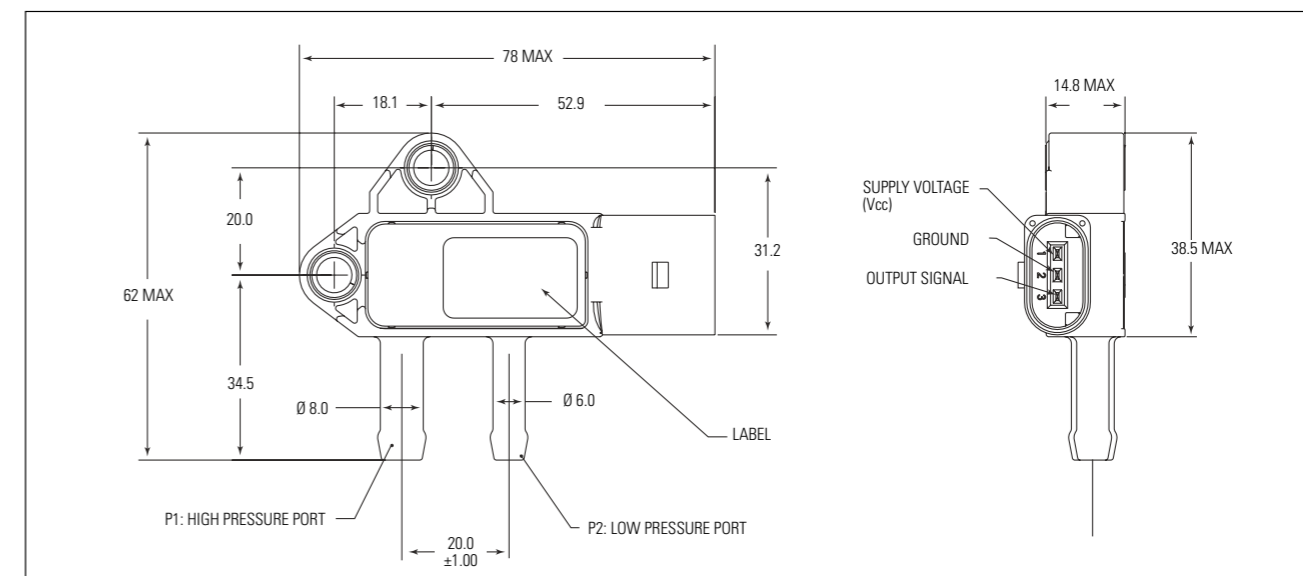
Applications

- Diesel Particulate Filter
- Venturi Flow Meter
- Air Filter Restriction
- Engine Controls & Monitors

Markets

- Automotive
- Agriculture & Construction Equipment
- Diesel Engines

Typical Dimensions (mm)



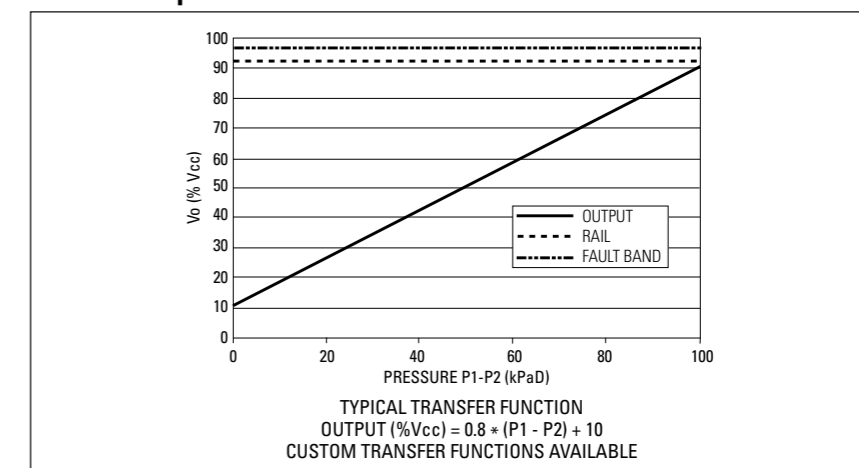
Typical Product Qualification Tests:

- Thermal Cycling
- High Temperature Endurance
- Low Temperature Endurance
- Vibration
- Humidity
- Salt Spray
- Corrosive Media

Standard Product Offerings

Specifications	Part #
100 kPa	1 MPP2-2
35 kPa	1 MPP2-1
18 kPa	1 MPP2-3

Nominal Output Characteristics



Competitive Advantages

Sensata	Competitors	Sensata Advantage
Single sensing die	Two sensing dies	Superior accuracy
Noble metallization	Aluminum metallization	Superior corrosion resistance
Gel protection	Metal diaphragm / oil fill	Superior thermal error
Conditioning electronics isolated from media	Conditioning electronics on chip exposed to media	Superior reliability
Open backside geometry	Constrained backside geometry	Superior resistance to ice damage



HERMETIC PRESSURE SENSORS

3PP8 SERIES

5 Vdc Supply, Ratiometric Output

WORLD CLASS PERFORMANCE

The 3PP8 series sensor uses silicon MEMS strain gage technology. The strain gage is glass bonded to a stainless steel diaphragm. Additional benefits include digital temperature compensation, EEPROM memory and self diagnostic capability. It is ideal for the most demanding applications.

Sensata Technologies has been a leading global supplier of pressure sensors and switches for over 50 years.

Features & Benefits

- High accuracy
- Stainless steel housing
- Hermetically sealed
- Low cost
- Capable of pressure ranges up to 15000 psi
- Small size

Applications

- Agriculture & Construction Equipment
- Vehicle Systems
- CO₂ Compressors
- Pumps
- Hydraulics & Pneumatics
- Engine Controls & Monitors
- Air Conditioning & Refrigeration

Technical Specifications

Performance

Accuracy: ±0.7% at 25°C span (linearity, hysteresis, repeatability, and calibration)

Total Error Band

0°C to 50°C ±1.0% span
-40°C to 125°C ±1.7% span

Operating Temperature -40°C to 125°C

Storage Temperature -40°C to 150°C

Physical

Proof 2X F.S. 500 - 3500 psi
1.5X F.S. 3500 - 15000 psi

Burst 3X Full Scale (Typical)

Cycle Life 10 Million + F.S. Cycles

Vibration 26g rms 20-2800 Hz
Random Profile

Drop 1.5 m

Pressure Ranges

0-500 psis to 0-15000 psis

Electrical

Supply 5 ± 0.25 Vdc

Output 0.5 to 4.5 Vdc typical

Supply Current 15 mA max

Output Load 1.1K ohm pull-up typical

Output Response Time 10 ms max

EMC 1-400MHz 100 V/m
400MHz-1GHz 50 V/m

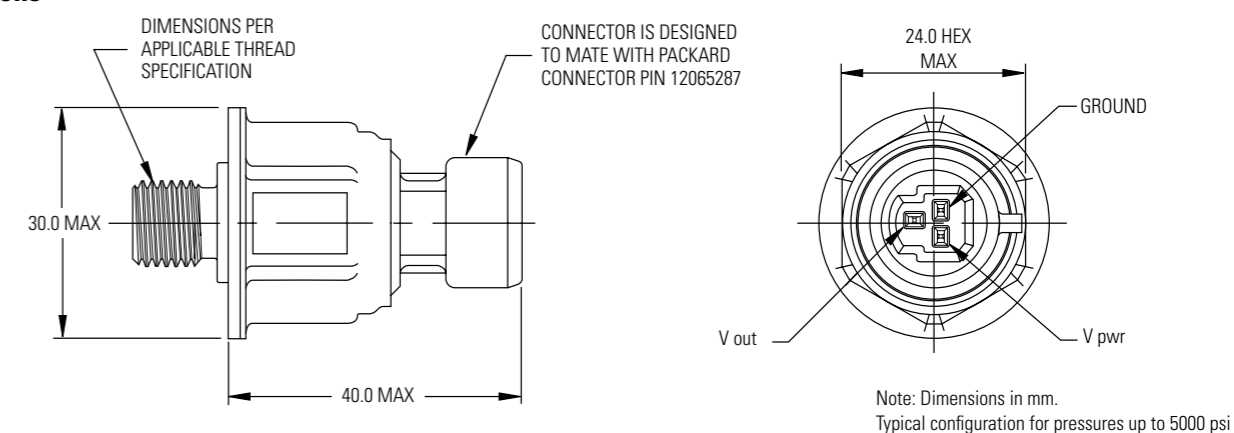
ESD 15 kV air discharge (human body model)

Supply Overvoltage Protection 16 Vdc

Supply Reverse Voltage Protection -16 Vdc

Output Short Circuit Protection 0 V / 16 Vdc
Ground / Supply

Dimensions



Standard Offerings

Pressure Connections (24mm hex body)

- 1/8" NPTF male (for pressures up to 10,000 psi)
- 1/4" NPTF male (for pressures up to 10,000 psi)
- 3/8"-24 UNF male o-ring
- M10 x 1 male o-ring
- M12 X 1.5 male o-ring

For other pressure connections please contact Sensata Technologies

Electrical Connection

- Standard Packard Metri-Pack™ (for pressures up to 5000 psi)
- AMP MQS™
- AMP EJII™ (for pressures over 5000 psi)

For other electrical connections please contact Sensata Technologies

Pressure Ranges

- 0 - 500 psis
- 0 - 1000 psis
- 0 - 3000 psis
- 0 - 5000 psis
- 0 - 7500 psis
- 0 - 10000 psis
- 0 - 12500 psis
- 0 - 15000 psis

For other pressure ranges please contact Sensata Technologies

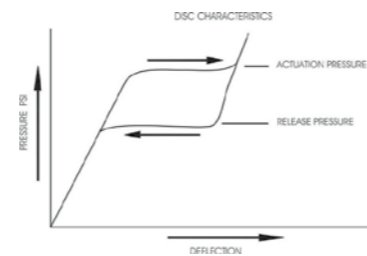
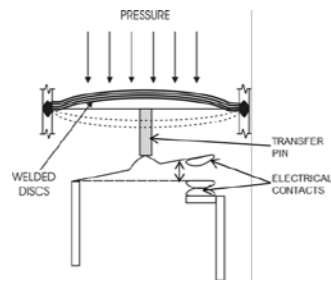
The World Depends on Sensors and Controls

PRESSURE SWITCHES

Highly reliable pressure switches provide direct control for electric motors and other demanding load applications.



Using Sensata's Klixon® snap acting disk, pressure switches provide precise actuation and release pressure settings over a wide pressure range.



Product	Key Characteristics	Applications
PS80	<ul style="list-style-type: none"> • 0-750psig • SPST • Best cost 	Typical Pressure Control Applications <ul style="list-style-type: none"> • HVAC/R • Engines (oil) • Machine Tools • Hydraulics
PS80-2X (New!)	<ul style="list-style-type: none"> • 2300psig (R744/CO₂) 	
20PS	<ul style="list-style-type: none"> • 13"-750psig • SPST • High durability 	<ul style="list-style-type: none"> • Direct motor control • SPDT option for secondary signal path (ex. Alarm)
25PS	<ul style="list-style-type: none"> • 0-750psig • High power (up to 600V/3A) • SPST or SPDT 	
29PS	<ul style="list-style-type: none"> • 200-750psig • Manual reset • SPST 	<ul style="list-style-type: none"> • Manual reset allows system check before restarting (safety)
36PS	<ul style="list-style-type: none"> • 0-100psig • SPST • Best durability 	<ul style="list-style-type: none"> • Mission critical and long life applications



Klixon | 20PS, 39PS, 40PS and 41PS PRESSURE SWITCHES

WORLD CLASS PERFORMANCE

The 20PS Family of Switch products (20PS, 39PS, 40PS and 41PS) was developed to meet the demanding needs of HVAC & industrial applications and has since become a staple of multiple mobile application segments. The reliable and durable construction allows the product to perform under severe environmental conditions and very high vibration levels.

Sensata Technologies has been a leading global supplier of pressure sensors and switches for over 50 years.

