

Sensors: Technologies and Markets to 2023

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Abstracts

Summary

Sensors have become indispensable in many industries because they provide vital information about parameters that include temperature, position, chemistry, pressure, force and load, and flow and level, and thus affect products, processes and systems. As technological advances in electronic control systems increase the efficiency of sensors, users are calling for advances in sensor accuracy, reliability, response time, robustness, miniaturization and communication capability. The sensor industry is robust and is expected to experience sound growth during the five-year forecast period.

Advances in micromachining have made it possible to produce micron-sized devices on a silicon wafer — a process that is very attractive for large-volume applications using mass production processes. This technology is particularly important in the sensor market since silicon has been shown as a very good material for use in sensors.

In the near future, the manufacturing costs and power consumption of wireless sensors will decrease, and wireless sensors will be fully integrated into wireless networks, replacing hardwired configurations. A broad spectrum of wireless communications hardware and software is already available, and the communication industry is the largest consumer of this technology, primarily in mobile phones and base stations. Fiber optic sensors will also play a role in networks and communications.

Magnetic field sensors will play a role in magnetic storage media and customer terminals. Photodetectors for local area networks (LANs) will also see growth in regional, municipal and longdistance network applications. Nanotechnology, which involves manipulating and harnessing chemical reactions and molecular processes of living cells in designs aimed at specific technological functions, will experience strong growth within the sensor market, especially for chemical detection.

Among the industrial sensor segments, pressure, force and load, and level sensors will experience strong growth. Image sensors will experience the highest growth because of their increased use in smartphones and many other portable devices. Biosensors and chemical sensors will also experience growth in the wake of terrorist threats to key industrial facilities such as chemical plants and due to increased use in medical applications.

Small companies account for the majority of companies within the sensor manufacturing business. Most companies pursue a focused strategy, but competitive and technological pressures are leading to consolidation and increasing concentration. However, the semiconductor industry is attempting to recapture its intensive capital investment by developing sensor solutions to address large-scale highvolume consumer-related applications. This will allow specialized industrial sensor manufacturers time to develop strategies for dealing with the competition. There are also opportunities for new entrants into the business, especially in MEMS. Further, companies with valuable intellectual property and strong customer bases make attractive acquisition candidates.

Since the publication of the previous version of this report, the CAGR five-year forecast has increased to REDACTED from REDACTED. The growth rate has increased mainly due to increased use of various types of sensors in Internet of Things (IoT) and Industrial Internet of Things (IIoT) applications, increased use of image sensors in various applications like cameras, increased use of fingerprint sensors for various purposes and sudden increase in the use of chemical sensors for many new applications. The global market for sensors, valued at nearly REDACTED in 2017, is expected to increase to more than REDACTED in 2018 and to more than REDACTED in 2023, for a compound annual growth rate (CAGR) of

REDACTED over the five-year period from 2018 through 2023.

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AB ELECTRONIK

ACCEL AB

ALEPH AMERICA

ALLEGRO MICROSYSTEMS INC.
ALPHASENSE
ALPS ELECTRIC CO. LTD.
AMERICAN ELECTRONIC COMPONENTS INC.
AMERICAN SENSOR TECHNOLOGIES INC.
AMETEK INC.
AMS AG
ANALOG DEVICES INC.
APPLIED TECHNOLOGY ASSOCIATES
APTINA IMAGING CORP.
ATI INDUSTRIAL AUTOMATION
AUTOLIV INC.
AUTOMOTIVE TECHNOLOGIES INTERNATIONAL INC.
BANNER ENGINEERING CORP.
BAUMER HOLDINGS AG
BEBOP SENSORS INC.
BEI SENSORS
BINSFELD ENGINEERING INC.
BOKAM ENGINEERING INC.
BOONTON ELECTRONICS CORPORATION
BORGWARNER BERU SYSTEMS GMBH
BOSCH SENSORTEC GMBH
BOURNS SENSORS GMBH
CAMBRIDGE CMOS SENSORS LTD.
CASCO PRODUCTS CORP.
CITY TECHNOLOGY LTD.
COGNEX CORP.
COLIBRYS SA
COMUS INTERNATIONAL BVBA
CONAX TECHNOLOGIES
CONTELEC AG
CONTINENTAL AG
CONTI TEMIC MICROELECTRONIC GMBH
COOPER INSTRUMENTS & SYSTEMS
CORRSYS-DATRON SENSORSYSTEME GMBH
CROSSBOW TECHNOLOGY INC.
CTS CORP.
CUSTOM SENSORS & TECHNOLOGIES (CST)
CYBEROPTICS CORP.

