your partner
in sensor
technology.

The Integrated Management System of E+E Elektronik Ges.m.b.H.

Management System Handbook

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Chapter 1

This chapter describes the structure of the Management System.

How is the Management System structured?

This Management Handbook constitutes the main internal point of reference in relation to the comprehensive Management System of E+E Elektronik Ges.m.b.H. (hereafter named E+E Elektronik) at the main site in Engerwitzdorf and for the Remote Support Function at Gallneukirchen. The handbook also aims to provide persons outside the company with **clear information** on the basic structure and operation of the Management System and its processes in order to create confidence that quality requirements will be met.

As an **internal reference document**, the content of this handbook is principally of significance to managerial employees who maintain the company's quality capability by establishing and upholding an appropriate structural and process organisation. The handbook answers the question of, **"WHO does WHAT?".**

How is the handbook (MHB) structured?

The handbook is structured on the basis of **questions** and relevant **answers** that provide an overview of the **overall Management System** of E+E Elektronik The handbook is the top level of system documentation, which is continued at the next level of detail in Procedural Instructions and Process Descriptions (QSVs and PBs). The third and final level of documentation is formed by the various detailed sets of instructions which define all key guidelines for company activities.

About the table of contents

The table of contents lists **questions** along with the page numbers on which you will find the corresponding **answers**.

How do I find supporting documents?

The text of this handbook incorporates **links** that provide simple internal references to supporting E+E Process Descriptions and Procedural Instructions in the German original version.

Document structure in the Management System

The documentation is structured according to the three levels of detail as specified.

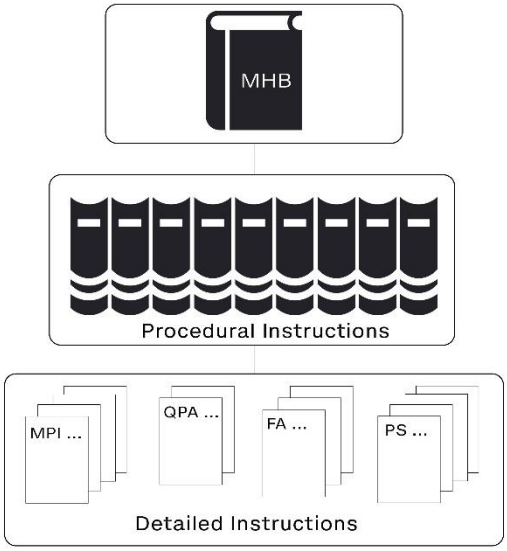

Figure 1 shows this handbook (MHB) as the highest documentation level, containing general information. The middle level of Procedural Instructions and Process Descriptions (QSVs and PBs) contains details of organisational processes, thereby linking the Management System with interdivisional regulations and regulations specific to certain divisions. Relevant details on the implementation of activities are defined in the Detailed Instructions at the lowest level.

The **appendix** to this handbook contains a clear depiction of **corporate processes** at E+E Elektronik

How are documents and data managed?

The **organisational documents** (MHB, QSVs, PBs and job descriptions) are managed on a **paperless** basis wherever possible and accessed electronically by relevant employees. In the case of **Detailed Instructions**, administration exclusively via IT would not be practical at workstations and would serve to lower acceptance among employees executing the instructions. For this reason, this lowest documentation level includes **traditional document management**. The management of documents in the form of paper, IT, external documents, etc. is organised by the QM staff unit.

Rules on the specification of necessary quality records are incorporated into the procedures for product and process development so as to ensure the **identification and traceability** of products (and input materials as necessary).

Which regulations does the system recognise?

The following standards, laws and regulations are taken into account in the current version of the Management System for E+E Elektronik :

- **Austrian standard EN ISO 9001:** Quality management system - Requirements
- **Austrian standard EN ISO 14001:** Environmental management systems - Requirements with guidance for use
- **Austrian Occupational Health and Safety Act (ASchG):** Federal Law Gazette BGBl. no. 450/94
- **ZVEI code of conduct** on societal responsibility
- **IATF 16949:** Requirements on QM systems
- **Austrian standard EN ISO/IEC 17025:** General requirements for the competence of testing and calibration laboratories
- **Directive 2014/34/EU:** Equipment and protective systems intended for use in potentially explosive atmospheres
- **Austrian standard EN ISO/IEC 80079-34:** Explosive atmospheres - Application of quality management systems

What is the significance of this Management Handbook to E+E Elektronik?

This Management Handbook provides a clear overview of the comprehensive Management System of E+E Elektronik , including requisite references concerning the application of the system within the company. The content is updated in response to organisational circumstances. Amendments are only approved subject to Management approval. This handbook sets out **binding guidelines** for the entire area and all employees of E+E Elektronik

The Management Board

H. Kindlhofer *W. Timelthaler*

Dipl. Ing. Heinz Kindlhofer Dipl. Ing. Wolfgang Timelthaler

Chapter 2

How does E+E Elektronik present itself to its partners?

The company's history offers an overview of its evolution at the Engerwitzdorf site.