Features & Benefits

- Automatic Reset
- Single-pole, single throw switch normally open or normally closed
- Factory calibrated set points g vacuum to 750 psig
- Snap acting Klixon™ stainless steel, hermetically sealed sensor
- Environmentally sealed or vented switch
- High cycle life - Proven reliability
- Custom engineered solutions

Applications

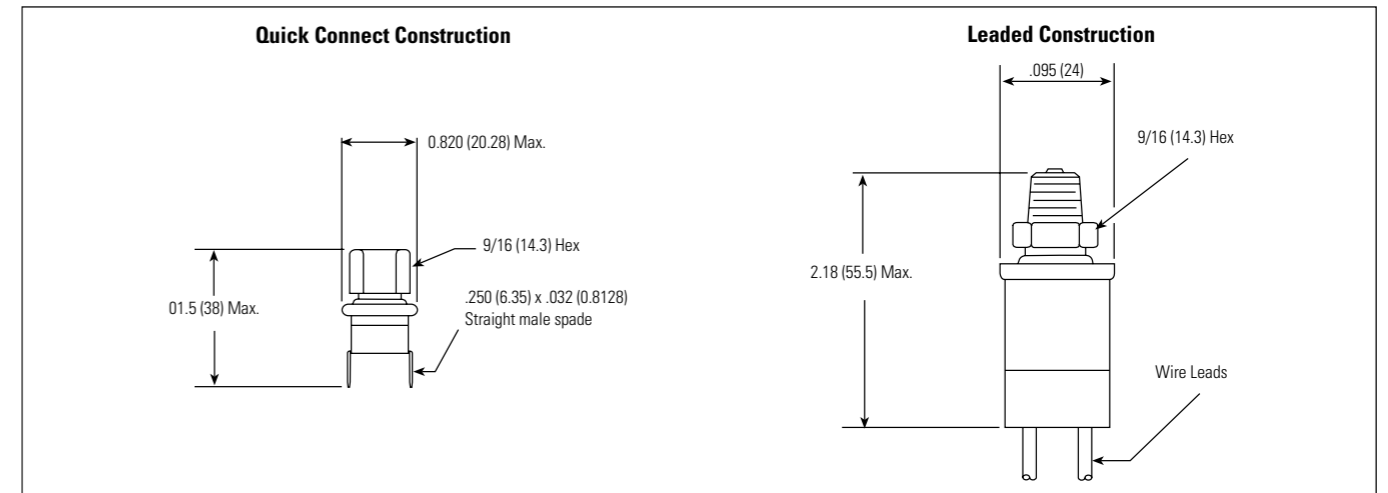
- Compressors & Pumps
- Hydraulics & Pneumatics
- Engine Controls
- Air Conditioning & Refrigeration
- Construction Equipment
- Agricultural Equipment
- Process Control / Laboratory
- Military

Technical Specifications

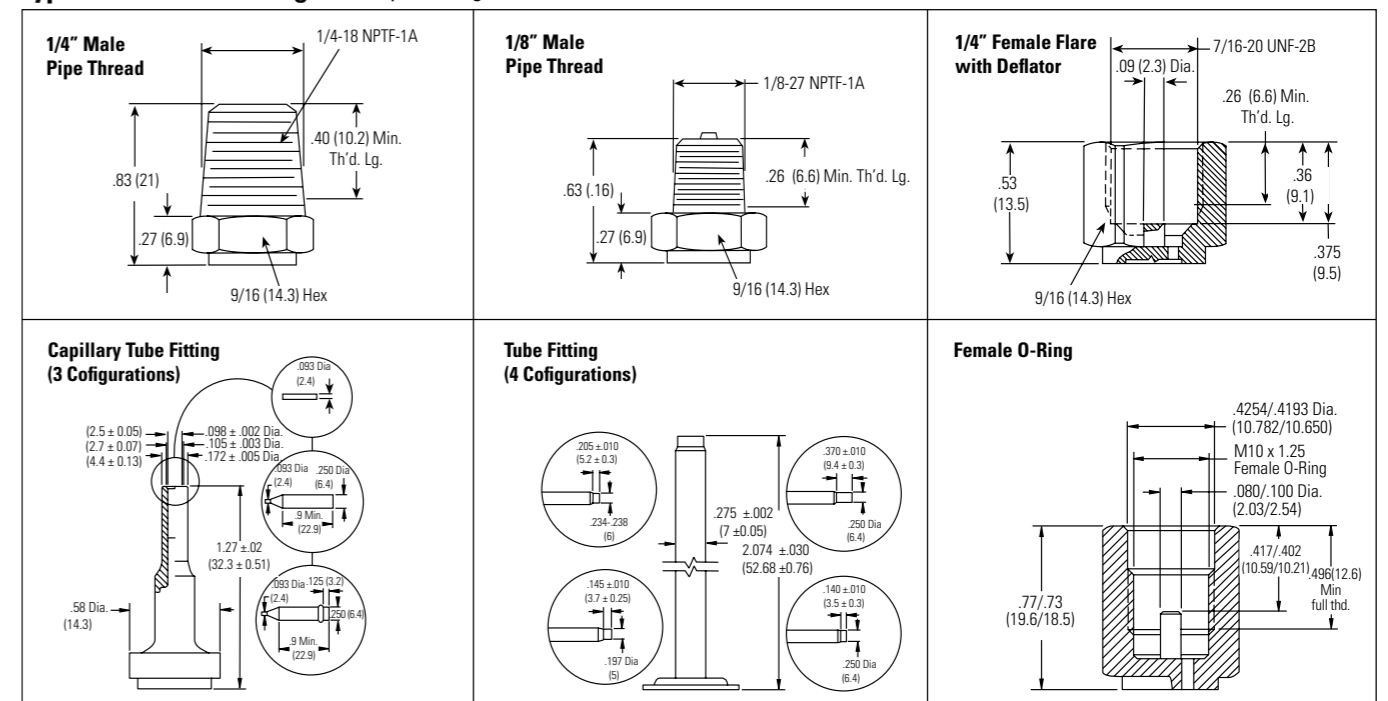
<p>Operating Pressure Vacuum to 750 psig (52 bar)</p> <p>Proof Pressure</p> <table border="1"> <tr> <th>Set Point</th> <th>Proof Pressure</th> </tr> <tr> <td><100psig</td> <td>250psig (17 Bar)</td> </tr> <tr> <td>100-500psig</td> <td>600psig (41 bar)</td> </tr> <tr> <td>>500psig</td> <td>800psig (55 bar)</td> </tr> </table> <p>Higher pressures available for certain applications. Contact Sensata.</p> <p>Burst Pressure 5000 psig</p> <p>Life at Rated Current 100,000 cycles (All - UL Recognition) 250,000 cycles (All except 20PS)</p> <p>Electrical Ratings 120 VAC - 5.8 FLA 34.8 LRA 240 VAC - 2.9 FLA 15.0 LRA 120/277 VAC - 375 VA Pilot Duty 24 VAC - 125 VA Pilot Duty</p>	Set Point	Proof Pressure	<100psig	250psig (17 Bar)	100-500psig	600psig (41 bar)	>500psig	800psig (55 bar)	<p>Dielectric Strength 750 Vrms Open Contacts 1550 Vrms Terminals to Fitting</p> <p>Lead Wire Material / Electrical Connection 18 or 16 AWG 600V 105°C PVC Quick Connects .250" x .032" Male Str. Tab Various AMP, Packard, Delphi & Deutsch Connectors</p> <p>Ambient Temperature -20°F to 176°F / (-29°C to 80°C) (20PS) -40°F to 248°F / (-40°C to 120°C) (40/41PS)</p> <p>Fluid Temperature -65°F to 275°F / (-53.9°C to 135°C)</p> <p>Agency Recognitions UL File SA995 Guide SDFY2 UL (Canada) File SA995 Guide SDFY8 PED EN 12263 Module B&D ENEC, EN60730 EN60730-1, EN60730-2-6 RoHS Compliancy Available</p>
Set Point	Proof Pressure								
<100psig	250psig (17 Bar)								
100-500psig	600psig (41 bar)								
>500psig	800psig (55 bar)								

The World Depends on Sensors and Controls

Typical Physical Characteristics - 20PS, 39PS, 40PS, 41PS



Typical Standard Fittings (Other port fittings are available. Contact Sensata.)





Klixon | PRESSURE SWITCHES

25PS, 42PS, 44PS, 45PS and 46PS Series

LEADING THE WORLD IN SWITCH DESIGN

Sensata's 25PS pressure switch family of products has been designed for direct control of electric motors and other demanding load applications requiring precise pressure settings. Sensata's Klixon® snap acting disc is the heart of this hermetically sealed product offering. Extended electrical capacities and life cycles, in both environmentally sealed and unsealed configurations, encourage usage in the most rigorous electrical protection applications.

Sensata Technologies has been a leading global supplier of pressure sensors and switches for over 50 years.

Features & Benefits

- Hermetically Sealed Sensor
- Snap Acting/Automatic Reset
- Custom Engineered Solutions
- Factory Calibrated Setpoints
- SPST or SPDT both normally open or closed contacts
- Electrically rated to 600V (44/45PS)
- High cycle life capability (42/44PS)
- Environmental sealing is available
- High current capability

Applications

- Air Conditioning (R410a, R22, R134a, R470c, CO 2, (R333a), Ammonia (R717))
- Fan Cycling
- High capacity compressors
- Refrigeration Industrial Systems
- Extreme load applications
- Single Pole, Double Throw (SPDT) for alarm signaling

Technical Specifications

Operating Pressure

500 psig (34 bar)

Proof Pressure*

600 psig (41 bar)

Burst Pressure

5000 psig (345 bar)

Life at Rated Current

1,000,000 cycles 0-300 psig/milliamp load
100,000 cycles 0-500 psig full amperage

Electrical Ratings

5 mA @ 9 Vdc to 2A @ 28 Vdc
5.8 FLA/34.8 LRA @ 120 Vac
2.9 FLA/15.0 LRA @ 240/277 Vac

Dielectric Strength

750 Vrms Open Contacts
1500 Vrms Terminals to Fittings (ground)

Lead Wire Material

#16 & #18 AWG 600 V 105°C 1/32" PVC
Quick Connects .250" x 0.032" straight male spa
Others upon request; call Sensata

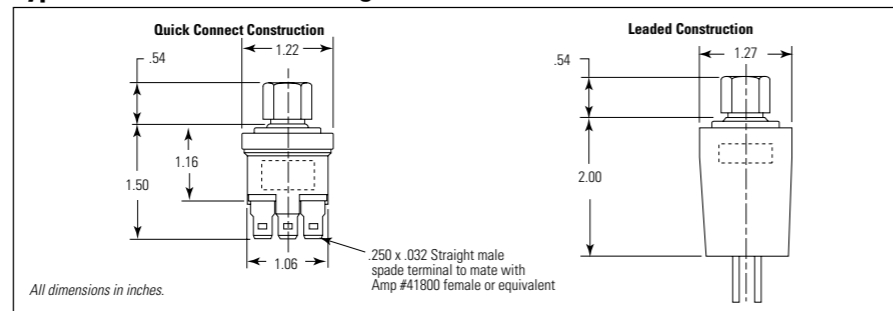
Ambient Temperature

-40°F to 257°F (-40°C to 125°C)
(4% setpoint shift @ 100°C)

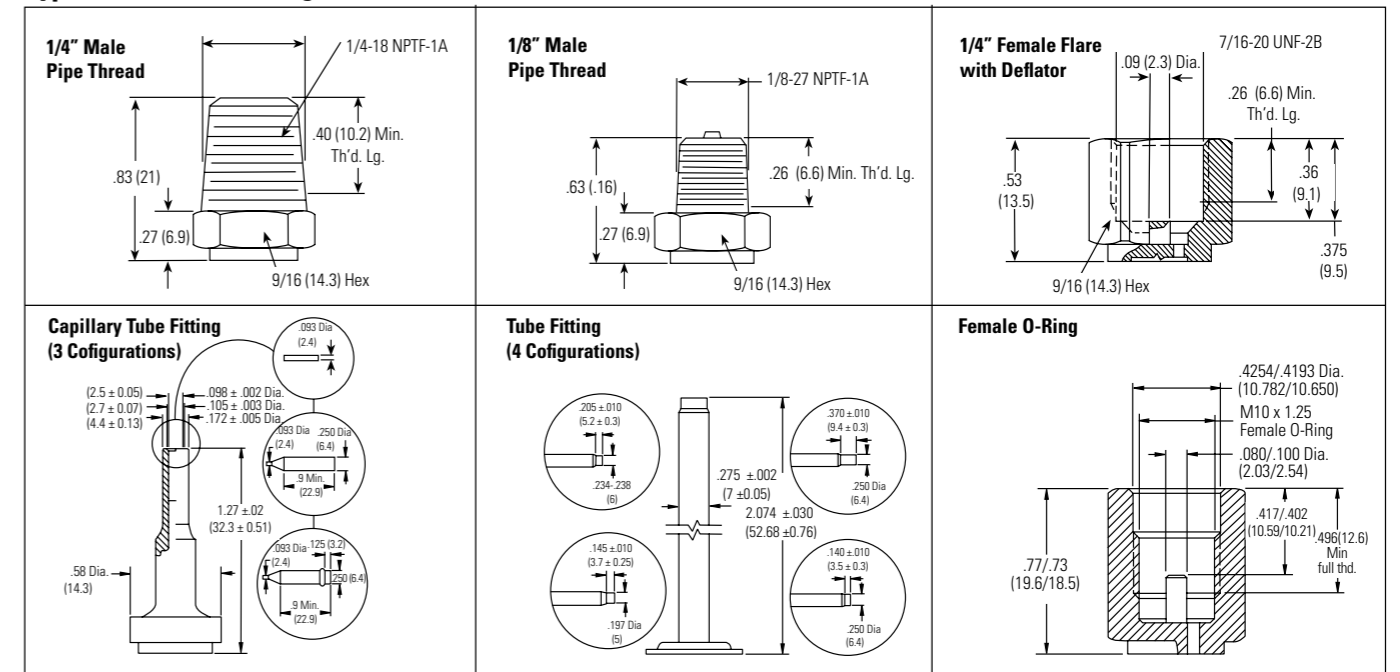
Fluid Temperature

-65°F to 275°F (-53.9°C to 135°C)

Typical Dimensional Drawings - 25PS, 42PS, 44PS, 45PS



Typical Standard Fittings (Other port fittings are available. Contact Marketing.)



