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Fault Detection and Classification (FDC) Market by offering type (Software, hardware, services), Application (Manufacturing, Packaging), end use (Automotive, Electronics & Semiconductor, Metal & Machinery) and Region - Global Forecast to 2028

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Abstracts

The global fault detection and classification market was valued at USD 4.4 billion in 2022 and is projected to reach USD 7.4 billion by 2028; it is expected to register a CAGR of 8.9% during the forecast period. High demand for application-specific integrated circuits (ASICs) and The increased complexity of systems are driving the growth of the fault detection and classification market. Whereaas,earth of skilled professionals in manufacturing factories are restraining the growth of fault detection and classification market.

The software offering segment is expected to grow at the highest CAGR during the forecast period

The software offering segment is expected to grow at second highest CAGR of 12.9% in the near future. FDC software tends to be more cost-effective than hardware-based alternatives. FDC software typically involves lower initial costs, and ongoing expenses are mainly related to software updates and support. This cost advantage is particularly appealing to organizations aiming to optimize their budget while still benefiting from advanced fault detection capabilities. Also, factors such as flexibility, cost-efficiency, scalability, compatibility, advanced analytics capabilities, remote accessibility, and user-friendly data visualization are boosting the growth of software segment in the coming years.

Automotive end use segment to register growth at the highest CAGR during the forecast

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period

The automotive segment is expected to grow at a highest CAGR of 9.7% during the forecast period. Safety is paramount in the automotive industry, and vehicles must comply with strict safety regulations globally. FDC systems play a pivotal role in ensuring compliance with these standards by identifying and addressing potential safety-critical faults early in the manufacturing process. Also, the rise of electric vehicles (EVs) and autonomous vehicles has amplified the importance of FDC systems. EVs rely heavily on complex battery systems, and any fault in these systems can have serious safety and performance implications. FDC systems are essential in monitoring battery health, ensuring optimal charging and discharging, and identifying potential faults to prevent critical incidents.

The manufacuting application segment is likely to grow at a higher CAGR during the forecast period

The manufacuting segment is expected to grow at a higher CAGR during the forecast period. In manufacturing processes, faults may originate from design failures, faulty production equipment, metal fatigue, unfavorable working conditions, or any interplay between these factors. Faults like undesired holes, pits, abrasions, and scratches on various pieces that exit the assembly line are unavoidable. Regardless of the source of the defect, defected components spike production costs, degrade product quality, shorten product lifespan, hamper customer satisfaction, and result in an extensive waste of resources. Therefore, fault detection is a core part of any manufacturing quality control and assurance process. Earlier, faults were inspected manually by human inspectors, which is naturally prone to fatigue, inattentiveness, and biases. Later, manual inspection was augmented by rule-based machine vision technologies. Over the past decade, fault detection has become increasingly technology-driven, building on advancements in artificial intelligence, deep learning, and big data. The use of smart cameras and related AI-enabled systems is already helping manufacturers deliver high-quality inspection in shorter cycles, reduce latency and costs, and set new standards that are far beyond the capabilities of even the most experienced human inspectors.

Breakdown of primaries

The study contains insights from various industry experts, ranging from component suppliers to Tier 1 companies and OEMs. The break-up of the primaries is as follows:

By Company Type - Tier 1 – 35%, Tier 2 – 45%, Tier 3 – 20%

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By Designation— C-level Executives - 40%, Sales Manager - 30%, Others - 30%

By Region—North America - 20%, Europe - 20%, Asia Pacific - 40%, RoW - 10%

The fault detection and classification market is dominated by a few globally established players such as Keyence Corporation (Japan), Cognex Corporation (US), KLA Corporation (US), Teledyne Technologies (US), OMRON Corporation (Japan). The study includes an in-depth competitive analysis of these key players in the fault detection and classification market, with their company profiles, recent developments, and key market strategies.

Research Coverage:

The report segments the fault detection and classification market and forecasts its size by offering type, device type, deployment, application, end-user, and region. The report also discusses the drivers, restraints, opportunities, and challenges pertaining to the market. It gives a detailed view of the market across four main regions—North America, Europe, Asia Pacific, and RoW. Supply chain analysis has been included in the report, along with the key players and their competitive analysis in the fault detection and classification ecosystem.

Key Benefits to Buy the Report:

Analysis of key drivers (The increased complexity of systems, Strong focus of manufacturers on automating quality control and quality assurance processes, Stringent health and safety measures imposed by governments and standards organizations on global manufacturing firms, High demand for application-specific integrated circuits (ASICs)). Restraint (Dearth of skilled professionals in manufacturing factories). Opportunity (Increasing adoption of artificial intelligence (AI) technology, Rapid industrialization in emerging economies, along with government initiatives to facilitate adoption of automated tools in manufacturing plants), Challenges (Complexity in implementation of fault detection and classification solution and technologies)

Product Development/Innovation: Detailed insights on upcoming technologies, research & development activities, and new product launches in the fault detection and classification market.

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Market Development: Comprehensive information about lucrative markets – the report analyses the fault detection and classification market across varied regions

Market Diversification: Exhaustive information about new products & services, untapped geographies, recent developments, and investments in the fault detection and classification market.

Competitive Assessment: In-depth assessment of market shares, growth strategies, and service offerings of leading players like Keyence Corporation (Japan), Cognex Corporation (US), KLA Corporation (US), Teledyne Technologies (US), OMRON Corporation (Japan), Microsoft (US), Tokyo Electron Limited (Japan), Siemens (Germany), Amazon Web Services, Inc. (US), Synopsys, Inc. (US) among others in the fault detection and classification market.