Production for IBM as a subdivision of the nationalised VOEST ALPINE AG	**1979** The Engerwitzdorf plant is constructed as a division of the state-run VOEST ALPINE AG. **1979 - 1995** Implementation of thin-film and assembly processes for various IBM locations
Start of independent sensor activities	**1985** Start of sensor activities Development of temperature and humidity sensors commences on the basis of existing knowledge in the area of thin-film technology.
With ISO 9001 certificate no. 100 and TS 16949 certificate no. 42, E+E Elektronik becomes a pioneer in the application of management systems.	**1991** First generation of E+E humidity sensors launched on the market Privatisation of Engerwitzdorf plant; company changes its name to E+E ELEKTRONIK The company is acquired by RSF Elektronik (Austrian firm active in the field of sensor technology). **1993** The quality assurance system of E+E Elektronik is certified by the ÖQS (Austrian association for the certification of quality assurance systems) according to the requirements of ISO 9001. **1994** E+E Elektronik is acquired by Dr. Johannes Heidenhain GmbH of Traunreut, Germany, global market leader in incremental linear encoders and angle encoders. **1995** The company commits to sensor technology, focusing on humidity and air velocity measurement.
Founding of first technical office	**1998** and **1999** Founding of E+E's first external sales branches in Germany and Beijing
New building, accreditation as calibration laboratory according to EN 45001 → IEC 17025	**2000** Thin-film production relocates to a modern new clean room production building. Humidity calibration laboratory of E+E Elektronik accredited according to EN 45001 (later ISO/IEC 17025) as an ÖKD (Austrian Calibration Service) laboratory (later Accreditation Austria 0608) for air humidity by the Federal Ministry of Labour and Economic Affairs.

2002 Certification of the management system of E+E Elektronik according to EN ISO 14001 (environmental management) and ISO/TS 16949 (technical specifications for automotive supply industry, later IATF 16949), a major step in the expansion of the automotive market

2003 Technical office opens in France

Carbon dioxide as new physical quantity

2004 CO_2 concentration expands the E+E product range as another environmental parameter

Designated laboratory for humidity

2005 E+E commissioned as a designated laboratory of the Federal Office of Metrology and Surveying (BEV) to provide the Austrian national standard for humidity; EURAMET recognises the quality system of the E+E calibration laboratory

2007 Foundig of E+E South Korea

2008 Expansion E+E in Italy

2010 E+E Elektronik Ltd. USA commences activities

Designated laboratory for air velocity

2011 Expansion of calibration activity of the accredited calibration laboratory to include contact thermometry and air velocity; in the same year, E+E commissioned to provide the Austrian national standard for air velocity.

2016 Expansion of calibration activity of the calibration laboratory to include the measurement of carbon dioxide concentrations.

Designated laboratory for carbon dioxide

2021 The E+E calibration laboratory also commissioned to provide the Austrian national standard for measuring carbon concentrations.

2022 E+E India was founded

How does the company define its place within the economy?

E+E Elektronik Ges.m.b.H Engerwitzdorf is a company of the Dr. Johannes Heidenhain GmbH corporate group (Heidenhain International GmbH). Sensing elements developed and produced internally form the basis for our products/sensors. The current focus is on the environmental/process measurement variables of humidity, air velocity and carbon dioxide. Thin-film sensor technology, calibration expertise and application know-how make up the foundation of our everyday business activity.

Alongside the constant technological changes in sensor technology, E+E Elektronik pays special attention to the external context as regards the **legal requirements and general conditions** governing the deployment of products; the company observes the **activities of competitors** and monitors the economic benefits that **customers** can gain by utilising the company's products.

Strong and rapid adaptability to continually changing customer/market conditions allied with **high quality standards** make E+E Elektronik a valued partner. Clients active in the automotive, heating/ventilation/climate control and process technology fields place their trust in the products of E+E Elektronik

The **scope of application** of the Integrated Management System incorporates those requirements of the **automotive industry** arising in connection with the delivery of components for use in automobiles to tier 1/tier 2 suppliers, etc. E+E Elektronik does not supply components for safety-critical applications or products in this market segment containing software components that can be changed independently of the hardware.
The customer-specific requirements are documented in a separate matrix.

Within the internal context, E+E Elektronik focuses on **cost-effectiveness** (and the **development and command of products and technologies needed to achieve this**) as well as **expertise on the part of employees and managerial staff**.

What are the guiding principles of E+E Elektronik?

Our quality policy informs the way we do business.
Continually improving and developing all aspects of the business is part and parcel of our management strategy.

Our quality policy takes account of the following interested partners:

The **customer** is our reason for being. We are motivated by our ability to recognise and meet specific customer requirements in a competent and reliable fashion with a view to establishing long-term partnerships. We consider all the relevant requirements of different market segments and regions for the benefit of our customers.

For the **owner**, we want to be a future-focused company, generating healthy revenue with products and services for the field of sensor technology and thereby establishing ourselves as an economically viable member of the group.

We want to remain competitive through partnerships with **suppliers**. With this in mind, we aim to enter into long-standing collaborations with reliable and competent suppliers, whom we expect to render products and services at the best possible price/performance ratio.

Every **employee** should perceive their role as important in terms of fulfilling the expectations of customers and the owner. We want to offer long-term prospects within the company to competent, committed and responsible employees.

We want to be proud of ourselves and we want to contribute to the good of **society**. This means recognising **opportunities** and responding to **risks** responsibly. We treat the environment and resources responsibly in our development and production activities, thereby applying an integrated environmental management system.

H. Kindlhofer, W. Timelthaler — *W. Tauschek*

Management Board — On behalf of the employees

T. Pflügl, G. Diesenreither, A. Eliskases
D. Pachinger, S. Humer, K. Mader

Heads of staff units and divisions

How do we deploy our guiding principles?

Our quality and environmental policy gives rise to the following guiding parameters that determine our **quality goals**:

Consistent implementation of quality and environmental policy	▪ Innovation and product concepts ▪ Adherence to delivery deadlines ▪ Customer loyalty ▪ Customer complaints
	▪ Earnings ▪ Operating performance ▪ Production efficiency
	▪ Performance of corporate processes ▪ Future focus
	▪ Supplier performance as regards deadlines, quality and costs ▪ Employee satisfaction
	▪ Resource consumption ▪ Waste, wastewater and emissions

When determining our goals and the activities necessary to achieve them, relevant **risks and opportunities** are defined and considered in a planned form.
This is carried out as part of the innovation process, especially where planning activities to achieve certain goals; the strengths and weaknesses of E+E Elektronik are considered accordingly, enabling us to factor in the business environment (i.e. the internal and external context) to maximum effect.