Electrical Ratings

Device	Switch Type**	28 Vdc		120 Vac			240 Vac			480 Vac		600 Vac		
		Amps Inductive	Amps Res	FLA	LRA	VA Pilot Duty	Amps Res	FLA	LRA	VA Pilot Duty	FLA	LRA	FLA	LRA
25/42PS	NO	15	13	13	65	125	10	10	45	125	-	-	-	-
	NC	15	25††	13	60	125	25††	10	45	125	-	-	-	-
25/42PS	NO	15	10	5.8	34.8	278	5	2.9	17.4	278	-	-	-	-
	NC	15	25††	13	60	125	25††	10	45	125	-	-	-	-
44/45PS	NO	15	13	13	65	125	10	10	45	125	4	24	3.2	19.2
	NC	15	25††	13	60	125	25††	10	45	125	4	24	3.2	19.2
44/45PS	NO	15	10	5.8	34.8	278	5	2.9	17.4	278	-	-	-	-
	NC	15	25††	13	60	125	25††	10	45	125	-	-	-	-



KLIXON | PRESSURE SWITCHES 29PS SERIES, MANUAL RESET

LEADING THE WORLD IN SWITCH DESIGN

The 29PS Series is a manual reset, single pole, single throw, snap acting pressure switch.

The 29PS is based on Sensata Technologies' 20PS pressure switch, long recognized as an industry standard control device. Features of this switch include manual reset, a broad assortment of port fittings and electrical connections, and the option of a panel mount or line mount design.

Sensata Technologies has been a leading global supplier of pressure sensors and switches for over 50 years.

Features

- Manual Reset
- Snap-acting, trip free mechanism
- Single-pole, single-throw switch, normally closed
- Factory calibrated pressure setpoints from 200 to 750 psig (14 to 52 bar)
- Tamper resistant

Applications

The Model 29PS pressure switch is primarily applied as an upper limit control on unitary and central air conditioning systems, heat pumps, roof top units, and refrigeration systems.

This hermetic pressure switch employs a trip-free manual reset function, providing high reliability in an environmentally sealed, low-cost package.

Operation

The 29PS utilizes a snap-acting stainless steel Klixon® disc that reverses its curvature when pressurized above a customer specified actuation pressure. When the disc snaps, it opens a set of electrical contacts by means of a transfer pin. Resetting of the switch must be accomplished manually by pressing the integrated reset button.

The unique latching mechanism in the 29PS design assures safe electrical cutout even if the reset button is held firmly depressed.

This “trip-free” design prevents the consumer from restarting the equipment until the line pressure has dropped below the release setpoint. Without this “trip-free” mechanism, the equipment could be restarted by simply holding the reset button in the depressed position, while an overpressure condition remains.

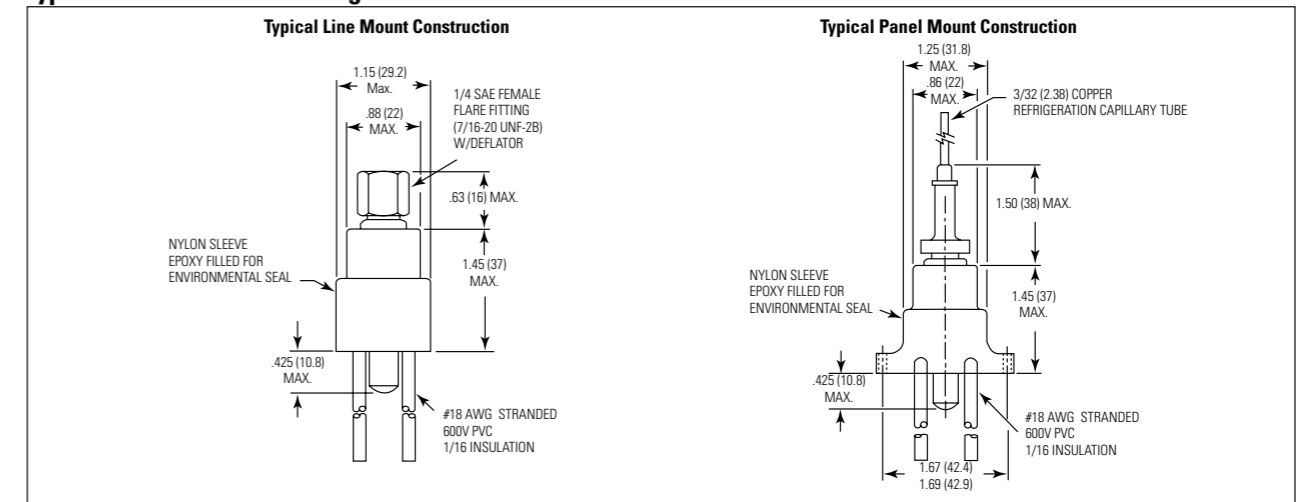
Product Features

The welded, hermetic design of the 29PS provides increased reliability and maintenance-free operation for the lifetime of the switch. The actuation and release pressures of the disc are factory calibrated, simplifying installation and making the 29PS tamper resistant.

The epoxy potting and rubber boot provide an environmental seal for the switch mechanism, protecting it from dust, oil and moisture. The 29PS is built into a vibration resistant package.

Its compact size coupled with a wide variety of threaded and brazed pressure connections allows the 29PS to be mounted wherever is most appropriate for the application; inside a control box or out in the elements. Panel-mounted devices are typically provided with capillary tubes to allow for convenient access to the reset button. A variety of line-mounted fittings are available to simplify installation. Many different lead termination options are available for maximum flexibility.

Typical Dimensional Drawings



Design Specifications

Operating Pressure:	200 to 750 psig (14 to 52 bar)		
Pressure Differential & Tolerance:	For actuation pressures of 200-350 psig (14 - 24 bar), tolerance is ±10 psig (±0.7 bar), 60-70% is standard differential; 351-500 psig (24 - 34.5 bar), ±10 psig (±0.7 bar), 65-75% differential; Differential = (release setpoint/actuation setpoint) X 100. Release Tolerance setpoint on all devices (0.2 bar), ±30 psig.		
Proof Pressure:	600 psig (41 bar) for actuation pressure up to 400 psig (28 bar); 800 psig (55 bar) for higher actuation pressures		
Burst Pressure:	5000 psig (345 bar)		
Standard Port Fittings	1/4" SAE female flare with deflator 1/4" SAE male flare	1/4" male NPTF 24" and 36" capillary tubes, straight or flared ends	1/8" male NPTF
Electrical Configuration	Single-pole single-throw normally closed at atmospheric pressure with manual reset		
Electrical Ratings:	Pilot-duty, 375 VA at 120 VAC 2.9 FLA, 15.0 LRA at 240 VAC	5.8 FLA, 34.8 LRA at 120 VAC 240 VAC 6A IND	
Dielectric Strength:	750 Vrms across open contacts; 1554 Vrms to ground		
Life at Rated Current:	10,000 cycles		
Leads:	AWG stranded UL style 1056 with 1/2" strip standard 6" and 12" lengths standard, other lengths available and special terminals available upon request		
Ambient Temperature:	-20°F to 150°F (-29°C to 66°C)		
Fluid Temperature:	-65°F to 275°F (-54°C to 135°C)		
Agency Approvals:	UL recognized File No. SA995 Canada Category SDFY8	U.S. Category SDFY2; ENEC Certified, PED CE0035 Module B/D	



KLIXON | PRESSURE SWITCHES 36PS SERIES, AUTOMATIC RESET

LEADING THE WORLD IN SWITCH DESIGN

Sensata's 36PS pressure switch offers a number of design features that ensure accurate, reliable performance in low pressure, dry circuit applications. The all-metal constructions of this hermetically sealed "free disc" switch allows the product to remain extremely stable over life. Compatible with most fluids, this product is rated up to 1M cycles.

Sensata Technologies has been a leading global supplier of pressure sensors and switches for over 50 years.

Features & Benefits

- Hermetically Sealed Sensor
- Snap Acting/Automatic Reset
- Wide Temperature Range
- Environmentally Sealed and Vented
- Factory Calibrated Set Points
- Compact and Lightweight for Direct Mounting
- Excellent Set Point Repeatability & Temperature Stability
- Narrow Tolerance and Hysteresis
- High Vibration Capability

Applications

- Construction Equipment
- Agricultural Equipment
- Compressors and Pumps
- Hydraulics and Pneumatics
- Engine Controls
- Process Control
- Automation Systems
- Industrial Systems
- Marine Engine/Equipment

Technical Specifications

Operating Pressure

500 psig (34 bar)

Proof Pressure*

600 psig (41 bar)

Burst Pressure

5000 psig (345 bar)

Life at Rated Current

1,000,000 cycles 0-300 psig/milliamp load
100,000 cycles 0-500 psig full amperage

Electrical Ratings

5 mA @ 9 Vdc to 2A @ 28 Vdc
5.8 FLA/34.8 LRA @ 120 Vac
2.9 FLA/15.0 LRA @ 240/277 Vac

Dielectric Strength

750 Vrms Open Contacts
1500 Vrms Terminals to Fittings (ground)

Lead Wire Material

#16 & #18 AWG 600 V 105°C 1/32" PVC
Quick Connects .250" x 0.032" straight male spa
Others upon request; call Sensata

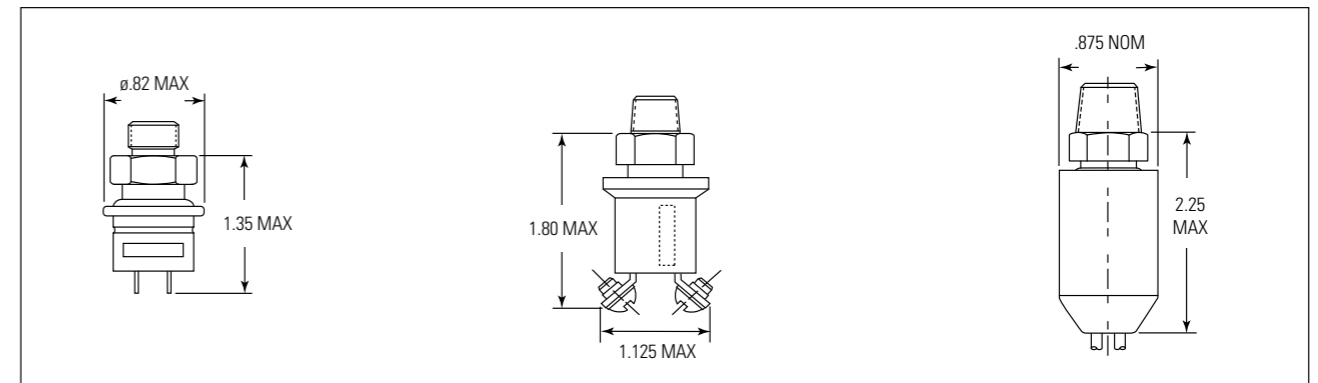
Ambient Temperature

-40°F to 257°F (-40°C to 125°C)
(4% setpoint shift @ 100°C)

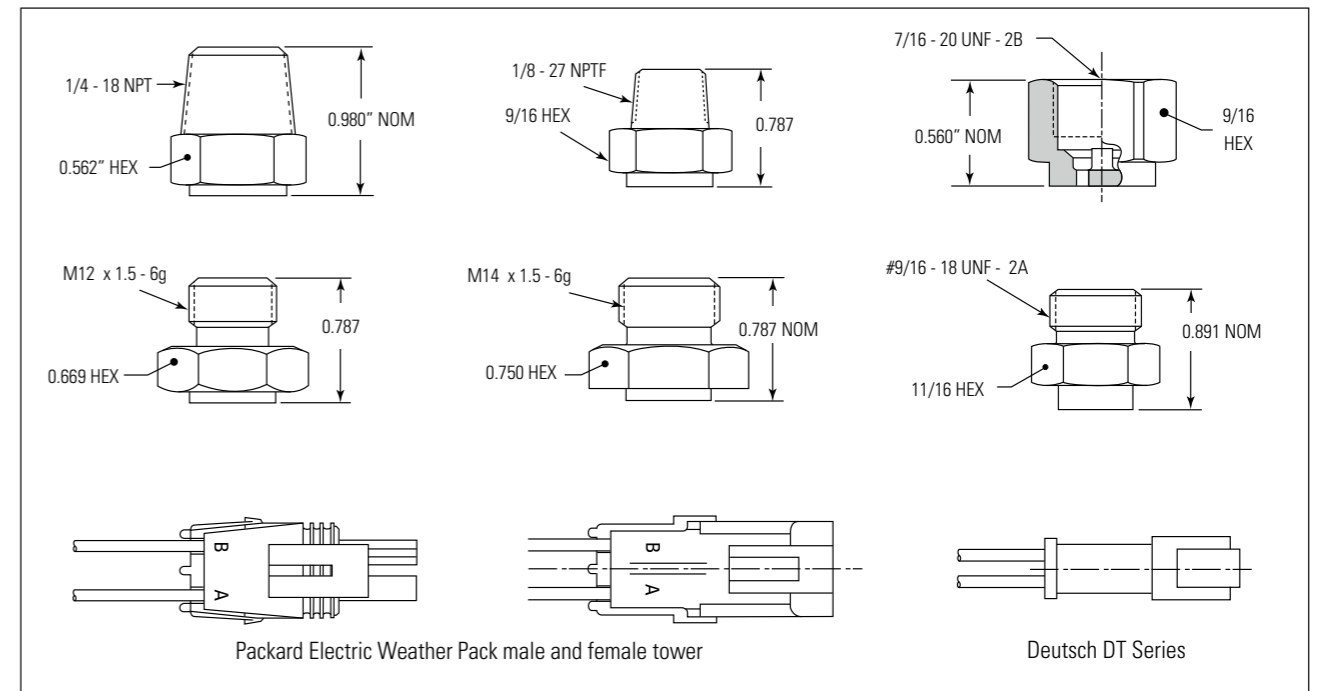
Fluid Temperature

-65°F to 275°F (-53.9°C to 135°C)

Typical Physical Characteristics (Additional configurations are available. Contact Sensata: sensors@sensata.com)



Typical Standard Fittings (Additional fittings are available. Contact Sensata: sensors@sensata.com)



Common Port Fittings

1/8" - 27 NPTF male
1/4" - 18 NPTF male
1/4" SAE male flare
1/4" SAE female flare

3/8" - 24 UNF male o-ring
9/16" - 18 UNF male o-ring
M 10 x 1 male o-ring
1/4" O.D. copper or stainless steel braze tube



KLIXON | PS80 AUTOMATIC RESET PRESSURE SWITCHES

LEADING THE WORLD IN SWITCH DESIGN

The PS80 is an automatic reset pressure switch designed to meet a broad spectrum of applications. It offers a wide range of pressure settings, port fittings, and electrical connections. The PS80 is available in quick connect or wire leaded construction and is manufactured globally at our ISO 9001 certified manufacturing facilities to ensure the quality you expect from Sensata Technologies.