CYNERGY3 COMPONENTS LTD.
D&R TECHNOLOGY LLC
DELPHI AUTOMOTIVE PLC
DELPHI CORP.
DENSO CORP.
DER EE ELECTRICAL INSTRUMENT CO. LTD.
DRAEGER SAFETY INC.
E2V TECHNOLOGIES PLC
ELECTRICFIL AUTOMOTIVE
ELECTRO-SENSORS INC.
ELMOS SEMICONDUCTOR AG
EMERSON PROCESS MANAGEMENT
ENDRESS+HAUSER INSTRUMENTS INTERNATIONAL AG
EPCOS AG
E.S.I. ENVIRONMENTAL SENSORS INC.
EXERGEN CORP.
FBGS TECHNOLOGIES GMBH
FIGARO ENGINEERING INC.
FINGERPRINT CARDS AB
FIRST SENSOR AG
FISO TECHNOLOGIES INC.
FLEXPOINT SENSOR SYSTEMS INC.
FLINTEC GMBH
FLIR SYSTEMS INC.
FLOWLINE INC.
FLOW TECHNOLOGY INC.
FREESCALE SEMICONDUCTOR INC.
GALAXYCORE INC.
GE MEASUREMENT & CONTROL
GEMS SENSORS & CONTROLS
GENTECH INTERNATIONAL LTD.
GEORGE FISCHER CORP.
GPIXEL INC.
HAMAMATSU PHOTONICS KK
HAMLIN ELECTRONICS
HANS TURCK GMBH & CO. KG
HEIDENHAIN CORPORATION
HELLA KGAA HUECK & CO.
HITACHI AUTOMOTIVE SYSTEMS

HONEYWELL SENSING & CONTROLS
IDEX ASA
IFM ELECTRONIC GMBH
I.G. BAUERHIN GMBH
INFINEON TECHNOLOGIES AG
INNOVATIVE SENSOR TECHNOLOGY IST AG
INTERNATIONAL SENSOR TECHNOLOGY
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INTERFACE INC.
INTERLINK ELECTRONICS INC.
INTERSEMA SENSORIC SA
INVENSENSE
INVISAGE TECHNOLOGIES INC.
IR-TEC INTERNATIONAL LTD.
ISORG
JEWELL INSTRUMENTS LLC
JOHNSON CONTROLS INC.
J-TEC ASSOCIATES INC.
JUMO GMBH & CO. KG
KAVILCO
KEIHIN CORP.
KEYENCE CORP.
KEY SAFETY SYSTEMS INC.
KIONIX INC.
KISTLER INSTRUMENTE GMBH
LEDDARTECH INC.
LITTELFUSE INC.
LORD MICROSTRAIN SENSING SYSTEMS
LTI HOLDING GMBH & CO. KG
MAGNA INTERNATIONAL INC.
MAXIMA TECHNOLOGIES
MEASUREMENT SPECIALITIES INC.
MEGGITT SENSING SYSTEMS
MELEXIS MICROELECTRONIC SYSTEMS
MEMSIC INC.
METHODE ELECTRONICS INC.
MICROE SYSTEMS INC.
MICRONAS SEMICONDUCTOR HOLDING AG
MICRON OPTICS, INC.

MICROSTRAIN INC.
MIDORI PRECISIONS CO. LTD.
MINDA STONERIDGE INSTRUMENTS LTD.
MITSUBISHI ELECTRIC CORP.
MOOG CROSSBOW
MOTION SENSORS INC.
MRU INSTRUMENT INC.
MTS SYSTEMS CORP.
MURATA ELECTRONICS OY
MURATA MANUFACTURING CO. LTD.
NEOPTIX, INC
NEXT BIOMETRICS GROUP ASA
NGK SPARK PLUG CO. LTD.
NIDEC ELESYS AMERICAS CORP.
NIPPON ALEPH CORP.
NIPPON CERAMIC CO. LTD.
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NOVA BIOMEDICAL CORP.
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NP PHOTONICS INC.
NXP SEMICONDUCTORS
NXP USA INC.
OCEAN OPTICS INC.
OMRON CORP.
OMRON SCIENTIFIC TECHNOLOGIES INC.
ONCQUE CORP.
OPSENS INC.
OPTEK TECHNOLOGY INC.
OPTEX CO. LTD.
OSRAM OPTO SEMICONDUCTORS GMBH
PANASONIC ELECTRIC WORKS
PCB PIEZOTRONICS INC.
PEPPERL+FUCHS
PHILIPS PHOTONICS
PIXART IMAGING INC.
PIXELPLUS CO. LTD.
PLK TECHNOLOGIES CO. LTD.
PREH GMBH
PROXIMION AB

PROXIMITY CONTROLS
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RAE SYSTEMS INC.
RAYTEK CORP.
RDP ELECTROSENSE INC.
RFMICRON INC.
ROBERT BOSCH GMBH
ROSEMOUNT INC.
SCHRADER INTERNATIONAL INC.
SENSANT CORP.
SENSATA TECHNOLOGIES BV
SENSEAIR AB
SENSEOR SAS
SENSIRION AG
SENSITEC GMBH
SENSORAR TECHNOLOGIES AS
SENSORMATE AG
SENSORNET LIMITED
SENSOR SCIENTIFIC INC.
SGX SENSORTECH LIMITED
SHANGHAI NICERA SENSOR CO. LTD.
SHANGHAI TM AUTOMATION INSTRUMENTS CO. LTD.
SICK AG
SIEMENS MILLTRONICS PROCESS INSTRUMENTS INC.
SILICON MICROSTRUCTURES INC.
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