How is the company organised?

The organisation chart, which is created and approved by the Management, is freely accessible to all employees. The heads of organisational units are responsible for ensuring that employees are sufficiently aware of the requirements imposed on them by this MHB and take these requirements into account in the performance of their tasks.

In 2018, the Management introduced altered designations for product categories and organisational units. The old designation of ‘sensing elements’ was replaced by ‘elements’, while ‘systems’ changed to ‘sensors’.

At the end of October 2022, the department Material Management was split into the departments Purchasing and Logistics.

The job description concept

Responsibilities, authorities, powers and job specifications are defined in job descriptions. The content of job descriptions as well as personnel allocations are defined responsibilities of managers and senior executives.

Resources and personnel for the Management System

The equipment and personnel requirements arising from the Management System are met by the Management in line with set procedures for procurement and staff recruitment. In accordance with job descriptions, the required number of employees are entrusted with quality management tasks (in whole or in part) across all divisions. The technical aspects of the environmental management system are overseen by an internal environmental officer with the appropriate expertise. The necessary equipment is available to these employees in the various sub-areas. The staff of **QM**, the **environmental officer** and the **explosion protection officer** are tasked with ensuring application of the Management System (by individual employees) and providing fast feedback to the persons responsible for management processes. The Management System is steadily developed through meetings of departmental heads, in which the Managing Directors and senior executives consider the various requirements and expectations of customers, owners, suppliers, employees and the environment.

Overall responsibility for the Management System

One member of the **Management board** of E+E Elektronik keeps authority for management tasks and upholding the Management System. **Changes to the Management System** are **carried out in a planned way** to ensure proper functioning of the Management System at all times. To implement the management guidelines, the QM staff unit, which monitors and supports the implementation of specific tasks in the various divisions is subordinate to the Management.

Evaluation of the Management System

The Management **evaluates** the Management System at least once a year, thereby defining targets and measures for the medium term and long term. The information below is used as a basis for the evaluation.

- **Reports on targets**: Support for guiding parameters, effectiveness of corporate processes
- **Reports on customer feedback**: Assessment of customer satisfaction
- **Internal audits:** Acceptance and realisation of quality principles
- **Improvement measures**: Practical implementation of improvement measures

Chapter 3

Who is responsible for what?

The clear allocation of activities and processes to departments and individuals is a fundamental element of our system.

Job descriptions are used to define tasks, authorities and job specifications in a practicable manner. It is important to ensure that those divisions or persons that make the greatest contributions to optimising process flows are also formally responsible. To this end, the organisation chart and job descriptions provide clear information on basic organisation. Although these do not reveal all of the links making up effective teamwork, such connections are the result of the practical implementation of management guidelines, especially in the form of interdisciplinary **teamwork**.

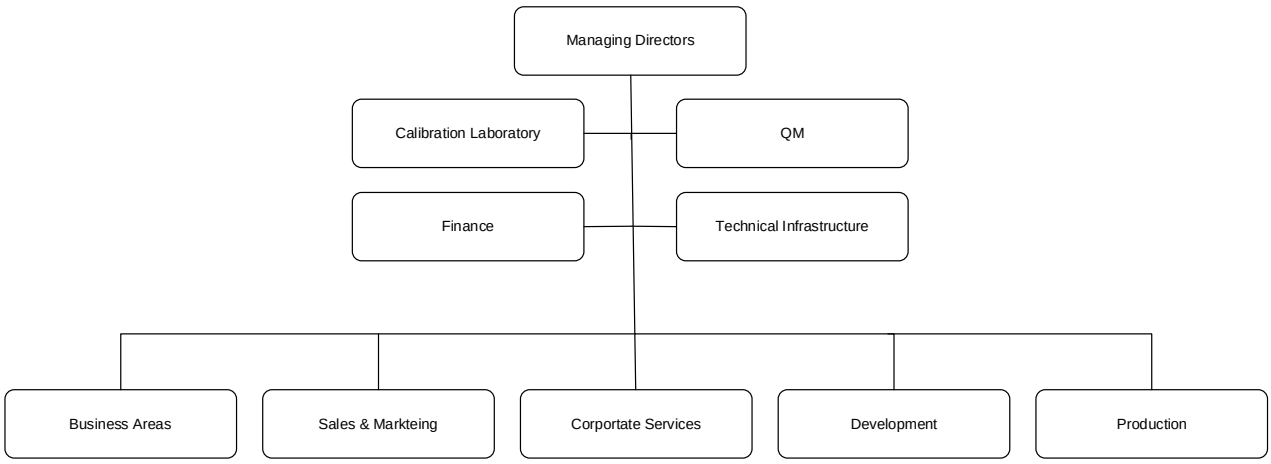

Figure 2 shows the basic organisational structure of E+E Elektronik

Management

Strategies for future-focused markets

The Management of E+E Elektronik defines medium-term and long-term **strategies and targets**, evaluates results and oversees fine-tuning in projects and business processes. The Board reviews all management guidelines in the MHB, QSVs and PBs and monitors changes to measures where internal system audits reveal discrepancies.