Sensata Technologies has been a leading global supplier of pressure sensors and switches for over 50 years.

Features & Benefits

- Custom Engineered Solutions
- Hermetically Sealed Sensor
- Environmentally Sealed Leads
- Flexible Set Point Range
- Fixed Set Points
- Single Pole, Single Throw
- Normally Open/Normally Closed
- Historically Proven Reliability

Applications

- Air Conditioning (R410a, R22, R134a, R407c, CO₂ (R333a), Ammonia (R717))
- Engine Oil
- Compressors & Pumps
- Process Controls
- Automation
- Agricultural & Construction Equipment
- Vehicle Controls

Technical Specifications

Operating Pressure

0 to 750 psig (50 bar)

Proof Pressure**

Set Point	Proof Pressure
<100psig	250psig (17 Bar)
100-500psig	600psig (41 bar)
>500psig	800psig (55 bar)

Burst Pressure

5000 psig (345 bar)

Life at Rated Current

100,000 cycles

Electrical Ratings

120/240 Vac - 6.0 FLA 36 LRA
120/277 Vac -375 VA Pilot Duty
24Vac - 125 VA Pilot Duty

**The highest pressure a switch can be exposed to without influencing the set-point.

Dielectric Strength

750 Vrms Open Contacts
1550 Vrms Terminals to Fitting (Ground)

Lead Wire Material/Electrical Connection

#18 AWG 600 V 125°C 1/32" XLP UL 3173
#18 AWG 600 V 125°C 1/16" XLP UL 3290
Quick Connects
Various AMP and Packard Connectors

Ambient Temperature (UL Rating)

-20°F to 176°F / (-29°C to 80°C)

Fluid Temperature (UL Rating)

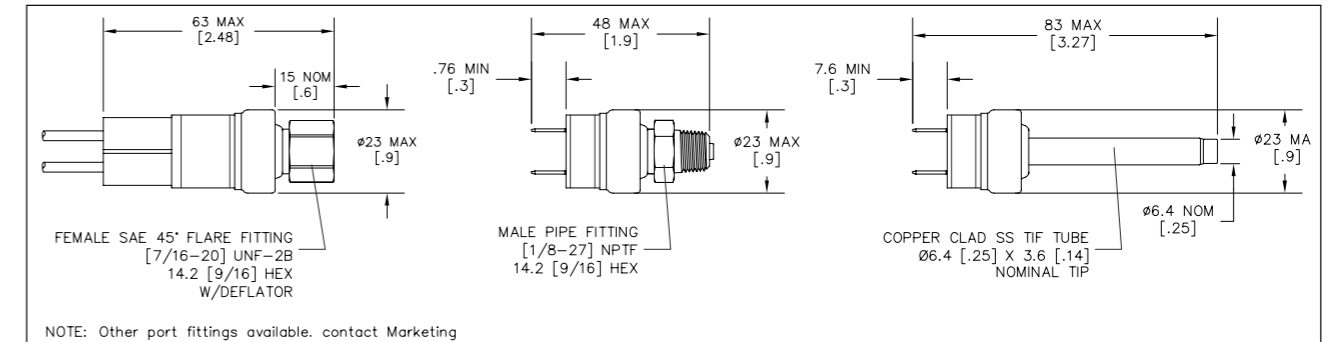
-65°F to 275°F (-54°C to 135°C)

Agency Recognitions

UL File SA995 Guide SDFY2
UL (Canada) File SA995 Guide SDFY8
PED EN 12263 Module B&D
ENEC, EN60730 EN60730-1, EN60730-2-6
RoHS Compliance Available

Note: Leaded devices can be exposed to moisture not for use while immersed

Typical Physical Characteristics (Additional configurations are available. Contact Sensata.)



Sample Request Data Form

Company Name and Address _____

Contact _____

Phone _____ Fax _____ Email _____

Description of Application _____

Exact Function of Switch in System _____

Cut In Pressure _____ Tolerance _____ Cut Out Pressure _____ Tolerance _____

Pressure Port Fitting _____ Switch Termination _____

Wire Lead termination (e.g., 1/2 inch strip, 1/4 inch female Q.C., etc.) _____

Sustained System Pressure _____ Peak System Pressure _____

Switch Logic (Contacts to open/close on Pressure Rise) _____

Volts (AC/DC) _____ Amps _____ Inductive/Resistive _____

Cycle Life Requirement _____ Operating Temperature _____

Allowable Drift Over Temperature/Life _____

Switch Environment (Protected/Unprotected) _____

Agency Approvals (UL, VDE, TUV, ?) _____ Estimated Annual Volume _____

The World Depends on Sensors and Controls



KLIXON | CO₂ SYSTEM PRESSURE SWITCHES

PS80-2X SERIES, FOR USE IN R744/CO₂ OPERATED SYSTEMS

LEADING THE WORLD IN SWITCH DESIGN

The PS80-2X is an automatic reset pressure switch designed to meet the unique challenges of R744/CO₂ based air conditioning and refrigeration equipment. These green systems require robust switches capable of withstanding the increased pressures and temperatures generated by these units. Sensata has redesigned the flagship PS80 to meet the special requirements of these transcritical R744 systems.

Sensata Technologies has been a leading global supplier of pressure sensors and switches for over 50 years.

Features & Benefits

- Hermetically sealed
- Environmentally sealed leads
- Reliable over a broad pressure & temperature range
- Factory calibrated settings
- Single pole, single throw
- Normally open/normally closed
- Proven reliability

Applications

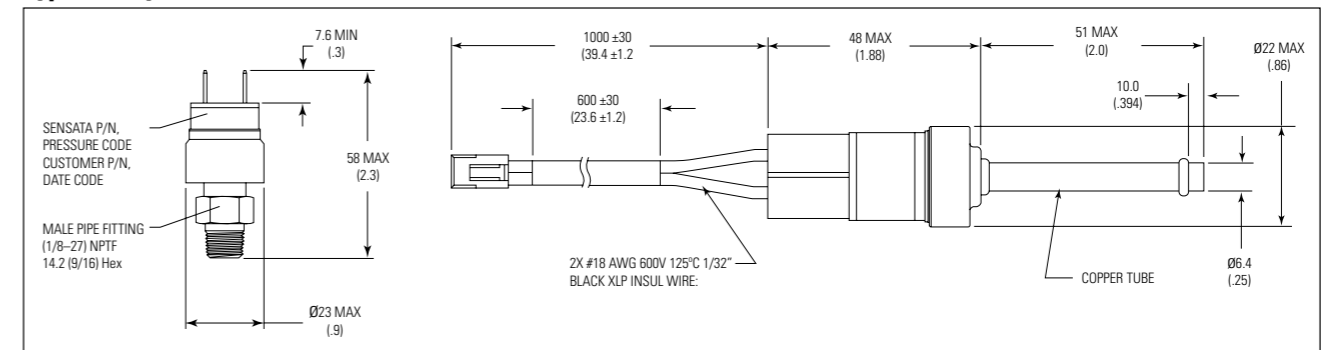
- CO₂ Air Conditioning
- CO₂ Refrigeration
- CO₂ Heat Pump
- High Pressure Safety Cut Out
- Low Pressure Safety Cut Out

Technical Specifications

<p>Maximum Operating Pressure 2300 psig 160 bar 16.0 MPa</p> <p>Maximum Calibration Pressure 2275 psig 157 bar 15.7 MPa</p> <p>Proof Pressure 3100 psig 215 bar 21.5 MPa</p> <p>Burst Pressure 6100 psig 420 bar 42.0 MPa</p> <p>Electrical Ratings 120/240 Vac - 6.0 FLA 36 LRA 120/277 Vac -375 VA Pilot Duty 24Vac - 125 VA Pilot Duty Gold contacts available</p>	<p>Life at Rated Current 100,000 cycles</p> <p>Dielectric Strength 750 Vrms Open Contacts 1500 Vac for 1 minute</p> <p>Lead Wire Material/Electrical Connection #18 AWG 600 V 125°C 1/32" XLP UL 3173 #18 AWG 600 V 125°C 1/16" XLP UL 3290 Quick Connects</p> <p>Ambient Temperature (UL Rating) -20°F to 176°F (-29°C to 80°C)</p> <p>Fluid Temperature (UL Rating) -65°F to 275°F (-54°C to 135°C)</p> <p>Agency Recognitions UL File SA995 Guide SDFY2 UL (Canada) File SA995 Guide SDFY8 PED EN 12263 Module B&D ENEC, EN60730 EN60730-1, EN60730-2-6 RoHS Compliant</p>
--	---

The World Depends on Sensors and Controls

Typical Physical Characteristics



PS80-20 Series Part Numbering System

Part Numbering Scheme	Switch Logic/Termination Style	Contact Type
PS80-21-XXXX	Normally closed switch, Wire leads	Silver contacts
PS80-22-XXXX	Normally open switch, Wire leads	Silver contacts
PS80-23-XXXX	Normally closed switch, Quick connect	Silver contacts
PS80-24-XXXX	Normally open switch, Quick connect	Silver contacts
PS80-25-XXXX	Normally closed switch, Wire leads	Gold contacts
PS80-26-XXXX	Normally open switch, Wire leads	Gold contacts
PS80-27-XXXX	Normally closed switch, Quick connect	Gold contacts
PS80-28-XXXX	Normally open switch, Quick connect	Gold contacts

Key Parameters for Sample Inquiry

Company Name and Address _____

Contact _____

Phone _____ Fax _____ Email _____

Description of Application _____

Exact Function of Switch in System _____

Current _____ Voltage _____ Life Cycle Requirement _____

Cut In Pressure _____ Tolerance _____ Cut Out Pressure _____ Tolerance _____

Pressure Port Fitting _____ Wire Gauge _____ Wire Length _____

Wire Lead termination (e.g., 1/2 inch strip, 1/4 inch female Q.C., etc.) _____

TEMPERATURE PRODUCTS

Rugged industrial thermostats and temperature sensors with a wide range of form factors and connection options for any application.

- **Thermostats**

Fast and accurate thermal response with Klixon® snap acting disk



- **Thermal Sensors**

Flexible sensing technology (thermistor, RTD, IC), temperature range, form factors, and mounting options



- **High Temp Sensing (HTS)**

Very high temp sensing (300–1200°C) for harsh environments



Temperature Sensors



Family	Key Products		Applications
Thermostats (Klixon® snap acting disk)	1NT	-40-200°C Up to 17A (@120V)	<ul style="list-style-type: none"> • Furnace • Appliance • Space Heaters
	20600	High power, up to 25/48A	
	3NT	-30-135°C Up to 10A	<ul style="list-style-type: none"> • Heat pump • Refrigeration
	SOS	“Stat-on-stilts” -30-175°C Up to 15A	<ul style="list-style-type: none"> • Heating/ Airstream mounts
Temperature Sensors (Thermistor, RTD,IC)	3000 Series	-40-130°C	<ul style="list-style-type: none"> • Engine coolant • Oil/transmission • HVAC/R • Compressors • Hydraulics
	5024 Series	-50-300°C	
	6024 Series	-40 – 120°C Hermetic	
High Temperature Sensors	Contact Sensata for more details		



KLIXON | 1NT SERIES FIXED TEMPERATURE THERMOSTATS

Key Features

- ISO9001: 2000 certification
- Factory inspected for continuity and contact resistance
- Global sales and technical support
- Ambient temperature rating from -40°C to 240°C (-40°F to 464°F)
- 1NT base provides:
 - Low cost
 - High temperature capability
 - Clean processing
 - High impact strength
 - Low static generation
- Bi-metal disc is factory pre-set to achieve:
 - Operation at requested temperatures
 - Tamperproof settings

Applications

- Microwave ovens
- Sandwich makers
- Rice cookers
- Hair dryers
- Fan heaters
- Vacuum cleaners
- Gas / electric furnaces
- Espresso machines
- Tea makers
- Automotive / truck

- Product innovations include:
 - Solid metal-to-metal terminal construction
 - Current free spring
 - One piece transfer mechanism
- Switch actions:
 - Automatic reset: Available with both normally open and normally closed switch logic
 - Manual reset: Mechanical reset device
 - Trip free manual reset: UL M2 class rating that resists consumer tampering
 - One shot: meets agency requirements for single operation device



WORLD CLASS PERFORMANCE

The 1NT has been designed to be applied for use in many HVAC and appliance products as either a regulating or over-temperature safety switch.

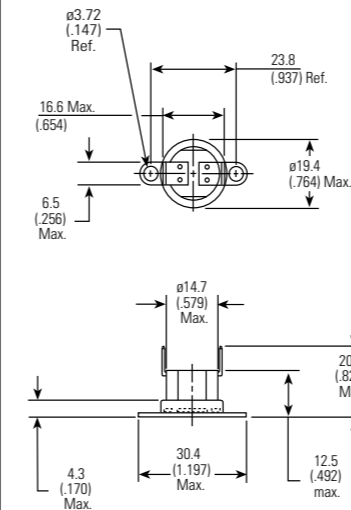
The 1NT uses Klixon® technology and is available in several mounting options.

