

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

Market Report | 2023-09-20 | 250 pages | MarketsandMarkets

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Report description:

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 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

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

The manufacturing 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%

-□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)

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

Table of Contents:

1	INTRODUCTION	31
1.1	STUDY OBJECTIVES	31
1.2	MARKET DEFINITION	31
1.2.1	INCLUSIONS AND EXCLUSIONS	32
1.3	STUDY SCOPE	33
1.3.1	MARKETS COVERED	33
FIGURE 1	MARKET SEGMENTATION	33
1.3.2	REGIONS COVERED	33
1.3.3	YEARS CONSIDERED	34
1.3.4	CURRENCY CONSIDERED	34
1.3.5	UNITS CONSIDERED	34
1.4	LIMITATIONS	34
1.5	STAKEHOLDERS	35
1.6	IMPACT OF RECESSION	35
2	RESEARCH METHODOLOGY	36
2.1	RESEARCH APPROACH	36
FIGURE 2	FAULT DETECTION AND CLASSIFICATION MARKET: RESEARCH DESIGN	36
2.1.1	SECONDARY AND PRIMARY RESEARCH	37
FIGURE 3	FAULT DETECTION AND CLASSIFICATION MARKET: RESEARCH APPROACH	38
2.1.2	SECONDARY DATA	38
2.1.2.1	Major secondary sources	39
2.1.2.2	Key data from secondary sources	39
2.1.3	PRIMARY DATA	40
2.1.3.1	Major primary participants	40
2.1.3.2	Primary interviews with experts	40
2.1.3.3	Breakdown of primaries	40
2.1.3.4	Key data from primary sources	41
2.1.3.5	Key industry insights	41
2.2	FACTOR ANALYSIS	42
2.2.1	SUPPLY-SIDE ANALYSIS	42
FIGURE 4	MARKET SIZE ESTIMATION METHODOLOGY: SUPPLY-SIDE ANALYSIS	42
FIGURE 5	MARKET SIZE ESTIMATION METHODOLOGY: TOP-DOWN SUPPLY-SIDE ANALYSIS	43
2.3	MARKET SIZE ESTIMATION	43
FIGURE 6	MARKET SIZE ESTIMATION METHODOLOGY: SUPPLY-SIDE ANALYSIS	44
2.3.1	BOTTOM-UP APPROACH	44

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2.3.1.1	Approach to derive market size using bottom-up analysis	44
FIGURE 7	MARKET SIZE ESTIMATION METHODOLOGY: BOTTOM-UP APPROACH	45
?		
2.3.2	TOP-DOWN APPROACH	45
2.3.2.1	Approach to derive market size using top-down analysis (supply side)	45
FIGURE 8	MARKET SIZE ESTIMATION METHODOLOGY: TOP-DOWN APPROACH	46
2.3.3	GROWTH PROJECTION AND FORECAST-RELATED ASSUMPTIONS	46
TABLE 1	MARKET GROWTH ASSUMPTIONS	46
2.4	DATA TRIANGULATION	47
FIGURE 9	DATA TRIANGULATION	47
2.5	RESEARCH ASSUMPTIONS	48
TABLE 2	KEY ASSUMPTIONS: MACRO-AND MICRO-ECONOMIC ENVIRONMENT	48
2.6	RESEARCH LIMITATIONS	49
2.7	RISK ASSESSMENT	49
TABLE 3	RISK ASSESSMENT	49
2.7.1	PARAMETERS CONSIDERED TO ANALYZE IMPACT OF RECESSION ON FAULT DETECTION AND CLASSIFICATION MARKET	49
3	EXECUTIVE SUMMARY	50
FIGURE 10	AUTOMOTIVE SEGMENT TO WITNESS HIGHEST CAGR DURING FORECAST PERIOD	50
FIGURE 11	SOFTWARE SEGMENT TO EXHIBIT HIGHEST CAGR IN MARKET DURING FORECAST PERIOD	51
FIGURE 12	CAMERA SEGMENT TO LEAD MARKET DURING FORECAST PERIOD	51
FIGURE 13	ASIA PACIFIC TO ACCOUNT FOR LARGEST MARKET SHARE THROUGHOUT FORECAST PERIOD	52
3.1	IMPACT OF RECESSION ON FAULT DETECTION AND CLASSIFICATION MARKET	53
FIGURE 14	PRE- AND POST-RECESSION IMPACT ON FAULT DETECTION AND CLASSIFICATION MARKET, 2019-2028	53
4	PREMIUM INSIGHTS	54
4.1	ATTRACTIVE GROWTH OPPORTUNITIES FOR PLAYERS IN FAULT DETECTION AND CLASSIFICATION MARKET	54
FIGURE 15	HIGH DEMAND FOR APPLICATION-SPECIFIC INTEGRATED CIRCUITS TO DRIVE MARKET	54
4.2	FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION	54
FIGURE 16	MANUFACTURING SEGMENT LEAD MARKET DURING FORECAST PERIOD	54
4.3	FAULT DETECTION AND CLASSIFICATION MARKET FOR MANUFACTURING, BY APPLICATION	55
FIGURE 17	ASSEMBLY VERIFICATION SEGMENT TO EXHIBIT HIGHEST CAGR FROM 2023 TO 2028	55
4.4	FAULT DETECTION AND CLASSIFICATION MARKET FOR PACKAGING, BY APPLICATION	55
FIGURE 18	LABEL VALIDATION SEGMENT TO CLAIM HIGHEST MARKET SHARE DURING FORECAST PERIOD	55
4.5	FAULT DETECTION AND CLASSIFICATION MARKET, BY REGION	56
FIGURE 19	ASIA PACIFIC TO HOLD LARGEST MARKET SHARE IN 2028, BY VALUE	56
4.6	FAULT DETECTION AND CLASSIFICATION MARKET, BY COUNTRY	56
FIGURE 20	CHINA TO DOMINATE MARKET DURING FORECAST PERIOD	56
?		
5	MARKET OVERVIEW	57
5.1	INTRODUCTION	57
5.2	MARKET DYNAMICS	57
FIGURE 21	FAULT DETECTION AND CLASSIFICATION MARKET: DRIVERS, RESTRAINTS, OPPORTUNITIES, AND CHALLENGES	57
5.2.1	DRIVERS	58
5.2.1.1	Effective detection and management of complex systems in modern technological landscape	58
5.2.1.2	Improved plant-efficiency and reduced costs with quality control processes in manufacturing	58
5.2.1.3	Increasing focus on deployment of automated tools in manufacturing sector	58