Calibration Laboratory staff unit

Accreditation Austria, Designated laboratory

The accredited Calibration Laboratory of E+E Elektronik provides competent, **independent** and **recognised measurement expertise** in the scope of accreditation. As a **designated laboratory** of the Federal Office of Metrology and Surveying (BEV), the calibration laboratory provides the national standard for air humidity and air flow for the Republic of Austria. Associated membership of EURAMET ensures **involvement in international metrology**.

Financl staff unit

Focus on finances

The **Finances** department performs **financial accounting**, accounts payable, accounts receivable, dunning and **controlling**.

Technical Infrastructure staff unit

Forward thinking and effective improvisation

Alongside procurement, organisation and **maintaining the complex technical infrastructure** of E+E Elektronik, the Technical Infrastructure staff unit is responsible for **maintaining** production systems.

Quality Management (QM) staff unit

Support, safeguarding product quality

The task of this staff unit is to support all other company divisions in implementing management requirements and applying the relevant regulations. In this context, QM is entrusted with inspection planning and ensuring product quality according to managerial specifications. E+E Elektronik treats outsourced processes in the same way as any externally provided products and services.

Business Areas division

Product portfolio, customer service

The **Sensors** department of the Business Areas division undertakes systematic **market monitoring** while aiming to optimise the **flow of communications** at the interface of market management, product management, development and production in the course of new developments, product modifications and the clarification of feasibility. This department is also responsible for **product information**.

The **Elements and Modules** department of the Business Areas division looks after large clients. Since the majority of these are internationally active, it is critical to provide a central point of contact for those functional areas stationed in different countries.

The **Service** department is responsible for supporting clients with technical issues, and for handling repairs and complaints efficiently in the course of delivering **customer service**.

Sales and Marketing division

Helping clients resolve tasks

Within the **Sales regions** and **Order processing** departments, determining the full **requirements and expectations of customers and the market** is a task of the Sales and Marketing division on a par with providing **competent advice** and technical support to subsidiaries, dealers and end customers.

Marketing

The **Marketing** department designs publications for external audiences, maintains the www.epluse.com web site and compiles sales documents and media for E+E trade show appearances.

Corporate Services division

Reliable provision of high quality purchased products

The Corporate Services division incorporates, Purchasing, Logistics, Human Resources, Business Applications and IT, whereby the Human Resources, Business Applications and part of the IT department (software development "ITS") operate as a so-called “Remote Support Function” at the Gallneukirchen site.

Focus on employees

Purchasing and Logistic are responsible for **on-time supplies of primary materials** and the long-term securing of purchased materials that are strategically important to the company. **Warehouse management, incoming goods and shipping** are tasks performed in the warehouse. Selection, support and ongoing contact with suppliers in different sectors ensure efficient and dependable partnerships with key suppliers.

Optimisation and support

Within the division, **Human Resources** is concerned with administration, staff recruitment, staff development, motivation and the incorporation of key social responsibilities.

The **Business Applications** department supports central business processes in sales, production and purchasing with the help of software (both procured and developed internally).

IT is part of Internal Services. It plays an essential role in establishing efficient workflows, paying attention to the details of the local network and office application programs as well as **software and database development**.

Development division

Never shying away from the seemingly impossible

New sensing elements and modules are developed and approved alongside associated process technologies in the Development Elements & Modules department of the Development division. The highest level of expert knowledge is required for the many **processes that stretch the limits of the technologically feasible**.

Intelligent solutions with an ideal price/performance ratio

In the Development Sensors department, technicians design electronic assemblies coordinated to sensing element properties which map the physical quantities of sensing elements to **standardised or customer-specific electrical output signals** while offering the best possible value for money. Looking closely at the requirements of the market and clients as well as our own production possibilities, complete sensors (sensing probes with electronic evaluation units) are developed as application-specific products.

Top-level expertise ensures product innovation

Within the company, the Predevelopment department possesses key **expertise in sensor technologies**, developing this (and the necessary **measuring technology**) in line with market requirements and strategic objectives. The **Testlab** department performs the characterisation and competent assessment of product test results within E+E Elektronik

Production division

Controlling complex production processes

The Production Elements department is responsible for **producing sensing elements on time** through suitably adapted production logistics and qualified staff. Given fluctuating lead times and yields, the production steps for many product variants are inherently difficult to master technologically and represent the main challenge in terms of production control. Production is responsible for approving qualified products for delivery as well as maintaining relevant manufacturing records.

Made-to-order production with high level of product diversity

In the Production Sensors department, qualified employees and experts produce a wide variety of **measuring transducers and special equipment** for a wide range of application areas on the basis of the company's sensing elements. The highly **customer-focused production method**, involving special product variants and highly varying quantities, places considerable demands on flexibility in production. Working closely with Product Development, an internal **Process Development** department realises and optimises the manufacturing processes and machinery required for this.

The **Production Equipment Engineering** department creates solutions for production support and manufacturing automation – including the **development of equipment control software** – for all divisions of E+E Elektronik

Chapter 4

What are the benefits of the Integrated Management System?

The Management System is intended as a practical management tool for steering the company; it is not intended to be an end in itself, even in part.

Slimline and comprehensible documents created in partnership with users ensure maximum acceptance

Consistent and carefully coordinated '**game rules**', which create a network for the system (comprising this handbook plus additional procedural instructions, process descriptions and detailed instructions) make up the most important component in a beneficial Management System. Accepted regulations can only be created and maintained through **partnership** between managers, administrators, technicians and the employees who enact them. Practical, non-bureaucratic system documents only contain information which cannot be conveyed through training alone and which can be applied over the long term. The Management System documentation also contains **clear descriptions** of the interaction between company divisions and processes; this in turn facilitates the transparent verification of all relevant certification regulations.

What are the advantages of the Management System from a customer viewpoint?