Sensata Technologies has been leading global supplier of pressure sensors and switches for over 50 years.

Available Constructions

High Profile Construction

Options shown: 90° - 1/4" Q.C. terminals with Surface mount flange

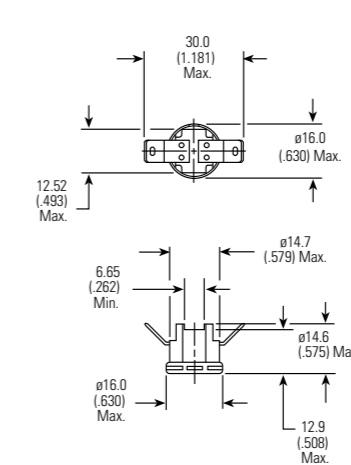


Part Types by Construction

- 1NT01 Auto Reset / Silver Contacts
- 1NT11 Auto Reset / Gold Contacts
- 1NT09 One Shot: -35°C (-31°F) Reset
- 1NT10 One Shot: 0°C (32°F) Reset

Low Profile Construction

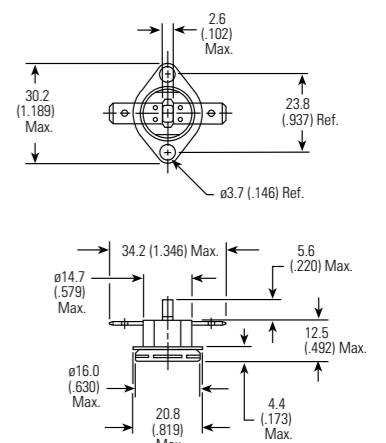
Options shown: 45° - 1/4" Q.C. terminals with 4 post and flat Al cup



- 1NT02 Auto Reset / Silver Contacts
- 1NT02TL Low Profile / One Shot
- 1NT20 Auto Reset / Gold Contacts

Manual Reset Construction

Options shown: Flat 1/4" Q.C. terminals with Airstream mount cup

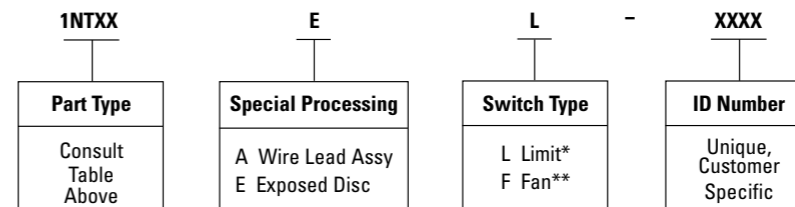


- 1NT08 Manual Reset / Silver Contacts
- 1NT12 Manual Reset / Gold Contacts
- 1NT15 Trip Free MR / Silver Contacts
- 1NT19 Trip Free MR / Gold Contacts

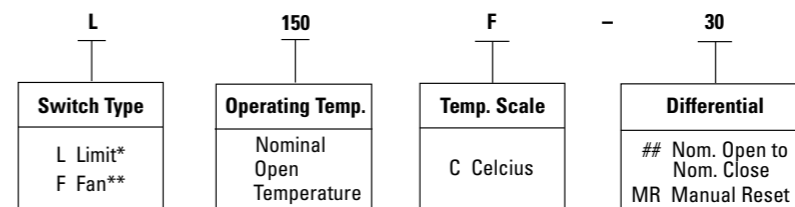
All dimensions mm (in.)

Numbering System

Part Number



Temperature Code



* Limit switch opens on temperature rise
 ** fan switch closes on temperature rise

1NT Series Electrical Ratings

The 1NT series of thermostats has been recognized by safety agencies, including UL, Canadian-UL and KEMA. Agency ratings are presented below as a general guide. However, the temperature settings, mechanical, electrical, thermal and environmental conditions of the specific application may differ significantly from agency test conditions. Therefore, the user must not rely solely on the agency ratings presented here, but must perform its own testing of the product to confirm that the thermostat selected will operate as intended over the useful design life of the user's applications.

UL and C-UL

Type	Max. Temp.		Cycles (X 1000)	Electrical Rating	
	°C	°F			
NT01, 02	204	400	100	120 Vac	0 - 9 amps 10 - 17 amps*
				240 Vac	0 - 5 amps 6 - 17 amps*
				277 Vac	7.2 amps
1NT08, 15, 08E**	204	400	1 + 5	240 Vac	25 amps
1NT09, 10	204	400	1-Shot	240 Vac 277 Vac	25 amps 7.2 amps
1NT11, 20	204	400	100	125 VA 30 Vdc	1 amp
1NT12, 19	204	400	1 + 5	125 VA	
1NT01E, 02E**	204	400	100	120 Vac	10 amps

* UL rated at these current levels at specific open/close temperatures. When applying to these electrical levels, nominal open/close temperatures must be considered to determine if the thermostat selected will operate as intended in the user's application. Please consult a Sensata Engineer for additional clarification.
** "E" means exposed disc.

KEMA

Type	Max. Temp. °C	Cycles (X 1000) (unless otherwise specified)	Electrical (Rating)*	
1NT01, 02	204	100	240 Vac	0 - 5 amps (1.66)A 6 - 13.5 amps (1.66)A**
		30	240 Vac 16(5)A	
		30	400 Vac 4(1)A	
1NT02TL	204	1 cycle	240 Vac 16(5)A	
1NT08	204	10	240 Vac 16(5)A	
		10	400 Vac 4(1)A	
1NT09	204	1 cycle	240 Vac 16(5)A	
1NT11	204	100	30 Vdc 1A	
1NT15	204	10	240 Vac 16(5)A	
1NT20	204	100	30 Vdc 1A	

* Parenthesis indicate inductive load ratings.
** KEMA rated at these current levels at specific open/close temperatures. When applying to these electrical levels, nominal open/close temperatures must be considered to determine if the thermostat selected will operate as intended in the user's application. Please consult a Sensata Engineer for additional clarification.

Standard Temperatures, Tolerances and Differential

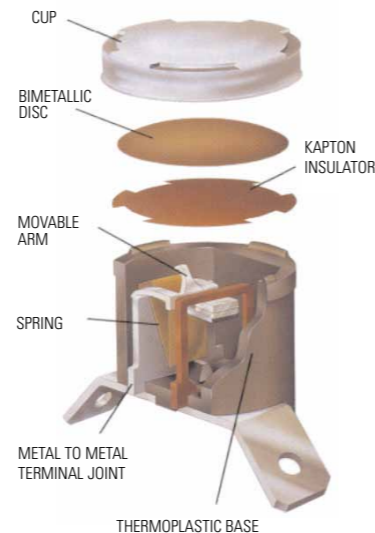
Automatic Reset Thermostats

Nominal Top Temperature		Min. Bottom Temperature		Differential		Standard Tolerances			
°C	°F	°C	°F	°C	°F	Open		Close	
°C	°F	°C	°F	°C	°F	°C	°F	°C	°F
18 to 27	65 to 80	-33	-26	11 to 16	20 to 29	±3.0	±5.5	±4.0	±7.5
				17 to 21	30 to 38	±3.0	±5.5	±4.5	±8.5
				22 to 33	39 to 59	±3.0	±5.5	±5.5	±10.0
28 to 80 and *81 to 93	81 to 176 and 177 to 199	-33	-26	11 to 13	20 to 23	±3.0	±5.5	±4.0	±7.5
				14 to 16	24 to 29	±3.0	±5.5	±4.5	±8.5
				17 to 33	30 to 59	±3.0	±5.5	±5.0	±9.0
*94 to 121	*200 to 249	50	122	11 to 16	20 to 29	±3.5	±6.5	±4.5	±8.5
				17 to 21	30 to 38	±3.5	±6.5	±5.5	±10.0
				22 to 33	39 to 59	±3.5	±6.5	±6.5	±12.0
122 to 149	250 to 300	50	122	14 to 21	24 to 38	±4.0	±7.5	±5.5	±10.0
				21 to 33	39 to 59	±4.0	±7.5	±8.0	±14.5
				34 to 55	60 to 99	±5.5	±10.0	±11.0	±20.0
150 to 177	301 to 399	50	122	22 to 33	39 to 59	±5.0	±9.0	±9.0	±16.5
				34 to 44	60 to 79	±5.5	±10.0	±11.0	±20.0
				45 to 55	80 to 99	±5.5	±10.0	±11.0	±20.0
178-204**	351 to 399	50	122	22 to 33*	39 to 59	±5.0	±9.0	±9.0	±16.5
				34 to 44	60 to 79	±5.5	±10.0	±10.0	±20.0
				45 to 55	80 to 99	±5.5	±10.0	±10.0	±20.0

* Not valid for Fan Devices
** Top Temp for Fan Devices cannot exceed 380°F (193°C)

Manual Reset and One-Shot Thermostats

Nominal Top Temperature		Open Tolerances	
°C	°F	°C	°F
<60	<140	±4.0	±7.5
61 TO 160	141 to 320	±5.0	±9.0
161 TO 204	321 to 399	±6.0	±11.0



Sample Order Placement

To enable Sensata Technologies to serve you in a quicker, more efficient manner, please be prepared to provide the following information when requesting samples:

- Detailed application description
- Estimated yearly usage
- Opening and closing temperatures
- Max. temperature tolerances allowable
- Switch type
- Mounting style desired
- Terminal orientation and material
- Electrical load

Other conditions which are likely to affect the 1NT operation should also be described. These include:

- Maximum temperature exposure
- Location with respect to heat source
- Temperature transfer medium (air, metal surface, etc)
- Possible contamination sources (lint, chemical fumes, liquid, condensation, humidity, etc.)

When ordering thermocouple samples, specify whether J, K, or T type and the lead length desired. Standard wire size is 30 Ga..

Thermostat Handling Tips

- Exposed disc devices should be kept free of dust and particulates, liquid and condensation. The face of the disc should never be snapped.
- Mounting screws and drivers for use with smaller integral cups and flanges should be sized to provide adequate clearance to the thermostat body.
- The installation force applied to the cup face should not exceed 66.7N (15 lbs.)
- The maximum reset force on the manual reset and trip free button is 22.2N (5 lbs.).

Marketing / Sales Offices

The Americas

Brazil

Sensata Technologies
Sensores e Controles Do
Brasil LTDA
Rua Azarias de Melo #648-Taquaral
Campinas - SP - Brasil
CEP 13076008
Phone: +55 19 3754.1111
Fax: +55 19 3251.8321

Mexico

Sensata Technologies de Mexico S de RL
de CV
AV. Aguascalientes Sur #401,
Ex Ejido Salto de Ojocaliente
CP. 20290
Aguascalientes, Ags.
Mexico
Phone: 011 52 449 9 105500
Fax: 011 52 449 9 105536

United States

Sensata Technologies, Inc.
529 Pleasant Street
P.O. Box 2964
Attleboro, MA 02703
Phone: 1-888-438-2214
Phone: 1-508-236-1894
Phone: 1-508-236-3192

Europe

The Netherlands

Sensata Technologies
Holland B.V.
Kolthofsingel 8
P.O. Box 43, MS4240
7600 AA Almelo
The Netherlands
Phone: +31 5468 79555
Fax: +31 5468 70535

Korea

Sensata Technologies
Korea Limited
Jhincheon Plant
67-1, Sakok-Ri, Ewol-Myon.
Jhincheon-Kun.
ChungCheongBuk-Do
365-823, Korea
Phone: 82 43 533 0300
Fax: 82 43 533 0309

China

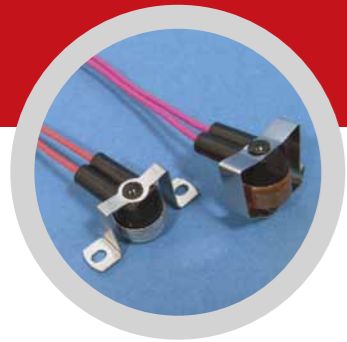
Sensata Technologies
Baoying Co. Ltd.
9 East Taishan Road
Baoying Economic Development Zone
Baoying, China
Phone: (86) 514 823 8484
Fax: (86) 514 822 8467

Japan

Sensata Technologies
Changzhou Co. Ltd.
18 Chuangxin Avenue
Xinbei District
Changzhou 213031, China
Phone: 0086 519 5161188
Fax: 0086 519 516 1151

Japan

Sensata Technologies
Japan Limited
305 Tanagashira, Oyama-Cho,
Sunto-Gun Shizuoka-Ken, Japan 410-1396
Phone: 81 550 78 1211
Fax: 81 550 90 1330



KLIXON | 3NT SERIES FIXED TEMPERATURE THERMOSTATS

WORLD CLASS PERFORMANCE

The 3NT is an automatic reset thermostat designed to meet customer specific application requirements. With its unique dry seal, the switch is protected from environmental hazards such as water, dust, oil, etc. without the use of epoxies or additives. The 3NT is UL/CSA, KEMA/ENEC approved.

Sensata Technologies has been a leading global supplier of pressure sensors & switches for over 50 years.