5.2.1.4	High demand for application-specific integrated circuits	59
FIGURE 22 FAULT DETECTION AND CLASSIFICATION MARKET: IMPACT ANALYSIS OF DRIVERS		
5.2.2	RESTRAINTS	60
5.2.2.1	Shortage of skilled professionals	60
FIGURE 23 FAULT DETECTION AND CLASSIFICATION MARKET: IMPACT ANALYSIS OF RESTRAINTS		
5.2.3	OPPORTUNITIES	61
5.2.3.1	Improved production processes using AI-based fault detection and classification instruments	61
5.2.3.2	Government-led initiatives to boost adoption of automation and data acquisition systems	62
FIGURE 24 FAULT DETECTION AND CLASSIFICATION MARKET: IMPACT ANALYSIS OF OPPORTUNITIES		
5.2.4	CHALLENGES	62
5.2.4.1	Growing complexities in manufacturing processes attributed to technological innovations	62
FIGURE 25 FAULT DETECTION AND CLASSIFICATION MARKET: IMPACT ANALYSIS OF CHALLENGES		
5.3	VALUE CHAIN ANALYSIS	63
FIGURE 26 FAULT DETECTION AND CLASSIFICATION MARKET: VALUE CHAIN ANALYSIS		
5.3.1	RESEARCH & DEVELOPMENT ENGINEERS	64
5.3.2	RAW MATERIAL SUPPLIERS	64
5.3.3	MANUFACTURERS	64
5.3.4	SYSTEM INTEGRATORS	64
5.3.5	SUPPLIERS AND DISTRIBUTORS	64
5.4	PORTER'S FIVE FORCES ANALYSIS	65
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	66
5.4.2	THREAT OF SUBSTITUTES	67
5.4.3	BARGAINING POWER OF SUPPLIERS	67
5.4.4	BARGAINING POWER OF BUYERS	67
5.4.5	INTENSITY OF COMPETITIVE RIVALRY	67
5.5	TRENDS/DISRUPTIONS IMPACTING CUSTOMER BUSINESS	68
FIGURE 28 REVENUE SHIFT AND NEW REVENUE POCKETS FOR PLAYERS IN FAULT DETECTION AND CLASSIFICATION MARKET		
5.6	ECOSYSTEM MAPPING	68
FIGURE 29 FAULT DETECTION AND CLASSIFICATION MARKET: ECOSYSTEM MAPPING		
5.7	PRICING ANALYSIS	69
FIGURE 30 AVERAGE SELLING PRICE OF HARDWARE, 2019-2028		
5.7.1	AVERAGE SELLING PRICE OF HARDWARE OFFERED BY KEY PLAYERS	69
FIGURE 31 AVERAGE SELLING PRICE OF HARDWARE, BY KEY PLAYERS		
TABLE 5 AVERAGE SELLING PRICE OF HARDWARE OFFERED BY KEY PLAYERS		
5.8	KEY STAKEHOLDERS AND BUYING CRITERIA	70
5.8.1	KEY STAKEHOLDERS IN BUYING PROCESS	70
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	71
FIGURE 33 KEY BUYING CRITERIA FOR TOP THREE VERTICALS		
TABLE 7 KEY BUYING CRITERIA FOR TOP THREE VERTICALS		