The system descriptions clearly define activities within the company and regulate external **relationships** (especially **with our clients**).

Where an important part of a customer's requirement is lacking or not clearly described, this will inevitably result in queries or incorrect deliveries. Unnecessarily wasting **time and resources** is unwelcome and inconvenient to both parties, and in nobody's interests.

Established processes and responsibilities (internally and at the customer interface) contribute to an understanding of processing and point the way to practical improvements in terms of addressing **customer needs**. In future, we want to respond with consistent speed and efficiency to these needs, which may arise in a specific form.

We enable the provision of verified **product and application information**, the **observance of product behaviour** during use and comparisons to other companies through the competent support of customers and dealers, and by incorporating customer and market information into product development at the earliest opportunity.

How does the Management System impact on the leadership of the company?

Team-oriented corporate management

In the procedural instructions and process descriptions, the Management System of E+E Elektronik primarily answers the question of, “HOW and BY WHAT MEANS can requirements be met?”

The interplay of current regulations aims to ensure all corporate processes are **planned appropriately** and enacted by means of flexible **project and process management** in line with the detailed specifications of the Management. To this end, committed employees are promoted at all levels.

How does the Management System influence collaboration between divisions?

The focus is on flexibility and **overall optimisation** of the company’s performance with a view to securing the future of the company. This requires **maximum flexibility** from individual divisions in the implementation of manufacturing processes, especially in this product and market segment. Accordingly, **interdivisional** information and **decision-making** with managerial control are both complex and important.

How is quality planning performed?

Advance planning integrated across all divisions according to specific tasks

A depiction of quality planning in relation to products (and product groups) is applied with particular regard to **documentation useful to the company** and carried out by means of control plans or integration into detailed instructions for products. Quality planning activities (determining and meeting quality requirements in relation to products, contracts and quality management) are incorporated into the appropriate management guidelines as outlined below.

Requirements on products and contracts

The systematic determination, definition and onward transfer of product and contract requirements is primarily performed by the Sales department at the market and customer coordination phase and defined in the relevant sales process regulations. In the course of a business initiation, the requirements arise with regard to automotive products are handled exclusively by the sales department at the headquarters of E+E Elektronik.

Requirements on subcontractors

The MHB and the QSV ‘Documentation’ contain detailed regulations on ensuring relevant documentation for products, processes and activities; this regulates how, to what extent and by whom documentation can be created and updated. Specifications on the definition, application and assessment of quality records are also included.

Requirements on measuring equipment

The QSVs for product and process development specify the requirements on measuring equipment. The procedure for monitoring measuring equipment is defined in the documentation on test equipment monitoring.

The company's calibration laboratory ensures independent and direct traceability to national standards for accredited physical quantities on behalf of both E+E Elektronik and external clients.

Testing requirements

The general definition of necessary testing is documented in a practical manner for E+E Elektronik as set out in the QSV 'Testing' (and in the QSVs and PBs for corporate processes with the focus on products). Depending on appropriateness to the individual product, product-specific specifications for quality inspections, testing facilities and other control measures are depicted in flowcharts and internal testing instructions or distributed in work and testing instructions. The QM staff unit is incorporated into product realisation as part of inspection planning.

Requirements on quality management

Ongoing updates established in Management System

Under department-specific regulations, the respective manager (usually the owner of the QSV or PB) or users of the documents (generally customers under the regulations) are responsible for updating requirements as regards changes to the Management System. In the case of cross-departmental regulations or amended quality system requirements arising from customers, standards or the Management, the requirements on the Management System will be updated accordingly.

Requirements on employee protection and social responsibility

Environmental management and employee protection integrated into Management System

Specifications based on the requirements of employee protection legislation are integrated at all levels of system documentation. As regards department-specific regulations, the respective owner of the QSV or PB, or users of the documents (in the form of change requests) are responsible for updating requirements as regards changes to the Management System. In the case of interdepartmental regulations or changes to legal conditions, safety-relevant requirements in respect of the Management System are monitored by the occupational safety officer and the regulations are updated accordingly.

Requirements on environmental management

Requirements on the environmental Management System are determined by the environmental officer and updated through coordination with the relevant manager. See chapter 6 for more information on the environmental Management System.

Requirements on products for use in environments with a risk of explosion

Requirements on products for use in potentially explosive environments are determined by the explosion protection officer; they are developed, procured and produced according to the Management System requirements for these products.

Requirements on ethics and the code of conduct

Rules, standards of conduct and conflict management (internally and in business transactions) are bindingly defined in that they are incorporated into the extended ZVEI code of conduct as it relates to corresponding detailed instructions for human resources.

Chapter 5

What is the significance of resources to our customers?

Planning the deployment of all existing and necessary resources to maximum effect is a particular challenge for innovative and flexible companies.

To meet customer and market demands, ‘supporting’ processes in the company are considered every bit as systematically as the actual processes of product creation. Although these activities take place in the background from a customer viewpoint, they are often critically important in terms of the quality of our products and services.

How do we ensure the competence of our employees?

Only competent and motivated employees can ensure the long-term success of our company

The Management of E+E Elektronik ensures the high educational level of its employees through established rules for further education and training. This **positive characteristic of our company**, which consistently meets with customer approval, is underlined by the following list.

For all **production** employees working **directly on products** for our customers, **workplace induction** rules ensure **only qualified staff** can perform and oversee relevant activities and processes. Detailed Instructions for the Management System define the knowledge of importance to **‘direct’ and ‘indirect’ employees in the Development and Production divisions, specialists in commercial and administrative company areas** and **managers**.

How are business aspects taken into account?