Key Features

- Automatic Reset
- Small and easy to mount
- Fast thermal response
- Innovative dry seal design - protects from moisture and dust
- Reliable 100K cycle life
- High temperature - to 275°F (135°C)

General Description

The 3NT thermostat from Sensata Technologies is a new, custom built, automatic reset thermostat designed to meet your specific application requirements. Its patented, tamperproof, Klixon® snap-acting bimetal disc provides reliable, repeatable switch actuation, for electrical loads ranging from dry circuits to 10A @ 240Vac.

The dry seal also allows direct integration of the thermostat into a wire harness, eliminating extra connections.

The core of the 3NT is the proven 1NT thermostat. Recognized by all major worldwide agencies, hundreds of millions are used daily in a wide variety of appliance, HVAC, automotive, and specialty applications. Manufactured since 1981, the 1NT thermostat is produced at ISO 9000 certified manufacturing sites.

Applications

Small size, a variety of mounting options, and outstanding thermal response, makes the 3NT an excellent temperature control for dehumidifiers, freezers, heat pumps, ice makers, refrigerators, or any place where a fixed temperature control is required in a wet or dirty environment.



Application Shown:
Residential heat pump

Design Specifications

Operating Temperature:

-20 to 135°C (-4 to 275°F)

Ambient Temperature:

-40°C to maximum wire lead insulation temperature rating:

PVC - 105°C

XLP - 125°C

(Allow 15°C de-rating below wire insulation rating at maximum 10A current)

Minimum Nominal

Temperature Differential:

8°C (15°F)

Dielectric Strength:

750 Vrms

1500 Vrms terminals to case

Switch Configurations

Switch Configurations

3NT thermostats are SPST switches which typically reset automatically. Single operation function is available.

Sensata recommends standard silver contacts for most applications. Customers may prefer to specify gold contacts for low voltage (<12V) or low current (less than 100mA) applications. Min. 25 m Amp

Standard Wire Leads:

18 AWG (1/32" or 1/16" wall thickness 105°C PVC)

16 AWG (1/32" thick, 105°C, PVC insulation)

1/32" wall thickness 125°C XLP insulation available upon request

A wide variety of wire lead terminals are available from stock. Custom termination support is available.

Agency Approvals

	File Number	Category
UL (USA) ¹	SA995	Category SDFY2
UL (CANADA) ¹	SA995	Category SDFY8
KEMA (ENEC)	2014531.16	EN 60730-2-9

¹) Recognized to US and Canadian requirements by Underwriters Laboratories (UL873 and C22.2 No. 24)

Electrical Ratings

Agency	Cycles x1000	Volts	FLA	LRA	Amps (resistive)	VA
UL (USA, Canada)	100	120 Vac	5.8	34.8	10	125
	100	240 Vac	2.9	17.4	10	125
	30	120 Vac	10.0	40.0		
	30	240 Vac	10.0	40.0		
	100	30 Vdc			1	
ENEC (Europe)	30	240 Vac			16	

Standard Temperatures and Tolerances

Nominal Top Temperature		Nominal Differential		Open Temperature Tolerance		Close Temperature Tolerance	
°F	°C	°F	°C	°F	°C	°F	°C
32 to 80	0 to 27	20 - 29	11 - 16	±5.5	±3	±7.5	±4
		30 - 38	17 - 21	±5.5	±3	±8.5	±4.5
		50 - 60	22 - 33	±5.5	±3	±10	±5.5
81 to 167	28 to 75	20 - 23	11 - 13	±5.5	±3	±7.5	±4
		24 - 29	14 - 16	±5.5	±3	±8.5	±4.5
		30 - 59	17 - 33	±5.5	±3	±10	±5
*168 to 199	*76 to 93	20 - 23	11 - 13	±5.5	±3	±7.5	±4
		24 - 29	14 - 16	±5.5	±3	±8.5	±4.5
		30 - 59	17 - 33	±5.5	±3	±9	±5
*200 to 249	*94 to 121	20 - 29	11 - 16	±6.5	±3.5	±8.5	±4
		30 - 38	17 - 21	±6.5	±3.5	±10	±4.5
		39 - 59	22 - 33	±6.5	±3.5	±12	±6.5
		50 - 99	34 - 55	±10	±5.5	±20	±11
250 to 275	122 to 135	24 - 38	14 - 21	±7.5	±4	±10	±5.5
		39 - 59	22 - 33	±7.5	±4	±14.5	±8
		60 - 99	34 - 55	±10	±5.5	±20	±11

*Minimum bottom temperature of 50°C (122°F)

Numbering System

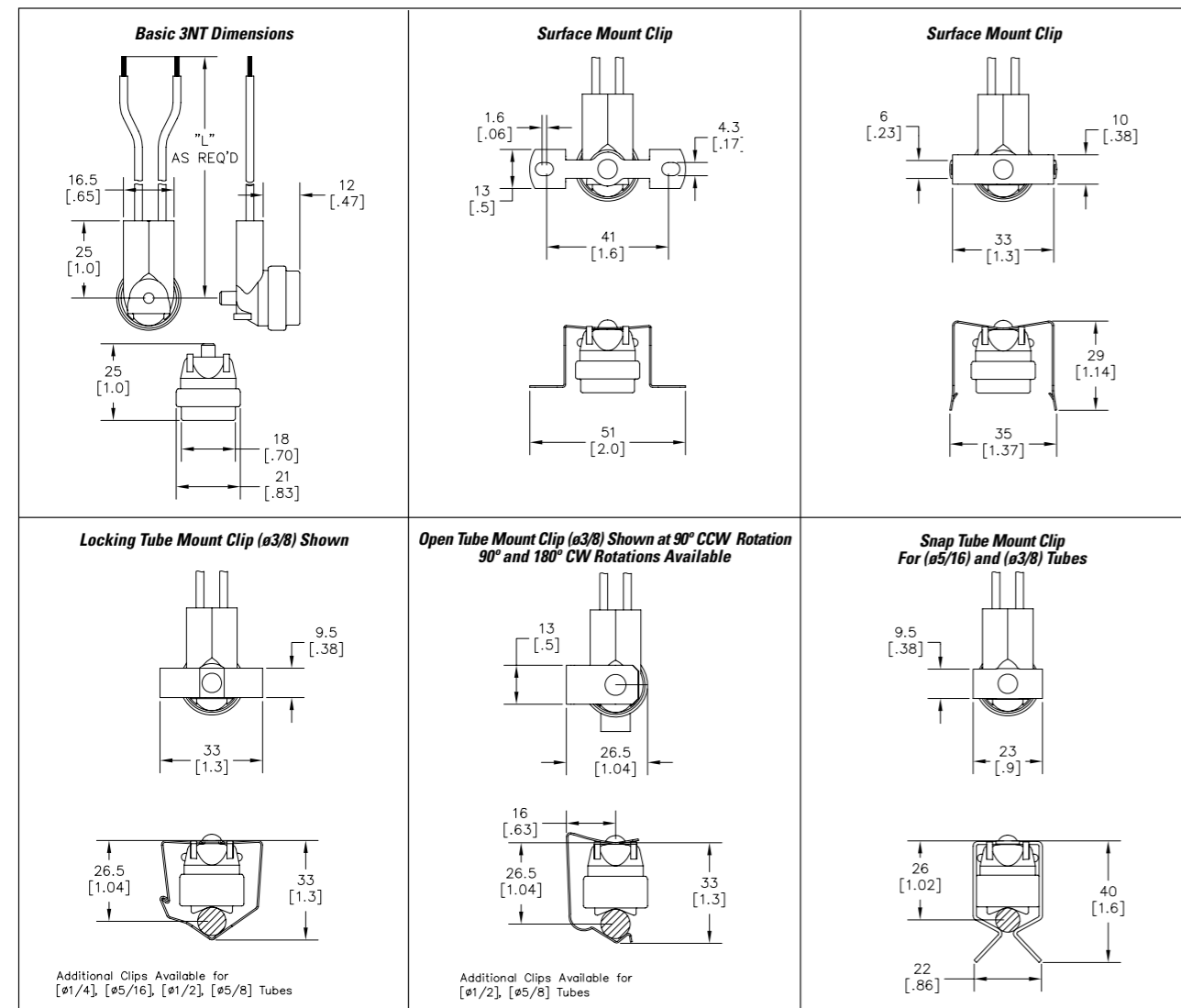
Part Number

3NT	01	L	H	XXXX
Sensata P/N Series	Contact Material	Switch Opening Logic	Dry Seal Construction	ID Number
	01 - Silver 11 - Gold	L - On Temp. Rise F - On Temp. fall	H - High Temp. (Silicon rubber) N - No leads	Customer & Application Specific

Temperature Code

L	50	F	30
Switch Type	Operating Temperature	Temp. Code	Differential
L - Limit F - Fan	Nominal Opening Temperature	C - Celsius F - Fahrenheit	Difference between Nominal Open and Nominal Close Temperature

Typical Physical Characteristics Dimensions in mm (inches)



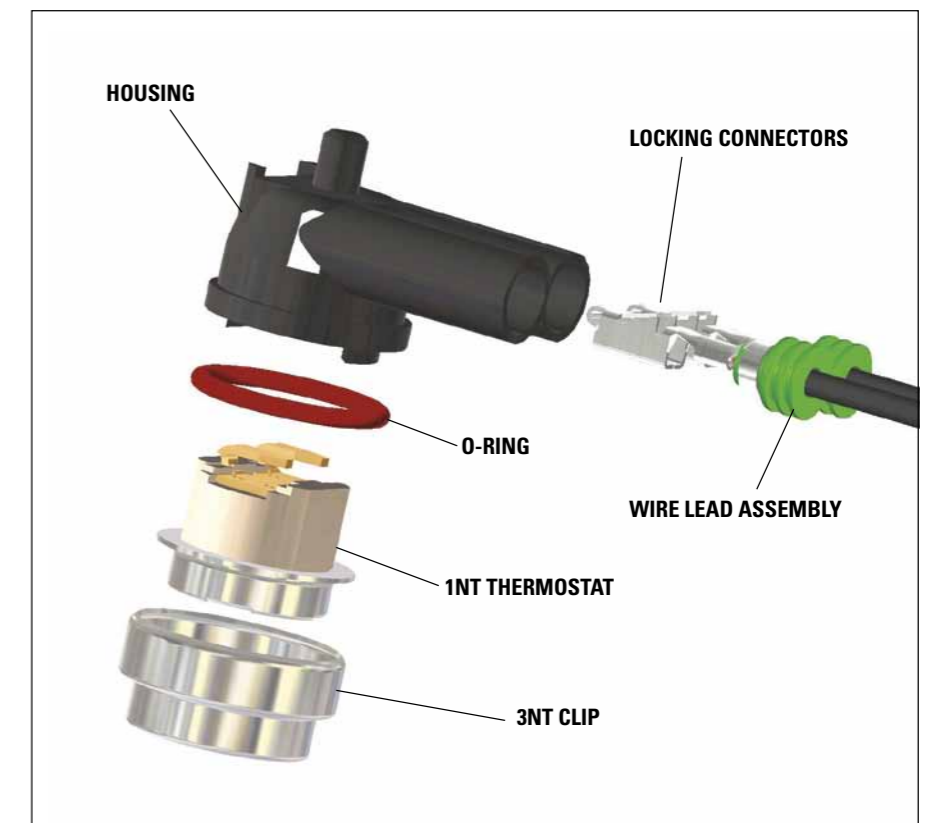
Ordering Samples

Sensata encourages the use of engineering test samples to assist in your thermostat specification process. Please call or FAX the following information for the fastest possible sampling lead times:

1. Customer product application
2. Electrical load requirements: voltage, current, power factor (inductive loads)
3. Nominal setpoint temperatures (opening and closing)
4. Maximum allowable temperature setpoint tolerances (see table for standards)
5. Mounting style desired:
 - flat surface - screw hole or snap-in
 - tube - diameter and orientation
6. Cup material (aluminum or copper)
7. Lead wire specifications (length, wire gage, terminations, insulation type and thickness)
8. Estimated annual usage

Non-functional thermocouple samples are available to determine thermostat setpoints. Please specify thermocouple type (J,K,T) and length. Standard wire size is 30 gauge.

3NT Dry Seal Design



Important Notice: The 3NT is not hermetically sealed, and should not be submerged in liquid. For such applications, please contact Sensata Technologies for advice.



AIRPAX | 5024 EGR SERIES CUSTOM HIGH TEMPERATURE SENSOR PACKAGES

FEATURES

- High temperature sensing NTC thermistor technology
- Fast response stainless steel packages in various thread sizes
- Lead wire or integral connector terminal options
- Available in 150°C or 300°C constructions

DESCRIPTION

The Airpax™ 5024 EGR temperature sensors provide up to 300°C temperature sensing capability in fast response stainless steel packages. Developed for the exhaust gas recirculation market, the new 5024 EGR temperature sensors provide accurate high temperature output in the fastest responding immersion package on the market today.

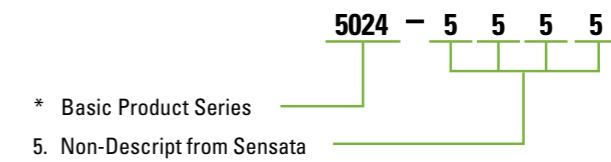
Please contact Sensata Technologies for assistance in applying the Airpax™ 5024 EGR temperature sensors to meet your high temperature sensing needs.