5.9 PATENT ANALYSIS 72

FIGURE 34 TOP 10 COMPANIES WITH HIGHEST NUMBER OF PATENT APPLICATIONS DURING LAST 10 YEARS 72

FIGURE 35 REGIONAL ANALYSIS OF PATENTS GRANTED FOR FAULT DETECTION AND CLASSIFICATION DEVICES, 2022 73

TABLE 8 FAULT DETECTION AND CLASSIFICATION MARKET: INNOVATIONS AND PATENT REGISTRATIONS, 2021-2023 73

5.10 TECHNOLOGY ANALYSIS 75

5.10.1 LIQUID LENS 75

5.10.2 ROBOTIC VISION 75

5.10.3 DEEP LEARNING 75

5.11 TRADE ANALYSIS 75

5.11.1 IMPORT SCENARIO 75

TABLE 9 IMPORT DATA FOR FAULT DETECTION AND CLASSIFICATION INSTRUMENTS, BY COUNTRY, 2018-2022 (USD MILLION) 76

5.11.2 EXPORT SCENARIO 76

TABLE 10 EXPORT DATA FOR FAULT DETECTION AND CLASSIFICATION INSTRUMENTS, BY COUNTRY, 2018-2022 (USD MILLION) 77

5.12 CASE STUDY ANALYSIS 77

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 77

5.12.2 APPLIED MATERIALS, INC. OFFERS COST-EFFECTIVE APPROACH TO PROPAGATE FRONT-END FD PRACTICES INTO BACK-END ATP PROCESSES 77

?