Strategic business planning and economic control measures

In the long haul, the interests of owners, customers and suppliers as partners to our company can only be met where our economic corporate strategy is balanced with other strategic priorities. Thanks to strategic business planning and **integrated software** for financial accounting, accounts receivable, accounts payable, materials management and order processing, relevant evaluations of results and costs are available at all times; these are utilised accordingly by the Management and senior executives for the purposes of business management. Moreover, defect costs assigned to product groups can be tracked in a practical way.

How is IT used as a tool?

The relevant software is maintained in a current state, and not only for the aforementioned purpose of economic corporate management. A local network of numerous workstations and IT systems provides an efficient communication medium and supports secure data administration. Alongside properly maintained standard software, applications largely developed in-house are a precondition for controlling complex sensor production as the range of types and the quantities increase. In the IT area, close attention is paid to the relationship between the technically feasible and the **economically viable** when deciding on **investments and updates**.

How important is measuring equipment?

As a manufacturer of sensing elements and transmitters for industrial measuring technology, air-conditioning systems, the automotive supply industry etc., in-house expertise in measuring technology has been a key priority for E+E Elektronik for as long as the company has been involved in sensor activities. Term definitions and specifications are applied according to the references in chapter 1. In addition to the appropriate inspection and calibration of measuring and testing equipment, the test equipment monitoring system as applied by QM includes problem regulations applicable to potentially incorrectly measured products with mandatory repeat measurements (and, where necessary, to customer integration and risk decisions by the Management).

How does the company secure suitable equipment?

The equipment required for development, production and testing is procured according to the requirements of product manufacturing. Given the special nature of the product technology, simple procurement of suitable equipment is only possible in rare cases; at the same time, the rule is that machinery for applied technologies must be adapted or even developed in-house at high expense. In addition to complex process development, special attention is paid to the monitoring and maintenance of these special machines and systems as well as the requisite environmental conditions. According to defined rules, technicians responsible for maintenance procure spare parts, rectify faults and undertake preventive maintenance (with subsequent approval) to ensure high levels of equipment availability and the fastest possible repairs in the event of damage. The Production Plant Technology division and a group of software developers support the development and construction of specialist equipment for the manufacture and testing of products.

How is the required knowledge provided?

In many areas, the products and technologies of E+E Elektronik call for **highly specialised knowledge** and a command of special processes. Alongside **extensive experience** in the development and production of thin-film sensors and electronic components, the company possesses outstanding internal expertise in the adjustment and calibration of sensor products. Maintaining and developing this knowledge calls for ongoing education and training for all employees as well as **collaboration with external institutions and research facilities**. Internal communications and **mutual exchanges of information between divisions** is another important aspect when it comes to applying existing knowledge as effectively as possible.

Chapter 6

How are environmental aspects considered?

We regard preserving our environment not as a tiresome duty, but as a basic social responsibility to future generations.

To fully and systematically accommodate the various aspects of environmental protection while using consumables and input materials sparingly, the integrated Management System of E+E Elektronik includes **recognised guidelines for environmental management**.

How is environmental management organised?

Based on the environmental management regulations stated in chapter 1, the various sections of this Management Handbook make practical reference to environmentally relevant rules. An **environmental officer** is nominated to oversee regulations relevant to the environment. Among other things, this officer supports all areas involved in the appropriate compilation, updating and application of specifications relating to the environmental Management System. Cross-departmental environmental regulations provide binding guidelines for the implementation of relevant content.

The regulations required for practical processing of the environmental Management System are **largely incorporated** into the various specification documents of the Management System. Where incorporation into existing documents is not possible or seems impractical for users, additional documents, forms, reports, etc. will be applied to cover all relevant aspects of environmental policy.

What is the guiding environmental policy of E+E Elektronik?

The environmental statement documents the responsibility of the company management for our present and future environment.

A responsible approach to the environment helps us secure the company's future

Further to the content of the mission statement and the guiding parameters (see chapter 2), the following environmental guidelines, which accord with the environmental guidelines of the Heidenhain group as a whole, apply to environmental management at E+E Elektronik

1. E+E Elektronik is **always aiming to improve** its environmental protection from the viewpoint of environmental harm and resource and energy consumption.

2. E+E Elektronik strives for **higher standards** of environmental protection than the legal provisions demand.

3. E+E Elektronik aims to eliminate potential environmental damage at the **concept phases** for products and production processes.

4. E+E Elektronik is committed to ensuring its safety devices and organisational measures are **state-of-the-art** at all times.

5. E+E Elektronik **reviews, monitors** and evaluates the impact of its business activities on the environment.

6. E+E Elektronik guarantees the implementation of its environmental policy through its **environmental Management System** from a technical and organisational standpoint.

7. E+E Elektronik trains and informs its employees, **promoting environmental awareness** inside and outside the company.

8. E+E Elektronik also raises awareness among its **contractual partners**, motivating them to think and act with the environment in mind.

9. E+E Elektronik aims to uphold a smooth **exchange of information with local authorities** in the course of cooperative partnerships.

10. E+E Elektronik informs **customers and the general public** about the environmental aspects of the company and its products.

What are the advantages of systematic environmental management?

Legal compliance and confidence in the company

Systematic environmental management in our modern production business is justified not only to meet relevant customer requirements but also to **establish compliance** with applicable legal and normative specifications. We also use transparent reporting and targeted improvement measures to generate economic benefits and generally motivate our employees to **consider the environment** beyond the scope of their defined duties.

The **emergency preparedness** enshrined in the environmental Management System applies above and beyond the core aspects of environmental protection, helping to anticipate potential problem situations for the company and thereby facilitate appropriate emergency planning.

The annual **environment report** contains details on environmental management, which we are pleased to provide on request.