SPECIFICATIONS

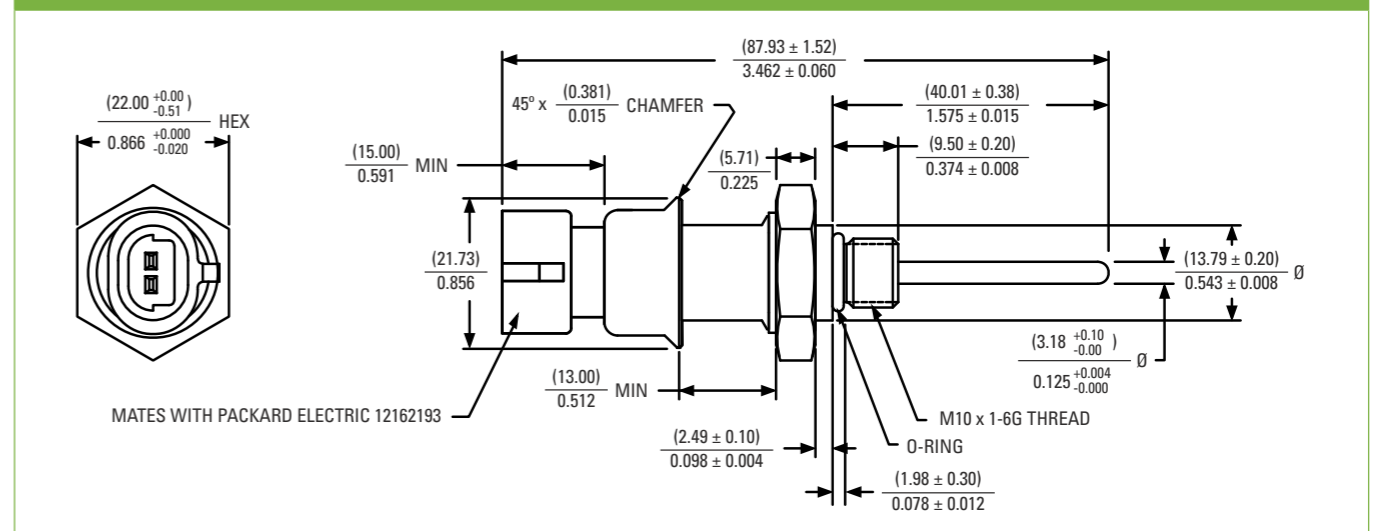
Max Operating Temperature	-55°C to 300°C (-67°F to 572°F)
Temperature Tolerance	150°C max version: 25°C ± 0.4°C, 150°C ± 0.6°C 300°C max version: 25°C ± 0.8°C, 300°C ± 3.7°C
Body Material	304 Stainless Steel
Sensor Type	150°C max version: 3,000 ohms @ 25C, NTC 300°C max version: 49,120 ohms @ 25C, NTC
Mating Connector	150°C max version: Packard Electric 12162193 300°C max version: Packard Electric 12162197

EXAMPLE : 5024-5555

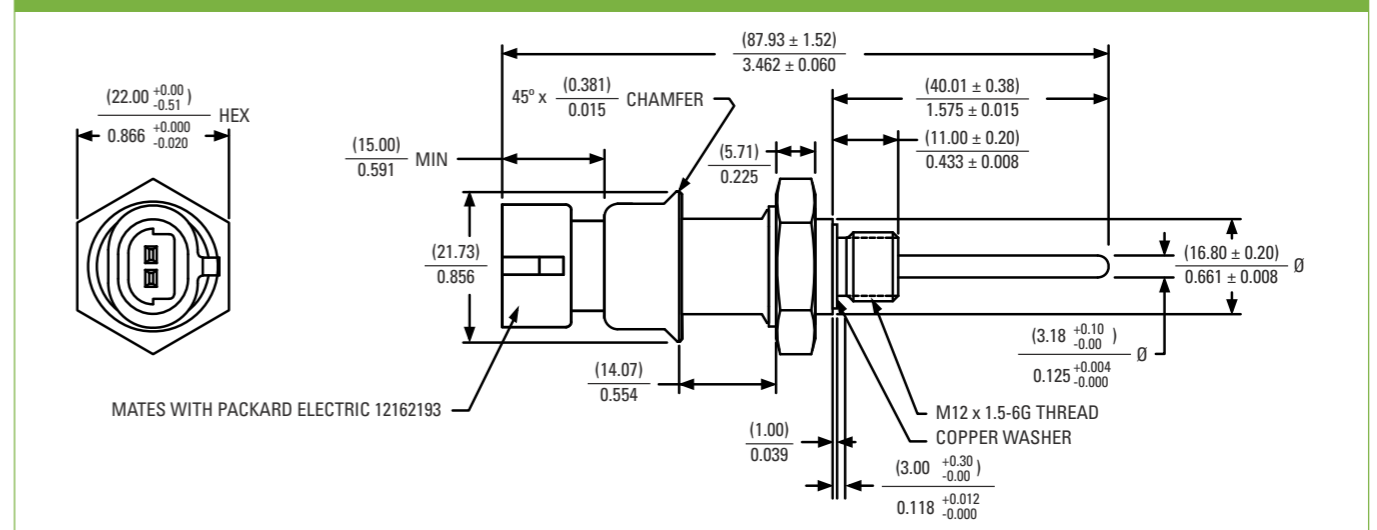
5024 series assigned a unique, 4-digit non-descript by Sensata Technologies to specify the body, terminals and sensing element.



5024 EGR 150°C MAX CONFIGURATION



5024 EGR 300°C MAX CONFIGURATION





AIRPAX | 3000 SERIES TEMPERATURE SENSOR PROBES

FEATURES

- Stainless steel probe assemblies
- Thermistor, RTD or IC sensing technologies
- Ideal for immersion, surface and air sensing

DESCRIPTION

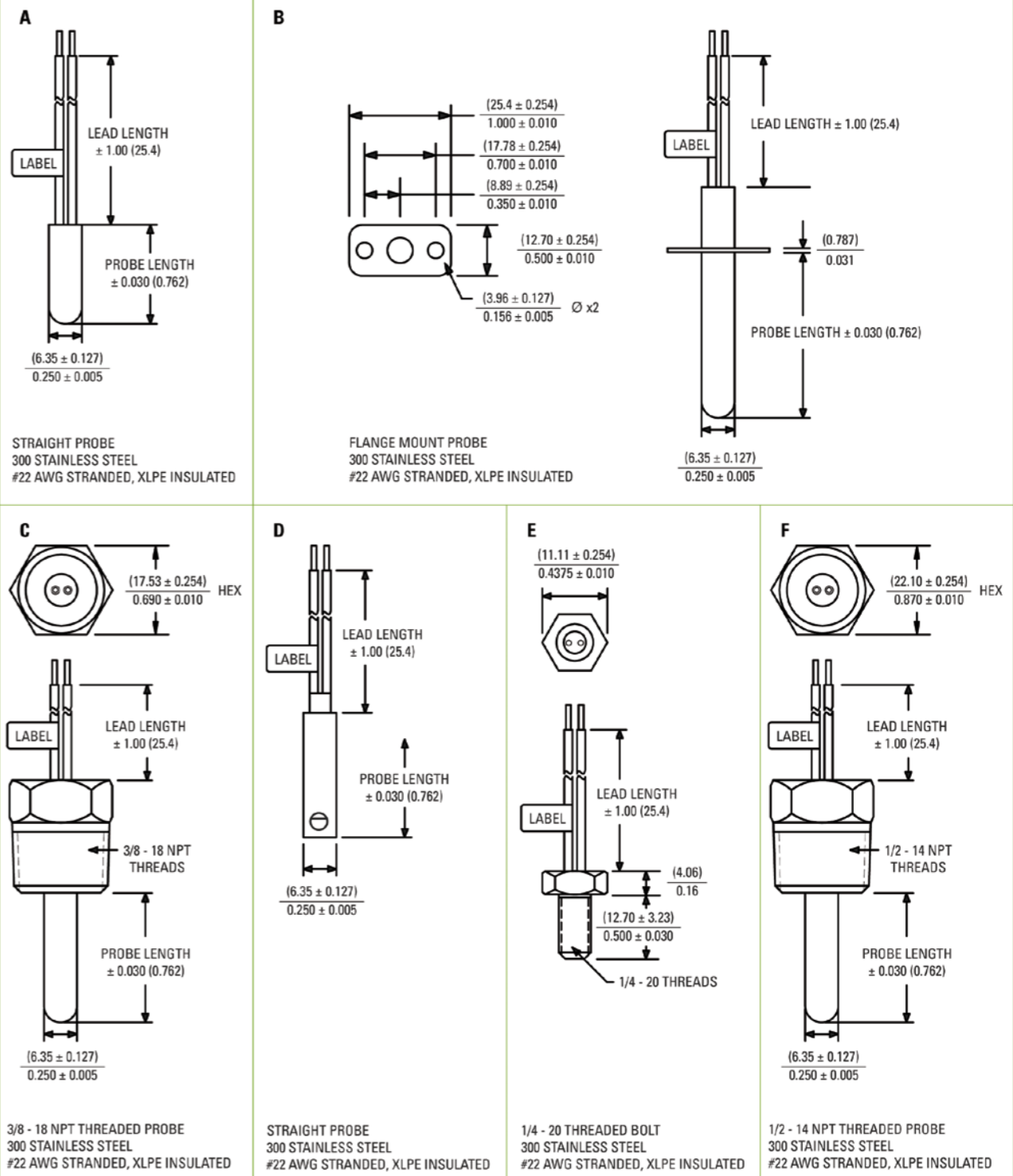
The Airpax™ 3000 series is part of Sensata’s growing line of standard temperature sensors. An ideal solution for monitoring and regulating temperature in equipment and processes, the 3000 series offers the choice of thermistor, RTD or Integrated Circuit (IC) temperature sensing technology.

Since no single technology is optimal for every application, the VeriSense™ 3000 offers several thermal-sensing options from which to choose. Thermistor, RTD or Integrated Circuit sensing elements are available. Each of these technologies offers unique advantages. Airpax experts can help select the right temperature sensing technology for a specific application.

The 3000 series offers the advantage of today’s best temperature sensing technology in standard, low-cost probe assemblies that ensure the technology performs accurately and reliably in demanding applications. Whether surface, liquid, or ambient air sensing is required, the Airpax™ 3000 series offers an optimal probe assembly. Flexible leads suitable for welding or soldering provide reliable connections and greater access to remote locations.

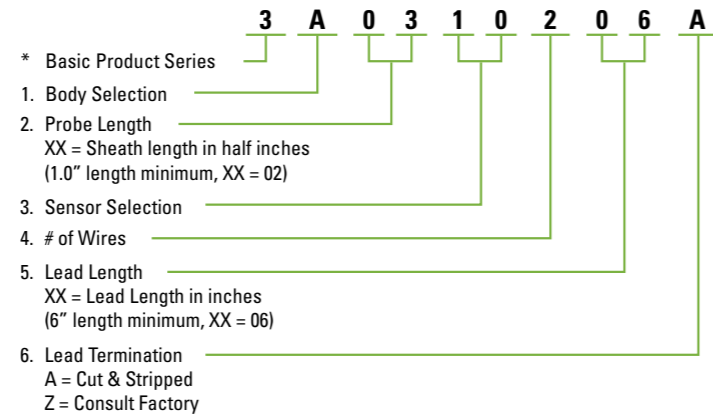
AIRPAX™ 3000 SERIES DECISION TABLES

1. BODY SELECTION

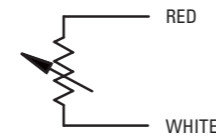


EXAMPLE : 3 A 03 10 2 06 A

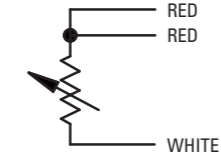
3A = 3000 series, straight probe
 03 = 1.5" length
 10 = RTD
 2 wire, 06 = 6" leads
 cut & stripped termination



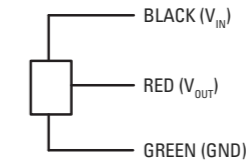
WIRE COLOR SCHEMATIC



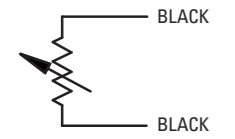
OPTION 10, 11, 15



OPTION 10, 11, 15



OPTION 20, 21, 22



OPTION 30, 31

3. SENSOR SELECTION

CODE	TYPE	INPUT	OUTPUT	OUTPUT CHANGE W/ TEMPERATURE	TOLERANCE	TEMPERATURE RANGE
10	RTD	1 mA	100Ω at 0°C	0.385Ω per °C	±0.06Ω at 0°C	-40°C to 125°C
11	RTD	1 mA	100Ω at 0°C	0.385Ω per °C	±0.12Ω at 0°C	-40°C to 125°C
15	RTD	1 mA	1,000Ω at 0°C	3.85Ω per °C	±1.2Ω at 0°C	-40°C to 125°C
20	IC	4 to 30 VDC	0.000 Volts at 0°C	10mV per °C	±1°C at 25°C	0°C to 100°C
21	IC	2.7 to 10 VDC	0.600 Volts at 0°C	10mV per °C	±3°C at 25°C	-25°C to 85°C
30	THERMISTOR	10 mA	1,000Ω at 25°C	NON-LINEAR (PTC)	±1.3°C at 25°C	-40°C to 125°C
31	THERMISTOR	0.4 mA	10,000Ω at 25°C	NON-LINEAR (NTC)	±0.2°C, 0°C to 70°C	-40°C to 125°C
ZZ	CONSULT FACTORY	CONSULT FACTORY	CONSULT FACTORY	CONSULT FACTORY	CONSULT FACTORY	CONSULT FACTORY

4. NUMBER OF WIRES

CODE	SENSOR WIRING
2	2 wires for sensor codes 10, 11, 15, 30, 31
3	3 wires for sensor codes 10, 11, 15, 20, 21
4	4 wires for sensor codes 10, 11, 15

APPLICATION OVERVIEW

Sensata solutions are suitable for any application that require:
Pressure and or temperature measurement and control with:

- High accuracy • Robust industrial packaging
- Long term reliability and stability

Measurement

- Pressure
 - Switch
 - Sensor
- Temperature
 - Switch
 - Sensor

Of...