5.13 KEY CONFERENCES AND EVENTS, 2023-2024 78

TABLE 11 FAULT DETECTION AND CLASSIFICATION MARKET: LIST OF CONFERENCES AND EVENTS 78

5.14 REGULATORY LANDSCAPE 79

5.14.1 REGULATORY BODIES, GOVERNMENT AGENCIES, AND OTHER ORGANIZATIONS 79

TABLE 12 NORTH AMERICA: LIST OF REGULATORY BODIES, GOVERNMENT AGENCIES, AND OTHER ORGANIZATIONS 79

TABLE 13 EUROPE: LIST OF REGULATORY BODIES, GOVERNMENT AGENCIES, AND OTHER ORGANIZATIONS 79

TABLE 14 ASIA PACIFIC: LIST OF REGULATORY BODIES, GOVERNMENT AGENCIES, AND OTHER ORGANIZATIONS 79

TABLE 15 ROW: LIST OF REGULATORY BODIES, GOVERNMENT AGENCIES, AND OTHER ORGANIZATIONS 80

5.14.2 STANDARDS 80

5.15 TARIFF ANALYSIS 81

TABLE 16 TARIFF FOR HS CODE 903033-COMPLIANT PRODUCTS EXPORTED BY GERMANY 81

TABLE 17 TARIFF FOR HS CODE 903033-COMPLIANT PRODUCTS EXPORTED BY CHINA, 2022 81

6 TYPES OF FAULTS DETECTED BY FAULT DETECTION AND CLASSIFICATION SYSTEMS 82

6.1 INTRODUCTION 82

6.2 DIMENSIONAL FAULT 82

6.2.1 INCREASING USE TO MINIMIZE DIMENSIONAL FAULTS LEADING TO HIGH COSTS AND DOWNTIME 82

6.3 SURFACE DEFECTS 82

6.3.1 IRREGULARITIES DUE TO ELECTRICAL SHORTS AND DEVICE FAILURES 82

6.4 CONTAMINATION FAULTS 83

6.4.1 INTERFERENCE IN PRECISE ETCHING AND DEPOSITION PROCESS DUE TO CONTAMINATION ISSUES 83

6.5 PROCESS VARIABILITY 83

6.5.1 FLUCTUATION IN CLEANROOM ENVIRONMENT IMPACTING PROCESS STABILITY 83

6.6 OTHER FAULT TYPES 84

7 TYPES OF TECHNOLOGY FOR FAULT DETECTION AND CLASSIFICATION 85

7.1 INTRODUCTION 85

7.2 SENSOR DATA ANALYSIS 85

7.2.1 GROWING NEED FOR ANALYSIS OF LARGE VOLUMES OF SENSOR DATA IN REAL-TIME TO DRIVE DEMAND 85

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7.3	STATISTICAL METHODS	85
7.3.1	ABILITY TO TRANSFORM RAW DATA INTO ACTIONABLE INSIGHTS TO FOSTER SEGMENTAL GROWTH	85
7.4	MACHINE LEARNING ALGORITHMS	86
7.4.1	EARLY ISSUE DETECTION AND PREDICTIVE MAINTENANCE TO SPUR DEMAND	86
7.5	OTHER TECHNOLOGIES	86
8	FAULT DETECTION AND CLASSIFICATION MARKET, BY OFFERING	87
8.1	INTRODUCTION	88
	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	89
8.2.1	RISING CRITICALITY OF INFRASTRUCTURE SYSTEMS TO FOSTER SEGMENTAL GROWTH	89
8.3	HARDWARE	89
	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	91
8.3.1.1	Cameras, by format	91
8.3.1.1.1	Area scan cameras	92
8.3.1.1.1.1	Better flexibility than other cameras to drive demand	92
8.3.1.1.2	Line scan cameras	92
8.3.1.1.2.1	Cost advantage and high resolution to boost demand	92
8.3.1.2	Cameras, by frame rate	93
8.3.1.2.1	Ability to record smooth motion with less motion blur to foster segmental growth	93
8.3.2	SENSORS	93
8.3.2.1	CCD sensors	93
8.3.2.1.1	Less defective pixels due to simple structure to drive demand	93
8.3.2.2	CMOS sensors	94
8.3.2.2.1	Low power consumption and high-speed performance to drive demand	94
8.3.3	FRAME GRABBERS	94
8.3.3.1	Ability to capture high-resolution digital still images to boost demand	94
8.3.4	OPTICS	94
8.3.4.1	Need to regulate flaws in raw materials, components, and finished products to boost demand	94
8.3.5	PROCESSORS	95
8.3.5.1	High-resolution and real-time video analytics in vision algorithms to propel market	95
	?	
8.4	SERVICES	96
8.4.1	GROWING ADOPTION OF AI AND DEEP LEARNING TECHNOLOGIES TO BOOST DEMAND	96
9	FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION	97
9.1	INTRODUCTION	98
	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)

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9.2 MANUFACTURING 99

TABLE 26 MANUFACTURING: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019-2022 (USD MILLION) 100

TABLE 27 MANUFACTURING: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023-2028 (USD MILLION) 100

FIGURE 39 ASSEMBLY VERIFICATION SEGMENT TO CAPTURE LARGEST MARKET SHARE FOR MANUFACTURING APPLICATIONS THROUGHOUT FORECAST PERIOD 100

TABLE 28 MANUFACTURING: FAULT DETECTION AND CLASSIFICATION MARKET, BY VERTICAL, 2019-2022 (USD MILLION) 101

TABLE 29 MANUFACTURING: FAULT DETECTION AND CLASSIFICATION MARKET, BY VERTICAL, 2023-2028 (USD MILLION) 101

TABLE 30 MANUFACTURING: FAULT DETECTION AND CLASSIFICATION MARKET, BY REGION, 2019-2022 (USD MILLION) 101

TABLE 31 MANUFACTURING: FAULT DETECTION AND CLASSIFICATION MARKET, BY REGION, 2023-2028 (USD MILLION) 102

TABLE 32 MANUFACTURING: FAULT DETECTION AND CLASSIFICATION MARKET IN NORTH AMERICA, BY COUNTRY, 2019-2022 (USD MILLION) 102

TABLE 33 MANUFACTURING: FAULT DETECTION AND CLASSIFICATION MARKET IN NORTH AMERICA, BY COUNTRY, 2023-2028 (USD MILLION) 102

TABLE 34 MANUFACTURING: FAULT DETECTION AND CLASSIFICATION MARKET IN EUROPE, BY COUNTRY, 2019-2022 (USD MILLION) 102

TABLE 35 MANUFACTURING: FAULT DETECTION AND CLASSIFICATION MARKET IN EUROPE, BY COUNTRY, 2023-2028 (USD MILLION) 103

TABLE 36 MANUFACTURING: FAULT DETECTION AND CLASSIFICATION MARKET IN ASIA PACIFIC, BY COUNTRY, 2019-2022 (USD MILLION) 103

TABLE 37 MANUFACTURING: FAULT DETECTION AND CLASSIFICATION MARKET IN ASIA PACIFIC, BY COUNTRY, 2023-2028 (USD MILLION) 103

TABLE 38 MANUFACTURING: FAULT DETECTION AND CLASSIFICATION MARKET IN ROW, BY REGION, 2019-2022 (USD MILLION) 104

TABLE 39 MANUFACTURING: FAULT DETECTION AND CLASSIFICATION MARKET IN ROW, BY REGION, 2023-2028 (USD MILLION) 104

9.2.1 ASSEMBLY VERIFICATION 104

9.2.1.1 AI- and deep learning-based fault detection and classification systems to offer growth opportunities 104

?