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Contents

1 INTRODUCTION

1.1 STUDY OBJECTIVES
1.2 MARKET DEFINITION
  1.2.1 INCLUSIONS AND EXCLUSIONS
1.3 STUDY SCOPE
  1.3.1 MARKETS COVERED
FIGURE 1 MARKET SEGMENTATION
  1.3.2 REGIONS COVERED
  1.3.3 YEARS CONSIDERED
  1.3.4 CURRENCY CONSIDERED
  1.3.5 UNITS CONSIDERED
1.4 LIMITATIONS
1.5 STAKEHOLDERS
1.6 IMPACT OF RECESSION

2 RESEARCH METHODOLOGY

2.1 RESEARCH APPROACH
FIGURE 2 FAULT DETECTION AND CLASSIFICATION MARKET: RESEARCH DESIGN
  2.1.1 SECONDARY AND PRIMARY RESEARCH
FIGURE 3 FAULT DETECTION AND CLASSIFICATION MARKET: RESEARCH APPROACH
  2.1.2 SECONDARY DATA
    2.1.2.1 Major secondary sources
    2.1.2.2 Key data from secondary sources
  2.1.3 PRIMARY DATA
    2.1.3.1 Major primary participants
    2.1.3.2 Primary interviews with experts
    2.1.3.3 Breakdown of primaries
    2.1.3.4 Key data from primary sources
    2.1.3.5 Key industry insights
2.2 FACTOR ANALYSIS
  2.2.1 SUPPLY-SIDE ANALYSIS
FIGURE 4 MARKET SIZE ESTIMATION METHODOLOGY: SUPPLY-SIDE ANALYSIS
FIGURE 5 MARKET SIZE ESTIMATION METHODOLOGY: TOP-DOWN SUPPLY-

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SIDE ANALYSIS
2.3 MARKET SIZE ESTIMATION
FIGURE 6 MARKET SIZE ESTIMATION METHODOLOGY: SUPPLY-SIDE ANALYSIS
2.3.1 BOTTOM-UP APPROACH
2.3.1.1 Approach to derive market size using bottom-up analysis
FIGURE 7 MARKET SIZE ESTIMATION METHODOLOGY: BOTTOM-UP APPROACH
2.3.2 TOP-DOWN APPROACH
2.3.2.1 Approach to derive market size using top-down analysis (supply side)
FIGURE 8 MARKET SIZE ESTIMATION METHODOLOGY: TOP-DOWN APPROACH
2.3.3 GROWTH PROJECTION AND FORECAST-RELATED ASSUMPTIONS
TABLE 1 MARKET GROWTH ASSUMPTIONS
2.4 DATA TRIANGULATION
FIGURE 9 DATA TRIANGULATION
2.5 RESEARCH ASSUMPTIONS
TABLE 2 KEY ASSUMPTIONS: MACRO-AND MICRO-ECONOMIC ENVIRONMENT
2.6 RESEARCH LIMITATIONS
2.7 RISK ASSESSMENT
TABLE 3 RISK ASSESSMENT
2.7.1 PARAMETERS CONSIDERED TO ANALYZE IMPACT OF RECESSION ON FAULT DETECTION AND CLASSIFICATION MARKET

3 EXECUTIVE SUMMARY

FIGURE 10 AUTOMOTIVE SEGMENT TO WITNESS HIGHEST CAGR DURING FORECAST PERIOD
FIGURE 11 SOFTWARE SEGMENT TO EXHIBIT HIGHEST CAGR IN MARKET DURING FORECAST PERIOD
FIGURE 12 CAMERA SEGMENT TO LEAD MARKET DURING FORECAST PERIOD
FIGURE 13 ASIA PACIFIC TO ACCOUNT FOR LARGEST MARKET SHARE THROUGHOUT FORECAST PERIOD
3.1 IMPACT OF RECESSION ON FAULT DETECTION AND CLASSIFICATION MARKET
FIGURE 14 PRE- AND POST-RECESSION IMPACT ON FAULT DETECTION AND CLASSIFICATION MARKET, 2019–2028

4 PREMIUM INSIGHTS

4.1 ATTRACTIVE GROWTH OPPORTUNITIES FOR PLAYERS IN FAULT DETECTION AND CLASSIFICATION MARKET

+44 20 8123 2220
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FIGURE 15 HIGH DEMAND FOR APPLICATION-SPECIFIC INTEGRATED CIRCUITS TO DRIVE MARKET
4.2 FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION
FIGURE 16 MANUFACTURING SEGMENT LEAD MARKET DURING FORECAST PERIOD
4.3 FAULT DETECTION AND CLASSIFICATION MARKET FOR MANUFACTURING, BY APPLICATION
FIGURE 17 ASSEMBLY VERIFICATION SEGMENT TO EXHIBIT HIGHEST CAGR FROM 2023 TO 2028
4.4 FAULT DETECTION AND CLASSIFICATION MARKET FOR PACKAGING, BY APPLICATION
FIGURE 18 LABEL VALIDATION SEGMENT TO CLAIM HIGHEST MARKET SHARE DURING FORECAST PERIOD
4.5 FAULT DETECTION AND CLASSIFICATION MARKET, BY REGION
FIGURE 19 ASIA PACIFIC TO HOLD LARGEST MARKET SHARE IN 2028, BY VALUE
4.6 FAULT DETECTION AND CLASSIFICATION MARKET, BY COUNTRY
FIGURE 20 CHINA TO DOMINATE MARKET DURING FORECAST PERIOD

5 MARKET OVERVIEW

5.1 INTRODUCTION
5.2 MARKET DYNAMICS
FIGURE 21 FAULT DETECTION AND CLASSIFICATION MARKET: DRIVERS, RESTRAINTS, OPPORTUNITIES, AND CHALLENGES
5.2.1 DRIVERS
5.2.1.1 Effective detection and management of complex systems in modern technological landscape
5.2.1.2 Improved plant-efficiency and reduced costs with quality control processes in manufacturing
5.2.1.3 Increasing focus on deployment of automated tools in manufacturing sector
5.2.1.4 High demand for application-specific integrated circuits
FIGURE 22 FAULT DETECTION AND CLASSIFICATION MARKET: IMPACT ANALYSIS OF DRIVERS
5.2.2 RESTRAINTS
5.2.2.1 Shortage of skilled professionals
FIGURE 23 FAULT DETECTION AND CLASSIFICATION MARKET: IMPACT ANALYSIS OF RESTRAINTS
5.2.3 OPPORTUNITIES