- Air/gas
- Water
- Oil/lubricants
- Transmission fluid
- Hydraulic fluid
- Refrigerants
- Chemicals
- Solutions



In...

- HVAC
- Refrigeration
- Air Compressors
- Pumps
- Machine Tools
- Industrial automation
- Construction Equipment
- Food & Beverage
- Marine
- Hydraulics
- Agriculture

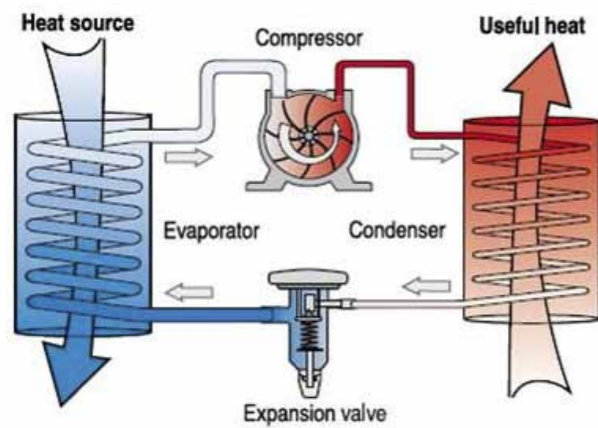




AIR CONDITIONING/VRF APPLICATION NOTE

Sensata solutions for Air Conditioning provide:

- Precise refrigerant pressure measurement and control
- Pressure sensing for efficient variable speed control / VRF systems
- Integrated pressure + temperature sensors for reduced components
- Hermetic options for demanding HVAC environments
- Solutions suitable for a variety of natural refrigerants (CO₂, Ammonia, Hydrocarbons)



End Markets

- Residential /Commercial air conditioning

Applications

- Unitary
- Mini/Multi-split
- Rooftop
- Chillers



2HMP

Sensata Solutions

- Pressure Switches - On/Off Control
 - 20PS
 - PS80 (New option for CO₂)
- Pressure Sensing – Variable speed control
 - 2CP5
 - 2HMP (New!)
- Thermostat
 - 1NT, 3NT
- Temp Sensing
 - 5024



HVAC Pressure switches, sensors

Features & Benefits of 2HMP

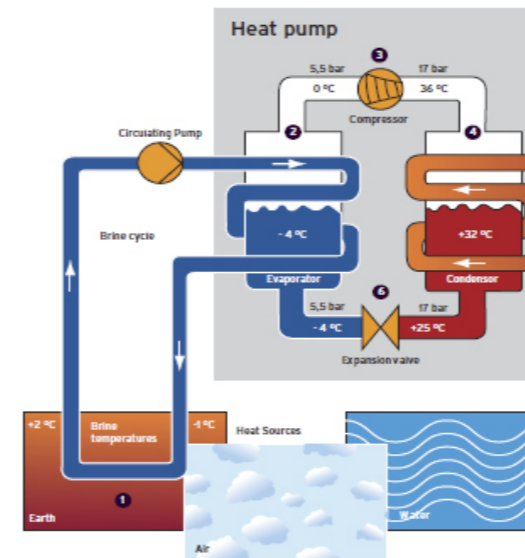
- Industry leading accuracy over wide operating range
- Stainless steel structure, hermetic and case isolated
- Temperature compensated
- Rugged seal ideal for outdoor environments
- Media and electrical isolation protects against thermal and electrical shock
- Outstanding EMC/ESD performance
- Low cost design for OEM application
- Flexibility with ports, connectors and mounting options



HEAT PUMPS & COOLING SYSTEMS APPLICATION NOTE

Sensata solutions for Heat pumps & Cooling systems provide:

- Precise refrigerant pressure measurement and control
- Pressure sensing for efficient variable speed control systems
- Solutions for new, environmentally-friendly refrigerants
- Long term reliability



End Markets

- Residential HVAC
- Commercial HVAC
- Industrial HVAC

Applications

- Air conditioning
- Heating
- Water heaters



Sensata Solutions



Switches PS80, 20PS, 29PS



APT

APT with Tif tube

APT P+T

Features & Benefits sensor APT P only

- Enhanced accuracy over wide operating range.
- Housing options are compatible with most media
- EMC protection to 100 V/m
- Broad operating temp. range (-40°C to +135°C)
- Exceptional shake and vibration tolerance
- Overvoltage and reverse polarity protection
- Small size and simple installation

Features & Benefits sensor APT P+T

- Both pressure and temperature in one package
- Fast in stream temperature measurement
- Precise super heat measurement

Features & benefits switches PS80, 20PS, 29PS

- Proven reliability
- Custom engineered solutions



NATURAL REFRIGERANTS APPLICATION NOTE

Much of the refrigeration and air conditioning equipment uses fluorocarbon refrigerants to facilitate the heat transfer process. Fluorocarbon refrigerants are synthetic chemicals which usually have a high global warming potential (GWP), and the potential to cause damage to the ozone layer as well if released in the atmosphere. Alternatives to these chemicals exist that can help to mitigate some of the environmental risks. Often referred to as 'natural' refrigerants because the substances also occur in nature, these alternatives include ammonia, carbon dioxide and a variety of hydrocarbons.



Switch PS80-2x For CO2 (New)

APT P+T - 112CP

End Markets

- Beverage coolers
- Supermarkets/Light commercial cooling systems
- Commercial & Industrial Cooling systems

Applications

- Air conditioning
- Cooling equipment
- Heat pumps

Features & Benefits

- ATEX standard pressure switches
- Suitable solutions for CO2, ammonia, propane, R1234YF, R32, etc.
- Hermetic sensors for withstanding harsh conditions
- Fully stainless steel offerings available
- Enhanced accuracy over very wide range of pressures and temperatures with high reliability
- Exceptional shake and vibration tolerance
- Both pressure and temp sensor available in one package
- Precise super heat measurement

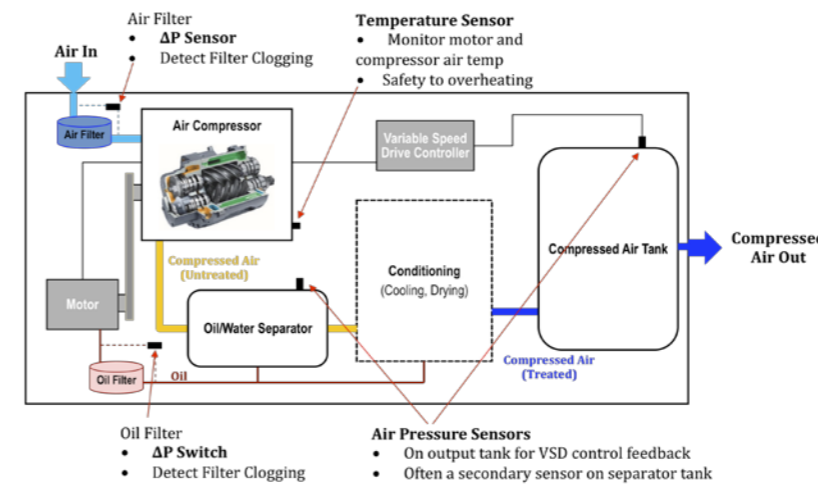


AIR COMPRESSORS APPLICATION NOTE

Sensata solutions for air compressors provide:

- Pressure and temperature measurement for safety and optimal efficiency
- Pressure sensing for efficient variable speed drive
- Optional 4-20mA output for longer transmission
- Integrated pressure + temperature sensors for reduced components

Many uses for pressure sensors to optimize efficiency and system reliability



Sensata Solutions

- Pressure Switches - On/Off Control
 - 20PS
 - PS80
- Pressure Sensing – Variable speed control
 - 60CP
 - 70CP
- Temp Sensing – Air and oil monitoring
 - 5024
 - Darts 100/200/500/1000 (PTC)
- Pressure + Temperature Sensing
 - 112CP

End Markets

- Industrial Manufacturers
- Process Technology

Applications

- Air pumps
- Air compressors for industrial use
- Hydraulic compressors
- Pneumatic Conveying
- Truck Pressure & Vacuum applications
- Air Treatment, Air Audits & System Control



Features & Benefits

- Enhanced accuracy over wide operating range.
- Housing options are compatible with most media
- EMC protection to 100 V/m
- Broad operating temp. range (-40°C to +135°C)
- Exceptional shake and vibration tolerance
- Overvoltage and reverse polarity protection
- Small size and simple installation

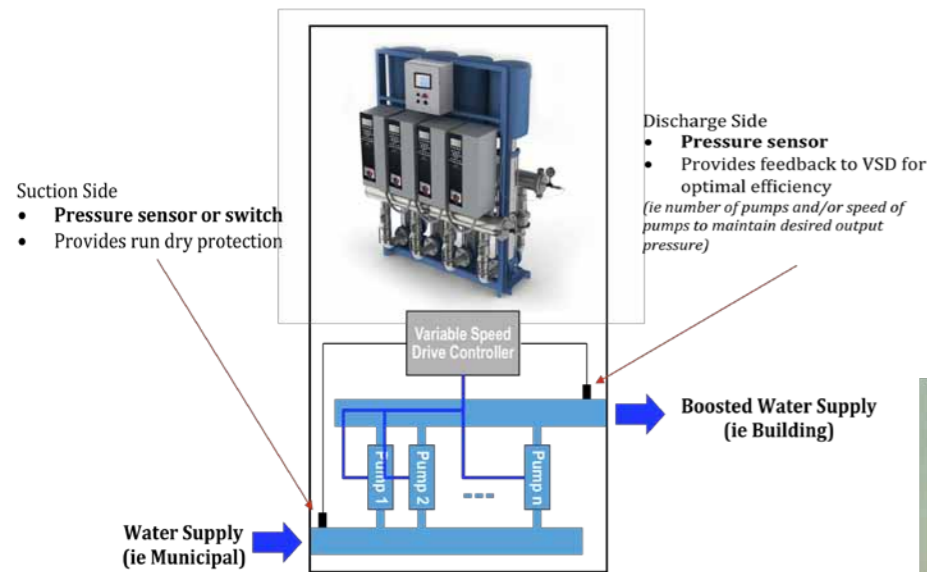


PUMPS & VARIABLE SPEED DRIVES APPLICATION NOTE

Sensata solutions for pumps provide:

- Pressure measurement for pump suction and discharge
- Pressure sensing for efficient variable speed booster pump systems
- Optional 4-20mA output for longer transmission
- Pressure sensing solutions for NFPA20 compliant fire pumps
- Hermetic solutions and rugged solutions for the harshest pump environments
- Accurate temperature sensing solutions,

Pressure sensors used by Variable Speed Drive (VSD) to optimize system efficiency



Sensata Solutions

- Pressure Switches - On/Off Control
 - 20PS
- Temperature sensors
- Pressure Sensing – VSD feedback
 - 70CP
 - 2HMP (New)



2HMP

70CP

End Markets

- Residential pumps
- Industrial pumps
- Agricultural pumps

Applications

- Booster pumps
- Fire pumps
- Submersible pumps
- Circulator pumps

OUR OFFICES WORLDWIDE

THE AMERICAS

United States

Sensata Technologies Inc.
529 Pleasant Street
Attleboro, MA 02703
USA
Phone: +1 508-236-3800

Sensata Technologies Inc.
2102 West Quail Avenue,
Suite 2
Phoenix AZ 85027
Phone: 480-682-6148

Sensata Technologies
Dimensions
4467 White Bear Lake Parkway
St. Paul, MN 55110
USA
Phone: +1 800-553-6418

Sensata Technologies Power
Controls
807 Woods Road
Cambridge, MD 21613
USA
Phone +1 410-228-4600

Brazil

Sensata Technologies Sensores e
Controles Do Brasil LTDA
Rua Azarias de Melo #648 -
Taquaral
Campinas - SP - Brasil
CEP 13076008
Phone: +55 1937541111

EUROPE

Belgium

Sensor-NITE N.V.
Industrielaan 24
B-2250 Olen
Belgium
Tel: +32 14 28 74 00
Fax: +32 14 28 74 01

Bulgaria

Sensor-NITE Industrial
Ltd.
1528 Sofia, Bulgaria
blvd.Iskarsko shose No 7
Building 15
Tel: +359 2 80 70 698
Fax: +359 2 80 70 670/671

Netherlands

Sensata Technologies Holland B.V.
Kolthofsingel 8
P.O. Box 43, MS 4220
7600 AA Almelo
The Netherlands
Phone: +31 546 87 95 55

ASIA PACIFIC

China

Sensata Technologies China Co.,
Ltd.
BM Intercontinental
Business Center
30th Floor
100 Yu Tong Road
Shanghai 200070
People's Republic of China
Phone: +8621 2306 1500

Japan

Sensata Technologies Japan Ltd.
Shin Yokohama Square Bldg. 7F,
2-3-12
Shin-yokohama, Kohoku-ku,
Yokohama-shi,
Kanagawa 222-0033
Japan
Phone: +81-45-277-7001

Korea

Sensata Technologies
Korea Cheonan R&D
Center
56, Chaan-dong,
Cheonan-si
Chongcheongnam-do,
330-200
South Korea

NOTES

NOTES

NOTES