9.2.2 FLAW DETECTION 105

9.2.2.1 Measurement 105

9.2.2.1.1 Semiconductor and electronics industries to generate significant demand 105

9.2.2.2 Surface anomalies 105

9.2.2.2.1 Implementation of technologically advanced products to detect real-time complex defects to drive market 105

9.2.2.3 Fabrication inspection 106

9.2.2.3.1 Welding inspection 106

9.2.2.3.1.1 Rising demand for light and efficient designs to foster segmental growth 106

9.2.2.3.2 Semiconductor device fabrication 106

9.2.2.3.2.1 Growing miniaturization of semiconductor devices to propel market growth 106

9.3 PACKAGING 107

TABLE 40 PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019-2022 (USD MILLION) 107

TABLE 41 PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023-2028 (USD MILLION) 108

FIGURE 40 LABEL VALIDATION SEGMENT TO CAPTURE LARGEST MARKET SHARE THROUGHOUT FORECAST PERIOD 108

TABLE 42 PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET, BY VERTICAL, 2019-2022 (USD MILLION) 109

TABLE 43 PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET, BY VERTICAL, 2023-2028 (USD MILLION) 109

TABLE 44 PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET, BY REGION, 2019-2022 (USD MILLION) 109

TABLE 45 PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET, BY REGION, 2023-2028 (USD MILLION) 110

TABLE 46 PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET IN NORTH AMERICA, BY COUNTRY, 2019-2022 (USD MILLION) 110

TABLE 47 PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET IN NORTH AMERICA, BY COUNTRY, 2023-2028 (USD

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MILLION)110

TABLE 48PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET IN EUROPE, BY COUNTRY, 2019-2022 (USD MILLION)110

TABLE 49PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET IN EUROPE, BY COUNTRY, 2023-2028 (USD MILLION)111

TABLE 50PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET IN ASIA PACIFIC, BY COUNTRY, 2019-2022 (USD MILLION)111

TABLE 51PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET IN ASIA PACIFIC, BY COUNTRY, 2023-2028 (USD MILLION)111

TABLE 52PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET IN ROW, BY REGION, 2019-2022 (USD MILLION)112

TABLE 53PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET IN ROW, BY REGION, 2023-2028 (USD MILLION)112

?

9.3.1GRADING112

9.3.1.1Introduction of application-specific products and solutions to boost market112

9.3.2LABEL VALIDATION113

9.3.2.1Product information113

9.3.2.1.1Assurance of defect-free product labeling with advanced fault detection and classification systems to drive market113

9.3.2.2Barcodes114

9.3.2.2.1Increasing concerns about quality standards to boost demand114

9.3.3CONTAINER/PACKAGING INSPECTION114

9.3.3.1Packaging integrity115

9.3.3.1.1Assurance of product sterility and reduced dependence on manual and expensive inspection processes to drive market115

10FAULT DETECTION AND CLASSIFICATION MARKET, BY VERTICAL116

10.1INTRODUCTION117

FIGURE 41ELECTRONICS & SEMICONDUCTORS TO LEAD MARKET THROUGHOUT FORECAST PERIOD117

TABLE 54FAULT DETECTION AND CLASSIFICATION MARKET, BY VERTICAL, 2019-2022 (USD MILLION)117

TABLE 55FAULT DETECTION AND CLASSIFICATION MARKET, BY VERTICAL, 2023-2028 (USD MILLION)118

10.2AUTOMOTIVE118

10.2.1RISING PRODUCTION OF HYBRID AND ELECTRIC VEHICLES TO BOOST MARKET118

TABLE 56AUTOMOTIVE: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019-2022 (USD MILLION)119

TABLE 57AUTOMOTIVE: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023-2028 (USD MILLION)119