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5.2.3.1 Improved production processes using AI-based fault detection and classification instruments
5.2.3.2 Government-led initiatives to boost adoption of automation and data acquisition systems
FIGURE 24 FAULT DETECTION AND CLASSIFICATION MARKET: IMPACT ANALYSIS OF OPPORTUNITIES
5.2.4 CHALLENGES
5.2.4.1 Growing complexities in manufacturing processes attributed to technological innovations
FIGURE 25 FAULT DETECTION AND CLASSIFICATION MARKET: IMPACT ANALYSIS OF CHALLENGES
5.3 VALUE CHAIN ANALYSIS
FIGURE 26 FAULT DETECTION AND CLASSIFICATION MARKET: VALUE CHAIN ANALYSIS
5.3.1 RESEARCH & DEVELOPMENT ENGINEERS
5.3.2 RAW MATERIAL SUPPLIERS
5.3.3 MANUFACTURERS
5.3.4 SYSTEM INTEGRATORS
5.3.5 SUPPLIERS AND DISTRIBUTORS
5.4 PORTER’S FIVE FORCES ANALYSIS
TABLE 4 FAULT DETECTION AND CLASSIFICATION MARKET: PORTER’S FIVE FORCES ANALYSIS
FIGURE 27 FAULT DETECTION AND CLASSIFICATION MARKET: PORTER’S FIVE FORCES ANALYSIS
5.4.1 THREAT OF NEW ENTRANTS
5.4.2 THREAT OF SUBSTITUTES
5.4.3 BARGAINING POWER OF SUPPLIERS
5.4.4 BARGAINING POWER OF BUYERS
5.4.5 INTENSITY OF COMPETITIVE RIVALRY
5.5 TRENDS/DISRUPTIONS IMPACTING CUSTOMER BUSINESS
FIGURE 28 REVENUE SHIFT AND NEW REVENUE POCKETS FOR PLAYERS IN FAULT DETECTION AND CLASSIFICATION MARKET
5.6 ECOSYSTEM MAPPING
FIGURE 29 FAULT DETECTION AND CLASSIFICATION MARKET: ECOSYSTEM MAPPING
5.7 PRICING ANALYSIS
FIGURE 30 AVERAGE SELLING PRICE OF HARDWARE, 2019–2028
5.7.1 AVERAGE SELLING PRICE OF HARDWARE OFFERED BY KEY PLAYERS
FIGURE 31 AVERAGE SELLING PRICE OF HARDWARE, BY KEY PLAYERS

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TABLE 5 AVERAGE SELLING PRICE OF HARDWARE OFFERED BY KEY PLAYERS
5.8 KEY STAKEHOLDERS AND BUYING CRITERIA
5.8.1 KEY STAKEHOLDERS IN BUYING PROCESS
FIGURE 32 INFLUENCE OF STAKEHOLDERS ON BUYING PROCESS FOR TOP THREE VERTICALS
TABLE 6 INFLUENCE OF STAKEHOLDERS ON BUYING PROCESS FOR TOP VERTICALS
5.8.2 BUYING CRITERIA
FIGURE 33 KEY BUYING CRITERIA FOR TOP THREE VERTICALS
TABLE 7 KEY BUYING CRITERIA FOR TOP THREE VERTICALS
5.9 PATENT ANALYSIS
FIGURE 34 TOP 10 COMPANIES WITH HIGHEST NUMBER OF PATENT APPLICATIONS DURING LAST 10 YEARS
FIGURE 35 REGIONAL ANALYSIS OF PATENTS GRANTED FOR FAULT DETECTION AND CLASSIFICATION DEVICES, 2022
TABLE 8 FAULT DETECTION AND CLASSIFICATION MARKET: INNOVATIONS AND PATENT REGISTRATIONS, 2021–2023
5.10 TECHNOLOGY ANALYSIS
5.10.1 LIQUID LENS
5.10.2 ROBOTIC VISION
5.10.3 DEEP LEARNING
5.11 TRADE ANALYSIS
5.11.1 IMPORT SCENARIO
TABLE 9 IMPORT DATA FOR FAULT DETECTION AND CLASSIFICATION INSTRUMENTS, BY COUNTRY, 2018–2022 (USD MILLION)
5.11.2 EXPORT SCENARIO
TABLE 10 EXPORT DATA FOR FAULT DETECTION AND CLASSIFICATION INSTRUMENTS, BY COUNTRY, 2018–2022 (USD MILLION)
5.12 CASE STUDY ANALYSIS
5.12.1 MICROSOFT PROVIDES END-TO-END FAULT DETECTION SYSTEM TO DETECT AND LOCALIZE FAULTS IN SOLAR PANELS BASED ON THEIR ELECTROLUMINESCENCE (EL) IMAGING
5.12.2 APPLIED MATERIALS, INC. OFFERS COST-EFFECTIVE APPROACH TO PROPAGATE FRONT-END FD PRACTICES INTO BACK-END ATP PROCESSES
5.13 KEY CONFERENCES AND EVENTS, 2023–2024
TABLE 11 FAULT DETECTION AND CLASSIFICATION MARKET: LIST OF CONFERENCES AND EVENTS
5.14 REGULATORY LANDSCAPE
5.14.1 REGULATORY BODIES, GOVERNMENT AGENCIES, AND OTHER

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ORGANIZATIONS
TABLE 12 NORTH AMERICA: LIST OF REGULATORY BODIES, GOVERNMENT AGENCIES, AND OTHER ORGANIZATIONS
TABLE 13 EUROPE: LIST OF REGULATORY BODIES, GOVERNMENT AGENCIES, AND OTHER ORGANIZATIONS
TABLE 14 ASIA PACIFIC: LIST OF REGULATORY BODIES, GOVERNMENT AGENCIES, AND OTHER ORGANIZATIONS
TABLE 15 ROW: LIST OF REGULATORY BODIES, GOVERNMENT AGENCIES, AND OTHER ORGANIZATIONS
5.14.2 STANDARDS
5.15 TARIFF ANALYSIS
TABLE 16 TARIFF FOR HS CODE 903033-COMPLIANT PRODUCTS EXPORTED BY GERMANY
TABLE 17 TARIFF FOR HS CODE 903033-COMPLIANT PRODUCTS EXPORTED BY CHINA, 2022

6 TYPES OF FAULTS DETECTED BY FAULT DETECTION AND CLASSIFICATION SYSTEMS

6.1 INTRODUCTION
6.2 DIMENSIONAL FAULT
6.2.1 INCREASING USE TO MINIMIZE DIMENSIONAL FAULTS LEADING TO HIGH COSTS AND DOWNTIME
6.3 SURFACE DEFECTS
6.3.1 IRREGULARITIES DUE TO ELECTRICAL SHORTS AND DEVICE FAILURES
6.4 CONTAMINATION FAULTS
6.4.1 INTERFERENCE IN PRECISE ETCHING AND DEPOSITION PROCESS DUE TO CONTAMINATION ISSUES
6.5 PROCESS VARIABILITY
6.5.1 FLUCTUATION IN CLEANROOM ENVIRONMENT IMPACTING PROCESS STABILITY
6.6 OTHER FAULT TYPES

7 TYPES OF TECHNOLOGY FOR FAULT DETECTION AND CLASSIFICATION

7.1 INTRODUCTION
7.2 SENSOR DATA ANALYSIS
7.2.1 GROWING NEED FOR ANALYSIS OF LARGE VOLUMES OF SENSOR DATA IN REAL-TIME TO DRIVE DEMAND