Chapter 7

How are customer requests to supply a product fulfilled?

Customers need to believe that we try to understand their requirements and expectations precisely, clarify the implementation possibilities properly, make serious commitments and deliver on these reliably.

Effective cooperation with many competent sales partners ensures a broad market presence

The **Sales** division of E+E Elektronik is the first point of contact for customers and handles all relevant enquiries; our specialist sales staff are happy to support clients and interested parties with detailed product information and technical **application support**.

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Customers and interested parties have access to sales subsidiaries in the following countries:

- Germany
- China
- France
- South Korea
- Italy
- USA
- India

Our **website** has further information on **dealers** around the world.

How are quotations compiled?

According to our principles, quotations are **clarified internally** before being submitted to interested parties **quickly and in full**. The following table illustrates the diligence we take at the tendering stage while ensuring the **fastest possible response times**.

Activity	Remarks	Divisions affected
Recording of request		Sales
Clarifying technical and commercial feasibility	Not necessary for approved products	Sales, Product Management, Development, Production, QM
Determining feasibility of deadlines		Sales, Production, Calibration Laboratory
Compiling quotation		Sales, Management

How are orders processed?

We are pleased to fulfil orders on the basis of a customer order, subject to full clarification of product requirements in partnership with the client or based on an issued quotation. Order details that were not properly defined at the quotation stage (or remain unclear for other reasons) will be clarified before a binding order confirmation is submitted to the customer. Typical examples here would be the precise delivery date, packaging/shipping methods and logistical processing of customer components.

Activity	Remarks	Divisions affected
Create sales order with preferred delivery date	in ERP	Sales
Clarify outstanding points	as required	Sales, customer, Product Management, specialist departments
Check and organise primary material availability		Scheduling, Purchasing
Realise the preferred delivery date and agree alternatives as necessary	Order planning, capacity planning, production control	Production, Sales, Customer
Confirm delivery date	in ERP	Production, Calibration Laboratory
Order confirmation	Orders are confirmed as quickly as possible	Sales
Shipping	Picking list from ERP	Logistic, Sales

Chapter 8

How is product development controlled?

In the area of sensor technology, product design and process design are very closely interlinked. Only the ability to address both factors equally from the outset will ensure high quality products.

The ability to develop products and processes in detail ourselves is the clearest demonstration of our breadth of expertise.

Product developments are initiated and controlled by the Management according to market needs or specific customer requirements. Depending on the focus of development activity, a project will be handled by the Development departments for **Elements, Sensors**, or **Predevelopment**. In the development of sensing elements, process development is intrinsically linked to product design. In the area of **sensor** development, specially delineated **process** development projects are generally applied to production processes.

What kind of development projects are there?

Studies are performed to determine the fundamentals and clarify certain basic issues, especially in the area of element technology. Although development projects that aim to create an **approved product** largely conform to the traditional development process, target specifications are only determined in many cases at an advanced stage of development (following process trials), with regular customer coordination as necessary. By contrast, **product changes** are made according to defined requirements and therefore enacted according to a standard procedure. Often, complex **production processes** and **software** must be developed for product implementation. Since these reach well beyond the simple transition from prototyping to production, they are essentially handled according to the same basic rules governing product development.

Which particular points are observed during development?

In the development of products, technicians consider aspects of product safety, the necessary **traceability** of input materials, work sequences and the deployment (wherever possible) of **environmentally friendly materials** alongside the **fastest** and most cost-effective **realisation** of products. Appropriate statistical evaluation of measurement results (and capability studies for processes where required) are important to all divisions. **Workplace safety** conditions are also relevant to process development and achieved by incorporating the relevant specialists and employees.

The development process takes account of technical **possibilities** and associated **risks**; these may be evaluated to ensure market/customer requirements of products are met.

What is a verified development activity?

To uphold the quality of complex development tasks, the development schedules of E+E Elektronik include the following check items, which provide for the **systematic scrutinising** of concepts and approaches to solutions at reasonable points.

- **Development specifications**: Coordination of the desired development result between Development division and client
- **Product approval**: Product presentation with fixed product details so that all subsequent measures as regards acquisition, transition from prototyping to production and market launch can be processed in parallel
- **Approval test**: Review of the fulfilment of required specifications and review of practical suitability for customers and Production, including approval by the Management

Chapter 9

How are materials and services procured?

We secure a long-term supply of procured products and services through partnerships with key suppliers.

Given that roles fluctuate between customers and suppliers from day to day, good contact in both directions is important. The better the contact, the easier it is to meet the goal of keeping our clients satisfied.

How are suppliers selected?

Despite our wide variety of in-house products, we aim to maintain a manageable number of **key suppliers** to procure the primary materials and services we need. For technological reasons and in line with company policy, E+E Elektronik sources product-relevant primary materials and services from as few suppliers as possible. We focus on the careful selection of suitable suppliers, with whom we subsequently hope to establish **long-term business relationships**. Along with the Management and Development division, Purchasing and QM are also involved in selections through specifications and sample evaluations.

How do we ensure the quality of supplied products?

Depending on how supply deficiencies arise and how they affect production and end products, Quality-management takes responsibility for adequate goods receipt inspections. For macroeconomic reasons, the **main focus** is on securing sufficient **supplier capability**. Until this status is attained, and in the case of critical supply products, the quality of primary materials is verified with sufficiently effective **incoming inspections** and suitable measures are enacted to ensure end product quality for E+E Elektronik. Thanks to IT support, products with planned incoming inspections are only booked as available when corresponding inspection approval has been obtained. In line with the rules on product traceability, labelling of goods receipts ensures a sufficiently precise assignment of product-relevant input materials, enabling potential hidden defects to be reliably eliminated at a later point.