FIGURE 42ASSEMBLY VERIFICATION TO LEAD MARKET THROUGHOUT FORECAST PERIOD120

TABLE 58AUTOMOTIVE: FAULT DETECTION AND CLASSIFICATION MARKET, BY MANUFACTURING APPLICATION, 2019-2022 (USD MILLION)120

TABLE 59AUTOMOTIVE: FAULT DETECTION AND CLASSIFICATION MARKET, BY MANUFACTURING APPLICATION, 2023-2028 (USD MILLION)120

TABLE 60AUTOMOTIVE: FAULT DETECTION AND CLASSIFICATION MARKET, BY PACKAGING APPLICATION, 2019-2022 (USD MILLION)121

TABLE 61AUTOMOTIVE: FAULT DETECTION AND CLASSIFICATION MARKET, BY PACKAGING APPLICATION, 2023-2028 (USD MILLION)121

10.3ELECTRONICS & SEMICONDUCTORS121

10.3.1ABILITY TO DETECT COMPLEX AND MACRO DEFECTS TO BOOST DEMAND121

TABLE 62ELECTRONICS & SEMICONDUCTORS: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019-2022 (USD MILLION)122

TABLE 63ELECTRONICS & SEMICONDUCTORS: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023-2028 (USD MILLION)122

FIGURE 43BY MANUFACTURING APPLICATION, FABRIC INSPECTION TO DOMINATE MARKET DURING FORECAST PERIOD122

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TABLE 64	ELECTRONICS & SEMICONDUCTORS: FAULT DETECTION AND CLASSIFICATION MARKET, BY MANUFACTURING APPLICATION, 2019-2022 (USD MILLION)	123
TABLE 65	ELECTRONICS & SEMICONDUCTORS: FAULT DETECTION AND CLASSIFICATION MARKET, BY MANUFACTURING APPLICATION, 2023-2028 (USD MILLION)	123
TABLE 66	ELECTRONICS & SEMICONDUCTORS: FAULT DETECTION AND CLASSIFICATION MARKET, BY PACKAGING APPLICATION, 2019-2022 (USD MILLION)	123
TABLE 67	ELECTRONICS & SEMICONDUCTORS: FAULT DETECTION AND CLASSIFICATION MARKET, BY PACKAGING APPLICATION, 2023-2028 (USD MILLION)	123
10.4	METALS & MACHINERY	124
10.4.1	DEPLOYMENT OF INDUSTRY 4.0 AND IIOT IN METALS & MACHINERY TO DRIVE MARKET	124
TABLE 68	METALS & MACHINERY: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019-2022 (USD MILLION)	124
TABLE 69	METALS & MACHINERY: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023-2028 (USD MILLION)	124
FIGURE 44	ASSEMBLY VERIFICATION SEGMENT TO EXHIBIT HIGHEST CAGR IN FAULT DETECTION AND CLASSIFICATION MARKET FOR MANUFACTURING APPLICATIONS DURING FORECAST PERIOD	125
TABLE 70	METALS & MACHINERY: FAULT DETECTION AND CLASSIFICATION MARKET, BY MANUFACTURING APPLICATION, 2019-2022 (USD MILLION)	125
TABLE 71	METALS & MACHINERY: FAULT DETECTION AND CLASSIFICATION MARKET, BY MANUFACTURING APPLICATION, 2023-2028 (USD MILLION)	125
TABLE 72	METALS & MACHINERY: FAULT DETECTION AND CLASSIFICATION MARKET, BY PACKAGING APPLICATION, 2019-2022 (USD MILLION)	126
TABLE 73	METALS & MACHINERY: FAULT DETECTION AND CLASSIFICATION MARKET, BY PACKAGING APPLICATION, 2023-2028 (USD MILLION)	126
10.5	FOOD & PACKAGING	126
10.5.1	IMPLEMENTATION OF AI AND DEEP LEARNING SOFTWARE IN FOOD & PACKAGING TO DRIVE MARKET	126
TABLE 74	FOOD & PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019-2022 (USD MILLION)	127
TABLE 75	FOOD & PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023-2028 (USD MILLION)	127
FIGURE 45	ASSEMBLY VERIFICATION SEGMENT TO DISPLAY HIGHEST CAGR IN FAULT DETECTION AND CLASSIFICATION MARKET FOR MANUFACTURING APPLICATIONS THROUGHOUT FORECAST PERIOD	127
TABLE 76	FOOD & PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET, BY MANUFACTURING APPLICATION, 2019-2022 (USD MILLION)	128
TABLE 77	FOOD & PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET, BY MANUFACTURING APPLICATION, 2023-2028 (USD MILLION)	128
TABLE 78	FOOD & PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET, BY PACKAGING APPLICATION, 2019-2022 (USD MILLION)	128
TABLE 79	FOOD & PACKAGING: FAULT DETECTION AND CLASSIFICATION MARKET, BY PACKAGING APPLICATION, 2023-2028 (USD MILLION)	128
10.6	PHARMACEUTICALS	129
10.6.1	ABILITY TO INSPECT LARGE NUMBER OF TABLETS ACCURATELY TO BOOST DEMAND	129
TABLE 80	PHARMACEUTICALS: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019-2022 (USD MILLION)	129
TABLE 81	PHARMACEUTICALS: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023-2028 (USD MILLION)	129
FIGURE 46	ASSEMBLY VERIFICATION TO DISPLAY HIGHEST CAGR DURING FORECAST PERIOD	130
TABLE 82	PHARMACEUTICALS: FAULT DETECTION AND CLASSIFICATION MARKET, BY MANUFACTURING APPLICATION, 2019-2022 (USD MILLION)	130

TABLE 83 PHARMACEUTICALS: FAULT DETECTION AND CLASSIFICATION MARKET, BY MANUFACTURING APPLICATION, 2023-2028 (USD MILLION) 130

TABLE 84 PHARMACEUTICALS: FAULT DETECTION AND CLASSIFICATION MARKET, BY PACKAGING APPLICATION, 2019-2022 (USD MILLION) 131

TABLE 85 PHARMACEUTICALS: FAULT DETECTION AND CLASSIFICATION MARKET, BY PACKAGING APPLICATION, 2023-2028 (USD MILLION) 131