+44 20 8123 2220
info@marketpublishers.com

7.3 STATISTICAL METHODS
7.3.1 ABILITY TO TRANSFORM RAW DATA INTO ACTIONABLE INSIGHTS TO FOSTER SEGMENTAL GROWTH
7.4 MACHINE LEARNING ALGORITHMS
7.4.1 EARLY ISSUE DETECTION AND PREDICTIVE MAINTENANCE TO SPUR DEMAND
7.5 OTHER TECHNOLOGIES

8 FAULT DETECTION AND CLASSIFICATION MARKET, BY OFFERING

8.1 INTRODUCTION
FIGURE 36 HARDWARE SEGMENT TO CAPTURE LARGEST MARKET SHARE THROUGHOUT FORECAST PERIOD
TABLE 18 FAULT DETECTION AND CLASSIFICATION MARKET, BY OFFERING, 2019–2022 (USD MILLION)
TABLE 19 FAULT DETECTION AND CLASSIFICATION MARKET, BY OFFERING, 2023–2028 (USD MILLION)
8.2 SOFTWARE
8.2.1 RISING CRITICALITY OF INFRASTRUCTURE SYSTEMS TO FOSTER SEGMENTAL GROWTH
8.3 HARDWARE
TABLE 20 HARDWARE: FAULT DETECTION AND CLASSIFICATION MARKET, 2019–2022 (USD MILLION)
TABLE 21 HARDWARE: FAULT DETECTION AND CLASSIFICATION MARKET, 2023–2028 (USD MILLION)
FIGURE 37 BY HARDWARE OFFERING, CAMERA SEGMENT TO LEAD MARKET DURING FORECAST PERIOD
TABLE 22 HARDWARE: FAULT DETECTION AND CLASSIFICATION MARKET, 2019–2022 (MILLION UNITS)
TABLE 23 HARDWARE: FAULT DETECTION AND CLASSIFICATION MARKET, 2023–2028 (MILLION UNITS)
8.3.1 CAMERAS
8.3.1.1 Cameras, by format
8.3.1.1.1 Area scan cameras
8.3.1.1.1.1 Better flexibility than other cameras to drive demand
8.3.1.1.2 Line scan cameras
8.3.1.1.2.1 Cost advantage and high resolution to boost demand
8.3.1.2 Cameras, by frame rate
8.3.1.2.1 Ability to record smooth motion with less motion blur to foster segmental

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growth
8.3.2 SENSORS
8.3.2.1 CCD sensors
8.3.2.1.1 Less defective pixels due to simple structure to drive demand
8.3.2.2 CMOS sensors
8.3.2.2.1 Low power consumption and high-speed performance to drive demand
8.3.3 FRAME GRABBERS
8.3.3.1 Ability to capture high-resolution digital still images to boost demand
8.3.4 OPTICS
8.3.4.1 Need to regulate flaws in raw materials, components, and finished products to boost demand
8.3.5 PROCESSORS
8.3.5.1 High-resolution and real-time video analytics in vision algorithms to propel market
8.4 SERVICES
8.4.1 GROWING ADOPTION OF AI AND DEEP LEARNING TECHNOLOGIES TO BOOST DEMAND

9 FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION

9.1 INTRODUCTION
FIGURE 38 MANUFACTURING SEGMENT TO CAPTURE LARGEST MARKET SHARE THROUGHOUT FORECAST PERIOD
TABLE 24 FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019–2022 (USD MILLION)
TABLE 25 FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023–2028 (USD MILLION)
9.2 MANUFACTURING
TABLE 26 MANUFACTURING: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019–2022 (USD MILLION)
TABLE 27 MANUFACTURING: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023–2028 (USD MILLION)
FIGURE 39 ASSEMBLY VERIFICATION SEGMENT TO CAPTURE LARGEST MARKET SHARE FOR MANUFACTURING APPLICATIONS THROUGHOUT FORECAST PERIOD
TABLE 28 MANUFACTURING: FAULT DETECTION AND CLASSIFICATION MARKET, BY VERTICAL, 2019–2022 (USD MILLION)
TABLE 29 MANUFACTURING: FAULT DETECTION AND CLASSIFICATION MARKET, BY VERTICAL, 2023–2028 (USD MILLION)

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TABLE 30 MANUFACTURING: FAULT DETECTION AND CLASSIFICATION MARKET, BY REGION, 2019–2022 (USD MILLION)
TABLE 31 MANUFACTURING: FAULT DETECTION AND CLASSIFICATION MARKET, BY REGION, 2023–2028 (USD MILLION)
TABLE 32 MANUFACTURING: FAULT DETECTION AND CLASSIFICATION MARKET IN NORTH AMERICA, BY COUNTRY, 2019–2022 (USD MILLION)
TABLE 33 MANUFACTURING: FAULT DETECTION AND CLASSIFICATION MARKET IN NORTH AMERICA, BY COUNTRY, 2023–2028 (USD MILLION)
TABLE 34 MANUFACTURING: FAULT DETECTION AND CLASSIFICATION MARKET IN EUROPE, BY COUNTRY, 2019–2022 (USD MILLION)
TABLE 35 MANUFACTURING: FAULT DETECTION AND CLASSIFICATION MARKET IN EUROPE, BY COUNTRY, 2023–2028 (USD MILLION)
TABLE 36 MANUFACTURING: FAULT DETECTION AND CLASSIFICATION MARKET IN ASIA PACIFIC, BY COUNTRY, 2019–2022 (USD MILLION)
TABLE 37 MANUFACTURING: FAULT DETECTION AND CLASSIFICATION MARKET IN ASIA PACIFIC, BY COUNTRY, 2023–2028 (USD MILLION)
TABLE 38 MANUFACTURING: FAULT DETECTION AND CLASSIFICATION MARKET IN ROW, BY REGION, 2019–2022 (USD MILLION)
TABLE 39 MANUFACTURING: FAULT DETECTION AND CLASSIFICATION MARKET IN ROW, BY REGION, 2023–2028 (USD MILLION)
9.2.1 ASSEMBLY VERIFICATION
9.2.1.1 AI- and deep learning-based fault detection and classification systems to offer growth opportunities
9.2.2 FLAW DETECTION
9.2.2.1 Measurement
9.2.2.1.1 Semiconductor and electronics industries to generate significant demand
9.2.2.2 Surface anomalies
9.2.2.2.1 Implementation of technologically advanced products to detect real-time complex defects to drive market
9.2.2.3 Fabrication inspection
9.2.2.3.1 Welding inspection
9.2.2.3.1.1 Rising demand for light and efficient designs to foster segmental growth
9.2.2.3.2 Semiconductor device fabrication
9.2.2.3.2.1 Growing miniaturization of semiconductor devices to propel market growth
9.3 PACKAGING
TABLE 40 PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019–2022 (USD MILLION)
TABLE 41 PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET, BY

APPLICATION, 2023–2028 (USD MILLION)
FIGURE 40 LABEL VALIDATION SEGMENT TO CAPTURE LARGEST MARKET SHARE THROUGHOUT FORECAST PERIOD
TABLE 42 PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET, BY VERTICAL, 2019–2022 (USD MILLION)
TABLE 43 PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET, BY VERTICAL, 2023–2028 (USD MILLION)
TABLE 44 PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET, BY REGION, 2019–2022 (USD MILLION)
TABLE 45 PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET, BY REGION, 2023–2028 (USD MILLION)
TABLE 46 PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET IN NORTH AMERICA, BY COUNTRY, 2019–2022 (USD MILLION)
TABLE 47 PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET IN NORTH AMERICA, BY COUNTRY, 2023–2028 (USD MILLION)
TABLE 48 PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET IN EUROPE, BY COUNTRY, 2019–2022 (USD MILLION)
TABLE 49 PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET IN EUROPE, BY COUNTRY, 2023–2028 (USD MILLION)
TABLE 50 PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET IN ASIA PACIFIC, BY COUNTRY, 2019–2022 (USD MILLION)
TABLE 51 PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET IN ASIA PACIFIC, BY COUNTRY, 2023–2028 (USD MILLION)
TABLE 52 PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET IN ROW, BY REGION, 2019–2022 (USD MILLION)
TABLE 53 PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET IN ROW, BY REGION, 2023–2028 (USD MILLION)
9.3.1 GRADING
9.3.1.1 Introduction of application-specific products and solutions to boost market
9.3.2 LABEL VALIDATION
9.3.2.1 Product information
9.3.2.1.1 Assurance of defect-free product labeling with advanced fault detection and classification systems to drive market
9.3.2.2 Barcodes
9.3.2.2.1 Increasing concerns about quality standards to boost demand
9.3.3 CONTAINER/PACKAGING INSPECTION
9.3.3.1 Packaging integrity
9.3.3.1.1 Assurance of product sterility and reduced dependence on manual and

expensive inspection processes to drive market

10 FAULT DETECTION AND CLASSIFICATION MARKET, BY VERTICAL

10.1 INTRODUCTION
FIGURE 41 ELECTRONICS & SEMICONDUCTORS TO LEAD MARKET THROUGHOUT FORECAST PERIOD
TABLE 54 FAULT DETECTION AND CLASSIFICATION MARKET, BY VERTICAL, 2019–2022 (USD MILLION)
TABLE 55 FAULT DETECTION AND CLASSIFICATION MARKET, BY VERTICAL, 2023–2028 (USD MILLION)
10.2 AUTOMOTIVE
10.2.1 RISING PRODUCTION OF HYBRID AND ELECTRIC VEHICLES TO BOOST MARKET
TABLE 56 AUTOMOTIVE: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019–2022 (USD MILLION)
TABLE 57 AUTOMOTIVE: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023–2028 (USD MILLION)
FIGURE 42 ASSEMBLY VERIFICATION TO LEAD MARKET THROUGHOUT FORECAST PERIOD
TABLE 58 AUTOMOTIVE: FAULT DETECTION AND CLASSIFICATION MARKET, BY MANUFACTURING APPLICATION, 2019–2022 (USD MILLION)
TABLE 59 AUTOMOTIVE: FAULT DETECTION AND CLASSIFICATION MARKET, BY MANUFACTURING APPLICATION, 2023–2028 (USD MILLION)
TABLE 60 AUTOMOTIVE: FAULT DETECTION AND CLASSIFICATION MARKET, BY PACKAGING APPLICATION, 2019–2022 (USD MILLION)
TABLE 61 AUTOMOTIVE: FAULT DETECTION AND CLASSIFICATION MARKET, BY PACKAGING APPLICATION, 2023–2028 (USD MILLION)
10.3 ELECTRONICS & SEMICONDUCTORS
10.3.1 ABILITY TO DETECT COMPLEX AND MACRO DEFECTS TO BOOST DEMAND
TABLE 62 ELECTRONICS & SEMICONDUCTORS: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019–2022 (USD MILLION)
TABLE 63 ELECTRONICS & SEMICONDUCTORS: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023–2028 (USD MILLION)
FIGURE 43 BY MANUFACTURING APPLICATION, FABRIC INSPECTION TO DOMINATE MARKET DURING FORECAST PERIOD
TABLE 64 ELECTRONICS & SEMICONDUCTORS: FAULT DETECTION AND CLASSIFICATION MARKET, BY MANUFACTURING APPLICATION, 2019–2022 (USD

+44 20 8123 2220
info@marketpublishers.com

MILLION)
TABLE 65 ELECTRONICS & SEMICONDUCTORS: FAULT DETECTION AND CLASSIFICATION MARKET, BY MANUFACTURING APPLICATION, 2023–2028 (USD MILLION)
TABLE 66 ELECTRONICS & SEMICONDUCTORS: FAULT DETECTION AND CLASSIFICATION MARKET, BY PACKAGING APPLICATION, 2019–2022 (USD MILLION)
TABLE 67 ELECTRONICS & SEMICONDUCTORS: FAULT DETECTION AND CLASSIFICATION MARKET, BY PACKAGING APPLICATION, 2023–2028 (USD MILLION)
10.4 METALS & MACHINERY
10.4.1 DEPLOYMENT OF INDUSTRY 4.0 AND IIOT IN METALS & MACHINERY TO DRIVE MARKET
TABLE 68 METALS & MACHINERY: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019–2022 (USD MILLION)
TABLE 69 METALS & MACHINERY: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023–2028 (USD MILLION)
FIGURE 44 ASSEMBLY VERIFICATION SEGMENT TO EXHIBIT HIGHEST CAGR IN FAULT DETECTION AND CLASSIFICATION MARKET FOR MANUFACTURING APPLICATIONS DURING FORECAST PERIOD
TABLE 70 METALS & MACHINERY: FAULT DETECTION AND CLASSIFICATION MARKET, BY MANUFACTURING APPLICATION, 2019–2022 (USD MILLION)
TABLE 71 METALS & MACHINERY: FAULT DETECTION AND CLASSIFICATION MARKET, BY MANUFACTURING APPLICATION, 2023–2028 (USD MILLION)
TABLE 72 METALS & MACHINERY: FAULT DETECTION AND CLASSIFICATION MARKET, BY PACKAGING APPLICATION, 2019–2022 (USD MILLION)
TABLE 73 METALS & MACHINERY: FAULT DETECTION AND CLASSIFICATION MARKET, BY PACKAGING APPLICATION, 2023–2028 (USD MILLION)
10.5 FOOD & PACKAGING
10.5.1 IMPLEMENTATION OF AI AND DEEP LEARNING SOFTWARE IN FOOD & PACKAGING TO DRIVE MARKET
TABLE 74 FOOD & PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019–2022 (USD MILLION)
TABLE 75 FOOD & PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023–2028 (USD MILLION)
FIGURE 45 ASSEMBLY VERIFICATION SEGMENT TO DISPLAY HIGHEST CAGR IN FAULT DETECTION AND CLASSIFICATION MARKET FOR MANUFACTURING APPLICATIONS THROUGHOUT FORECAST PERIOD
TABLE 76 FOOD & PACKAGING: FAULT DETECTION AND CLASSIFICATION