11 FAULT DETECTION AND CLASSIFICATION MARKET, BY REGION 132

11.1 INTRODUCTION 133

FIGURE 47 ASIA PACIFIC TO EXHIBIT HIGHEST CAGR DURING FORECAST PERIOD 133

TABLE 86 FAULT DETECTION AND CLASSIFICATION MARKET, BY REGION, 2019-2022 (USD MILLION) 134

TABLE 87 FAULT DETECTION AND CLASSIFICATION MARKET, BY REGION, 2023-2028 (USD MILLION) 134

11.2 NORTH AMERICA 135

FIGURE 48 NORTH AMERICA: FAULT DETECTION AND CLASSIFICATION MARKET SNAPSHOT 136

TABLE 88 NORTH AMERICA: FAULT DETECTION AND CLASSIFICATION MARKET, BY COUNTRY, 2019-2022 (USD MILLION) 136

TABLE 89 NORTH AMERICA: FAULT DETECTION AND CLASSIFICATION MARKET, BY COUNTRY, 2023-2028 (USD MILLION) 137

11.2.1 US 137

11.2.1.1 Presence of established players to foster market growth 137

TABLE 90 US: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019-2022 (USD MILLION) 137

TABLE 91 US: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023-2028 (USD MILLION) 138

11.2.2 CANADA 138

11.2.2.1 Thriving automotive and aerospace sectors to contribute to market growth 138

TABLE 92 CANADA: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019-2022 (USD MILLION) 138

TABLE 93 CANADA: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023-2028 (USD MILLION) 139

11.2.3 MEXICO 139

11.2.3.1 Growing FDIs in manufacturing to boost market growth 139

TABLE 94 MEXICO: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019-2022 (USD MILLION) 139

TABLE 95 MEXICO: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023-2028 (USD MILLION) 140

11.2.4 NORTH AMERICA: RECESSION IMPACT 140

11.3 EUROPE 141

FIGURE 49 EUROPE: FAULT DETECTION AND CLASSIFICATION MARKET SNAPSHOT 141

TABLE 96 EUROPE: FAULT DETECTION AND CLASSIFICATION MARKET, BY COUNTRY, 2019-2022 (USD MILLION) 142

TABLE 97 EUROPE: FAULT DETECTION AND CLASSIFICATION MARKET, BY COUNTRY, 2023-2028 (USD MILLION) 142

11.3.1 GERMANY 142

11.3.1.1 Increasing demand for robots in automotive and electronics industries to foster market growth 142

TABLE 98 GERMANY: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019-2022 (USD MILLION) 143

TABLE 99 GERMANY: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023-2028 (USD MILLION) 143

11.3.2 UK 143

11.3.2.1 Pharmaceutical industry to create significant demand for fault detection and classification systems 143

TABLE 100 UK: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019-2022 (USD MILLION) 144

TABLE 101 UK: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023-2028 (USD MILLION) 144

11.3.3 FRANCE 144

11.3.3.1 Rising automobile production to boost demand 144

TABLE 102 FRANCE: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019-2022 (USD MILLION) 144

TABLE 103 FRANCE: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023-2028 (USD MILLION) 145

11.3.4 REST OF EUROPE 145

TABLE 104 REST OF EUROPE: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019-2022 (USD MILLION) 145

TABLE 105 REST OF EUROPE: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023-2028 (USD MILLION) 146

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11.3.5	EUROPE: RECESSION IMPACT	146
11.4	ASIA PACIFIC	146
FIGURE 50	ASIA PACIFIC: FAULT DETECTION AND CLASSIFICATION MARKET SNAPSHOT	147
TABLE 106	ASIA PACIFIC: FAULT DETECTION AND CLASSIFICATION MARKET, BY COUNTRY, 2019-2022 (USD MILLION)	147
TABLE 107	ASIA PACIFIC: FAULT DETECTION AND CLASSIFICATION MARKET, BY COUNTRY, 2023-2028 (USD MILLION)	148
11.4.1	CHINA	148
11.4.1.1	Established manufacturing hub for consumer electronics and automobiles to propel market growth	148
TABLE 108	CHINA: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019-2022 (USD MILLION)	148
TABLE 109	CHINA: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023-2028 (USD MILLION)	149
11.4.2	JAPAN	149
11.4.2.1	Healthy growth of consumer electronics industry to boost demand	149
TABLE 110	JAPAN: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019-2022 (USD MILLION)	149
TABLE 111	JAPAN: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023-2028 (USD MILLION)	150
11.4.3	SOUTH KOREA	150
11.4.3.1	Expanding consumer electronics industry and manufacturing sector to boost market growth	150
TABLE 112	SOUTH KOREA: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019-2022 (USD MILLION)	151
TABLE 113	SOUTH KOREA: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023-2028 (USD MILLION)	151
11.4.4	INDIA	151
11.4.4.1	Government-led campaigns for boosting domestic manufacturing sector to drive market	151
TABLE 114	INDIA: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019-2022 (USD MILLION)	152
TABLE 115	INDIA: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023-2028 (USD MILLION)	152
11.4.5	REST OF ASIA PACIFIC	152
TABLE 116	REST OF ASIA PACIFIC: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019-2022 (USD MILLION)	152
TABLE 117	REST OF ASIA PACIFIC: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023-2028 (USD MILLION)	153
11.4.6	ASIA PACIFIC: RECESSION IMPACT	153
11.5	ROW	154
TABLE 118	ROW: FAULT DETECTION AND CLASSIFICATION MARKET, BY REGION, 2019-2022 (USD MILLION)	154
TABLE 119	ROW: FAULT DETECTION AND CLASSIFICATION MARKET, BY REGION, 2023-2028 (USD MILLION)	154
11.5.1	MIDDLE EAST & AFRICA	154
11.5.1.1	Booming energy & power industry to fuel demand	154
TABLE 120	MEA: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019-2022 (USD MILLION)	155
TABLE 121	MEA: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023-2028 (USD MILLION)	155
11.5.2	SOUTH AMERICA	155
11.5.2.1	Rising need for high-quality automated inspections to drive demand	155
TABLE 122	SOUTH AMERICA: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2019-2022 (USD MILLION)	156
TABLE 123	SOUTH AMERICA: FAULT DETECTION AND CLASSIFICATION MARKET, BY APPLICATION, 2023-2028 (USD MILLION)	156
11.5.3	ROW: RECESSION IMPACT	156
12	COMPETITIVE LANDSCAPE	157
12.1	OVERVIEW	157
12.2	KEY STRATEGIES ADOPTED BY MAJOR PLAYERS	157
TABLE 124	OVERVIEW OF STRATEGIES ADOPTED BY KEY PLAYERS	157
12.2.1	PRODUCT PORTFOLIO	158
12.2.2	REGIONAL FOCUS	158