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MARKET, BY MANUFACTURING APPLICATION, 2019–2022 (USD MILLION)
TABLE 77 FOOD & PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET, BY MANUFACTURING APPLICATION, 2023–2028 (USD MILLION)
TABLE 78 FOOD & PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET, BY PACKAGING APPLICATION, 2019–2022 (USD MILLION)
TABLE 79 FOOD & PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET, BY PACKAGING APPLICATION, 2023–2028 (USD MILLION)
10.6 PHARMACEUTICALS
10.6.1 ABILITY TO INSPECT LARGE NUMBER OF TABLETS ACCURATELY TO BOOST DEMAND
TABLE 80 PHARMACEUTICALS: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019–2022 (USD MILLION)
TABLE 81 PHARMACEUTICALS: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023–2028 (USD MILLION)
FIGURE 46 ASSEMBLY VERIFICATION TO DISPLAY HIGHEST CAGR DURING FORECAST PERIOD
TABLE 82 PHARMACEUTICALS: FAULT DETECTION AND CLASSIFICATION MARKET, BY MANUFACTURING APPLICATION, 2019–2022 (USD MILLION)
TABLE 83 PHARMACEUTICALS: FAULT DETECTION AND CLASSIFICATION MARKET, BY MANUFACTURING APPLICATION, 2023–2028 (USD MILLION)
TABLE 84 PHARMACEUTICALS: FAULT DETECTION AND CLASSIFICATION MARKET, BY PACKAGING APPLICATION, 2019–2022 (USD MILLION)
TABLE 85 PHARMACEUTICALS: FAULT DETECTION AND CLASSIFICATION MARKET, BY PACKAGING APPLICATION, 2023–2028 (USD MILLION)

11 FAULT DETECTION AND CLASSIFICATION MARKET, BY REGION

11.1 INTRODUCTION
FIGURE 47 ASIA PACIFIC TO EXHIBIT HIGHEST CAGR DURING FORECAST PERIOD
TABLE 86 FAULT DETECTION AND CLASSIFICATION MARKET, BY REGION, 2019–2022 (USD MILLION)
TABLE 87 FAULT DETECTION AND CLASSIFICATION MARKET, BY REGION, 2023–2028 (USD MILLION)
11.2 NORTH AMERICA
FIGURE 48 NORTH AMERICA: FAULT DETECTION AND CLASSIFICATION MARKET SNAPSHOT
TABLE 88 NORTH AMERICA: FAULT DETECTION AND CLASSIFICATION MARKET, BY COUNTRY, 2019–2022 (USD MILLION)

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TABLE 89 NORTH AMERICA: FAULT DETECTION AND CLASSIFICATION MARKET, BY COUNTRY, 2023–2028 (USD MILLION)
11.2.1 US
11.2.1.1 Presence of established players to foster market growth
TABLE 90 US: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019–2022 (USD MILLION)
TABLE 91 US: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023–2028 (USD MILLION)
11.2.2 CANADA
11.2.2.1 Thriving automotive and aerospace sectors to contribute to market growth
TABLE 92 CANADA: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019–2022 (USD MILLION)
TABLE 93 CANADA: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023–2028 (USD MILLION)
11.2.3 MEXICO
11.2.3.1 Growing FDIs in manufacturing to boost market growth
TABLE 94 MEXICO: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019–2022 (USD MILLION)
TABLE 95 MEXICO: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023–2028 (USD MILLION)
11.2.4 NORTH AMERICA: RECESSION IMPACT
11.3 EUROPE
FIGURE 49 EUROPE: FAULT DETECTION AND CLASSIFICATION MARKET SNAPSHOT
TABLE 96 EUROPE: FAULT DETECTION AND CLASSIFICATION MARKET, BY COUNTRY, 2019–2022 (USD MILLION)
TABLE 97 EUROPE: FAULT DETECTION AND CLASSIFICATION MARKET, BY COUNTRY, 2023–2028 (USD MILLION)
11.3.1 GERMANY
11.3.1.1 Increasing demand for robots in automotive and electronics industries to foster market growth
TABLE 98 GERMANY: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019–2022 (USD MILLION)
TABLE 99 GERMANY: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023–2028 (USD MILLION)
11.3.2 UK
11.3.2.1 Pharmaceutical industry to create significant demand for fault detection and classification systems
TABLE 100 UK: FAULT DETECTION AND CLASSIFICATION MARKET, BY

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APPLICATION, 2019–2022 (USD MILLION)
TABLE 101 UK: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023–2028 (USD MILLION)
11.3.3 FRANCE
11.3.3.1 Rising automobile production to boost demand
TABLE 102 FRANCE: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019–2022 (USD MILLION)
TABLE 103 FRANCE: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023–2028 (USD MILLION)
11.3.4 REST OF EUROPE
TABLE 104 REST OF EUROPE: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019–2022 (USD MILLION)
TABLE 105 REST OF EUROPE: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023–2028 (USD MILLION)
11.3.5 EUROPE: RECESSION IMPACT
11.4 ASIA PACIFIC
FIGURE 50 ASIA PACIFIC: FAULT DETECTION AND CLASSIFICATION MARKET SNAPSHOT
TABLE 106 ASIA PACIFIC: FAULT DETECTION AND CLASSIFICATION MARKET, BY COUNTRY, 2019–2022 (USD MILLION)
TABLE 107 ASIA PACIFIC: FAULT DETECTION AND CLASSIFICATION MARKET, BY COUNTRY, 2023–2028 (USD MILLION)
11.4.1 CHINA
11.4.1.1 Established manufacturing hub for consumer electronics and automobiles to propel market growth
TABLE 108 CHINA: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019–2022 (USD MILLION)
TABLE 109 CHINA: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023–2028 (USD MILLION)
11.4.2 JAPAN
11.4.2.1 Healthy growth of consumer electronics industry to boost demand
TABLE 110 JAPAN: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019–2022 (USD MILLION)
TABLE 111 JAPAN: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023–2028 (USD MILLION)
11.4.3 SOUTH KOREA
11.4.3.1 Expanding consumer electronics industry and manufacturing sector to boost market growth
TABLE 112 SOUTH KOREA: FAULT DETECTION AND CLASSIFICATION MARKET,

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BY APPLICATION, 2019–2022 (USD MILLION)
TABLE 113 SOUTH KOREA: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023–2028 (USD MILLION)
11.4.4 INDIA
11.4.4.1 Government-led campaigns for boosting domestic manufacturing sector to drive market
TABLE 114 INDIA: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019–2022 (USD MILLION)
TABLE 115 INDIA: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023–2028 (USD MILLION)
11.4.5 REST OF ASIA PACIFIC
TABLE 116 REST OF ASIA PACIFIC: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019–2022 (USD MILLION)
TABLE 117 REST OF ASIA PACIFIC: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023–2028 (USD MILLION)
11.4.6 ASIA PACIFIC: RECESSION IMPACT
11.5 ROW
TABLE 118 ROW: FAULT DETECTION AND CLASSIFICATION MARKET, BY REGION, 2019–2022 (USD MILLION)
TABLE 119 ROW: FAULT DETECTION AND CLASSIFICATION MARKET, BY REGION, 2023–2028 (USD MILLION)
11.5.1 MIDDLE EAST & AFRICA
11.5.1.1 Booming energy & power industry to fuel demand
TABLE 120 MEA: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019–2022 (USD MILLION)
TABLE 121 MEA: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023–2028 (USD MILLION)
11.5.2 SOUTH AMERICA
11.5.2.1 Rising need for high-quality automated inspections to drive demand
TABLE 122 SOUTH AMERICA: FAULT DETECTION AND CLASSIFICATION MARKET,
BY APPLICATION, 2019–2022 (USD MILLION)
TABLE 123 SOUTH AMERICA: FAULT DETECTION AND CLASSIFICATION MARKET,
BY APPLICATION, 2023–2028 (USD MILLION)
11.5.3 ROW: RECESSION IMPACT

12 COMPETITIVE LANDSCAPE

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12.1 OVERVIEW
12.2 KEY STRATEGIES ADOPTED BY MAJOR PLAYERS
TABLE 124 OVERVIEW OF STRATEGIES ADOPTED BY KEY PLAYERS
12.2.1 PRODUCT PORTFOLIO
12.2.2 REGIONAL FOCUS
12.2.3 MANUFACTURING FOOTPRINT
12.2.4 ORGANIC/INORGANIC STRATEGIES
12.3 MARKET SHARE ANALYSIS, 2022
TABLE 125 FAULT DETECTION AND CLASSIFICATION MARKET SHARE ANALYSIS, 2022
12.4 REVENUE ANALYSIS, 2018–2022
FIGURE 51 FAULT DETECTION AND CLASSIFICATION SYSTEMS: REVENUE ANALYSIS OF FIVE KEY PLAYERS, 2018–2022
12.5 EVALUATION MATRIX OF KEY COMPANIES, 2022
12.5.1 STARS
12.5.2 EMERGING LEADERS
12.5.3 PERVASIVE PLAYERS
12.5.4 PARTICIPANTS
FIGURE 52 FAULT DETECTION AND CLASSIFICATION SYSTEMS: EVALUATION MATRIX OF KEY COMPANIES, 2022
12.6 EVALUATION MATRIX OF STARTUPS/SMES, 2022
TABLE 126 FAULT DETECTION AND CLASSIFICATION MARKET: LIST OF KEY STARTUPS/SMES
TABLE 127 FAULT DETECTION AND CLASSIFICATION MARKET: STARTUPS/SMES COMPANY PROFILE
TABLE 128 FAULT DETECTION AND CLASSIFICATION MARKET: COMPETITIVE BENCHMARKING OF KEY STARTUPS/SMES (OFFERING)
TABLE 129 FAULT DETECTION AND CLASSIFICATION MARKET: COMPETITIVE BENCHMARKING OF KEY STARTUPS/SMES (VERTICAL FOOTPRINT)
TABLE 130 FAULT DETECTION AND CLASSIFICATION MARKET: COMPETITIVE BENCHMARKING OF KEY STARTUPS/SMES (REGION FOOTPRINT)
12.6.1 PROGRESSIVE COMPANIES
12.6.2 RESPONSIVE COMPANIES
12.6.3 DYNAMIC COMPANIES
12.6.4 STARTING BLOCKS
FIGURE 53 FAULT DETECTION AND CLASSIFICATION MARKET: EVALUATION MATRIX OF STARTUPS/SME, 2022
12.7 COMPANY FOOTPRINT

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TABLE 131 FAULT DETECTION AND CLASSIFICATION MARKET: COMPANY FOOTPRINT
TABLE 132 VERTICAL: COMPANY FOOTPRINT
TABLE 133 OFFERING: COMPANY FOOTPRINT
TABLE 134 REGION: COMPANY FOOTPRINT
12.8 COMPETITIVE SCENARIOS AND TRENDS
12.8.1 PRODUCT LAUNCHES
TABLE 135 FAULT DETECTION AND CLASSIFICATION MARKET: PRODUCT LAUNCHES, 2019–2023
12.8.2 DEALS
TABLE 136 FAULT DETECTION AND CLASSIFICATION MARKET: DEALS, 2019–2023
12.8.3 OTHERS
TABLE 137 FAULT DETECTION AND CLASSIFICATION MARKET: OTHERS, 2019–2023