12.2.3	MANUFACTURING FOOTPRINT	158
12.2.4	ORGANIC/INORGANIC STRATEGIES	158
12.3	MARKET SHARE ANALYSIS, 2022	158
TABLE 125	FAULT DETECTION AND CLASSIFICATION MARKET SHARE ANALYSIS, 2022	159
12.4	REVENUE ANALYSIS, 2018-2022	160
FIGURE 51	FAULT DETECTION AND CLASSIFICATION SYSTEMS: REVENUE ANALYSIS OF FIVE KEY PLAYERS, 2018-2022	160
12.5	EVALUATION MATRIX OF KEY COMPANIES, 2022	161
12.5.1	STARS	161
12.5.2	EMERGING LEADERS	161
12.5.3	PERVASIVE PLAYERS	161
12.5.4	PARTICIPANTS	161
FIGURE 52	FAULT DETECTION AND CLASSIFICATION SYSTEMS: EVALUATION MATRIX OF KEY COMPANIES, 2022	162
12.6	EVALUATION MATRIX OF STARTUPS/SMES, 2022	163
TABLE 126	FAULT DETECTION AND CLASSIFICATION MARKET: LIST OF KEY STARTUPS/SMES	163
TABLE 127	FAULT DETECTION AND CLASSIFICATION MARKET: STARTUPS/SMES COMPANY PROFILE	163
TABLE 128	FAULT DETECTION AND CLASSIFICATION MARKET: COMPETITIVE BENCHMARKING OF KEY STARTUPS/SMES (OFFERING)	164
TABLE 129	FAULT DETECTION AND CLASSIFICATION MARKET: COMPETITIVE BENCHMARKING OF KEY STARTUPS/SMES (VERTICAL FOOTPRINT)	164
TABLE 130	FAULT DETECTION AND CLASSIFICATION MARKET: COMPETITIVE BENCHMARKING OF KEY STARTUPS/SMES (REGION FOOTPRINT)	164
12.6.1	PROGRESSIVE COMPANIES	164
12.6.2	RESPONSIVE COMPANIES	164
12.6.3	DYNAMIC COMPANIES	165
12.6.4	STARTING BLOCKS	165
FIGURE 53	FAULT DETECTION AND CLASSIFICATION MARKET: EVALUATION MATRIX OF STARTUPS/SME, 2022	165
12.7	COMPANY FOOTPRINT	166
TABLE 131	FAULT DETECTION AND CLASSIFICATION MARKET: COMPANY FOOTPRINT	166
TABLE 132	VERTICAL: COMPANY FOOTPRINT	167
TABLE 133	OFFERING: COMPANY FOOTPRINT	168
TABLE 134	REGION: COMPANY FOOTPRINT	169
12.8	COMPETITIVE SCENARIOS AND TRENDS	170
12.8.1	PRODUCT LAUNCHES	170
TABLE 135	FAULT DETECTION AND CLASSIFICATION MARKET: PRODUCT LAUNCHES, 2019-2023	170
12.8.2	DEALS	177
TABLE 136	FAULT DETECTION AND CLASSIFICATION MARKET: DEALS, 2019-2023	177
12.8.3	OTHERS	181
TABLE 137	FAULT DETECTION AND CLASSIFICATION MARKET: OTHERS, 2019-2023	181
?		

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