13 COMPANY PROFILES

(Business Overview, Products/Solutions/Services Offered, Recent Developments, and MnM View (Key strengths/Right to Win, Strategic Choices Made, and Weaknesses and Competitive Threats))*
13.1 KEY PLAYERS
13.1.1 KEYENCE CORPORATION
TABLE 138 KEYENCE CORPORATION: COMPANY OVERVIEW
FIGURE 54 KEYENCE CORPORATION: COMPANY SNAPSHOT
TABLE 139 KEYENCE CORPORATION: PRODUCTS/SOLUTIONS/SERVICES OFFERED
TABLE 140 KEYENCE CORPORATION: PRODUCT LAUNCHES
13.1.2 COGNEX CORPORATION
TABLE 141 COGNEX CORPORATION: COMPANY OVERVIEW
FIGURE 55 COGNEX CORPORATION: COMPANY SNAPSHOT
TABLE 142 COGNEX CORPORATION: PRODUCTS/SOLUTIONS/SERVICES OFFERED
TABLE 143 COGNEX CORPORATION: PRODUCT LAUNCHES
TABLE 144 COGNEX CORPORATION: DEALS
13.1.3 OMRON CORPORATION
TABLE 145 OMRON CORPORATION: COMPANY OVERVIEW
FIGURE 56 OMRON CORPORATION: COMPANY SNAPSHOT
TABLE 146 OMRON CORPORATION: PRODUCTS/SOLUTIONS/SERVICES

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OFFERED
TABLE 147 OMRON CORPORATION: PRODUCT LAUNCHES
TABLE 148 OMRON CORPORATION: DEALS
TABLE 149 OMRON CORPORATION: OTHERS
13.1.4 TELEDYNE TECHNOLOGIES INCORPORATED
TABLE 150 TELEDYNE TECHNOLOGIES INCORPORATED: COMPANY OVERVIEW
FIGURE 57 TELEDYNE TECHNOLOGIES INCORPORATED: COMPANY SNAPSHOT
TABLE 151 TELEDYNE TECHNOLOGIES INCORPORATED: PRODUCTS/SOLUTIONS/SERVICES OFFERED
TABLE 152 TELEDYNE TECHNOLOGIES INCORPORATED: PRODUCT LAUNCHES
TABLE 153 TELEDYNE TECHNOLOGIES INCORPORATED: DEALS
13.1.5 KLA CORPORATION
TABLE 154 KLA CORPORATION: COMPANY OVERVIEW
FIGURE 58 KLA CORPORATION: COMPANY SNAPSHOT
TABLE 155 KLA CORPORATION: PRODUCTS/SOLUTIONS/SERVICES OFFERED
TABLE 156 KLA CORPORATION: PRODUCT LAUNCHES
TABLE 157 KLA CORPORATION: DEALS
TABLE 158 KLA CORPORATION: OTHERS
13.1.6 SIEMENS
TABLE 159 SIEMENS: COMPANY OVERVIEW
FIGURE 59 SIEMENS: COMPANY SNAPSHOT
TABLE 160 SIEMENS: PRODUCTS/SOLUTIONS/SERVICES OFFERED
TABLE 161 SIEMENS: DEALS
13.1.7 MICROSOFT
TABLE 162 MICROSOFT: COMPANY OVERVIEW
FIGURE 60 MICROSOFT: COMPANY SNAPSHOT
TABLE 163 MICROSOFT: PRODUCTS/SOLUTIONS/SERVICES OFFERED
TABLE 164 MICROSOFT: PRODUCT LAUNCHES
TABLE 165 MICROSOFT: DEALS
13.1.8 AMAZON WEB SERVICES, INC.
TABLE 166 AMAZON WEB SERVICES, INC.: COMPANY OVERVIEW
FIGURE 61 AMAZON WEB SERVICES, INC.: COMPANY SNAPSHOT
TABLE 167 AMAZON WEB SERVICES, INC.: PRODUCTS/SOLUTIONS/SERVICES OFFERED
TABLE 168 AMAZON WEB SERVICES, INC.: PRODUCT LAUNCHES
TABLE 169 AMAZON WEB SERVICES, INC.: DEALS
TABLE 170 AMAZON WEB SERVICES, INC.: OTHERS
13.1.9 TOKYO ELECTRON LIMITED
TABLE 171 TOKYO ELECTRON LIMITED: COMPANY OVERVIEW

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FIGURE 62 TOKYO ELECTRON LIMITED: COMPANY SNAPSHOT
TABLE 172 TOKYO ELECTRON LIMITED: PRODUCTS/SOLUTIONS/SERVICES OFFERED
13.1.10 SYNOPSYS, INC.
TABLE 173 SYNOPSYS, INC.: COMPANY OVERVIEW
FIGURE 63 SYNOPSYS, INC.: COMPANY SNAPSHOT
TABLE 174 SYNOPSYS, INC.: PRODUCTS/SOLUTIONS/SERVICES OFFERED
TABLE 175 SYNOPSYS, INC.: PRODUCT LAUNCHES
TABLE 176 SYNOPSYS, INC.: DEALS
13.1.11 APPLIED MATERIALS, INC.
TABLE 177 APPLIED MATERIALS, INC.: COMPANY OVERVIEW
FIGURE 64 APPLIED MATERIALS, INC.: COMPANY SNAPSHOT
TABLE 178 APPLIED MATERIALS, INC.: PRODUCTS/SOLUTIONS/SERVICES OFFERED
TABLE 179 APPLIED MATERIALS, INC.: PRODUCT LAUNCHES
13.2 OTHER PLAYERS
13.2.1 EINNOSYS TECHNOLOGIES INC.
13.2.2 DATALOGIC S.P.A.
13.2.3 PDF SOLUTIONS
13.2.4 NIKON CORPORATION
13.2.5 INFICON
13.2.6 QUALITAS TECHNOLOGIES
13.2.7 BEYONDMINDS
13.2.8 ELUNIC AG
13.2.9 CHOOCH INTELLIGENCE TECHNOLOGIES
13.2.10 KILI TECHNOLOGY
13.2.11 MOBIDEV
13.2.12 DWFRITZ AUTOMATION, LLC
13.2.13 RADIANT OPTRONICS PTE LTD
13.2.14 VISIONIFY.AI
13.3 SOUTH KOREA – OTHER PLAYERS
13.3.1 SAMSUNG SDS
13.3.2 LS ELECTRIC CO., LTD.
13.3.3 DOOSAN CORPORATION (DOOSAN ?KODA POWER)
13.3.4 HYUNDAI HEAVY INDUSTRIES

*Details on Business Overview, Products/Solutions/Services Offered, Recent Developments, and MnM View (Key strengths/Right to Win, Strategic Choices Made, and Weaknesses and Competitive Threats) might not be captured in case of unlisted companies.

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14 APPENDIX

14.1 DISCUSSION GUIDE
14.2 KNOWLEDGESTORE: MARKETSANDMARKETS’ SUBSCRIPTION PORTAL
14.3 CUSTOMIZATION OPTIONS
14.4 RELATED REPORTS
14.5 AUTHOR DETAILS

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