How are good supplier relations established?

As interested partners, selected suppliers are key to long-term collaborations.

A simple and practical system of supplier evaluation delivers information on supplier criteria of interest to E+E Elektronik. These criteria include delivery deadlines, adherence to quantities and product quality as well as **flexibility**. The applied procedure for **supplier evaluation** is flexibly structured in that only relevant suppliers are considered. This highly **practical focus** enables appropriate supplier information and coordination at low administrative cost.

Chapter 10

How are products manufactured?

Flexible production control allied with trained, dedicated employees are the preconditions for fast delivery times for both standard products and special product variants.

Realistic needs assessments by customers are linked to reliable delivery performance by E+E Elektronik

By applying in-house methods of production control and advance planning to **customer needs**, corresponding orders and batch quantities can be scheduled for production. In the case of fluctuating customer needs or the ramping up of mass production, realistic planned figures and timely coordination with customers are the key prerequisites that will allow the Production division to provide staffing and process capacities on time.

What types of production control are applied?

The Scheduling area within the Production Elements and Production Sensors departments is responsible for organising required production quantities for each product type. In the production of transmitters and sensors, appropriate delivery dates are determined by coordinating with Sales before an order is confirmed to the customer; production is completed before the delivery date on the basis of internal **production orders**. Given the longer lead times and higher quantities, production orders are not always expedient in the production of elements. In this area, production quantities can also be overseen via **batch units**, which are controlled **according to need** throughout the complex production process.

How is quality controlled during production?

Quality data for completed products is entered at numerous points in the production process. This is mainly achieved via automated data storage by measurement devices and complex **database systems** developed in-house. On the basis of **summarised evaluations** of quality data, the Production departments, Process Development and QM initiate **steering measures** as necessary. The weekly production meeting, carried out according to a defined system, is a central steering tool for the Production departments. QM employees assigned to specific task areas support the departments with **technical quality expertise**.

Which tests are carried out by production?

Intelligent combinations of self-tests, sorting measurements and inspection gates guarantee the highest quality standards, even where production processes are challenging.

Measuring tests are essential to both the manufacturing of sensors and the production of elements. At suitable points in the production process, largely automated devices measure relevant product characteristics. These

values either form the basis for sorting/adjustment or provide base data for subsequent process steps. **Visual checks** on intermediate products and end products are applied as self-tests or carried out at inspection stations. Tests defined in instructions are performed by competent staff, recorded in production documents or stored and assigned by measuring equipment so as to ensure a clear inspection status for processing units. For technological reasons, processes can only be characterised and monitored using statistical methods in exceptional cases. For this reason, **process control is generally carried out via process measurement data** or self-tests by operating personnel according to the specifications in work instructions.

How is the traceability of product manufacturing facilitated?

Depending on product requirements, the traceability of all or specific work steps in relation to batches, production orders or individual products is determined at the development phase of a product. This established traceability enables the optimisation of production processes while ensuring that all affected **units can be identified** in case of a problem. In the case of transmitters, traceability guarantees that any **defective products** in the production process after reworking are only processed again as reliably fault-free products following successful tests. Corresponding tracking data is stored in manufacturing records or IT and preserved in line with archiving guidelines.

Chapter 11

What if a problem arises in spite of all these precautions?

The likelihood of errors can be minimised, but not ruled out entirely. The goal of learning from mistakes and stopping them from happening again is what separates the best from the merely good.

Fault rectification represents the kind of competent service that many of our customers may never experience

The magic word is customer service. Our sense of duty and service towards customers leads to success: this is why customers choose E+E Elektronik as a partner for the long term. To us, the **fastest possible** problem handling and the supplying of feedback to clients comes every bit as naturally as **non-bureaucratic** and accommodating **problem resolution**.

What are the contact options in the event of a problem?

The **sales contact points** used for enquiries and orders (see chapter 7) also serve as '**help lines**'. The fullest and most precise information on customers enables fast processing and problem resolution.

How are product problems handled for customers?

Regardless of the possible cause of a problem that a customer encounters when utilising one of our products, the problem will be recorded and analysed according to a defined customer service process and a suitable solution will be initiated. Within the company, problem handling is organised in such a way that experts attend to a problem **without unnecessary delays**, offer **fast feedback** to the customer after an initial analysis and, where necessary, initiate suitable improvements internally following full determination of the cause. At the same time, Sales (as the responsible customer service division) organises and oversees problem resolution for the customer. Bearing in mind the special conditions for sensor technology, the vast majority of problem cases are due to the (often) highly specialist application of products rather than defective products. In these cases, one strength of E+E Elektronik is **competent application support**, which is **valued** by our clients.

What is the significance of service errors?

Given that errors relating to orders, packaging, labelling or shipping can be every bit as serious as product faults for our clients, we do not distinguish between types of error: we treat all problems that affect customers according to the same rules and with equal diligence.

How are product errors processed internally?

The Production area handles faulty products according to a defined procedure. Either the product in question is reworked immediately, the production process is restarted by our reworking units or the product will be scrapped for technical or economic reasons. Product tracking within the production process is designed so as to **prevent erroneous processing** and the delivery of any product identified as faulty. Where, despite all precautions, a faulty product is still delivered, we ensure customers are able to rectify the problem as appropriate in defined escalation stages. Records and data concerning errors that arise in the production process are statistically evaluated, with **improvement activities** introduced as necessary by the Management or departmental heads.

How are product risks evaluated?

Product risks determined on the basis of varying types of information (customer complaints, product audits, internal breakdowns, etc.) are subject to internal and interdisciplinary risk analyses and evaluations in which the Management may be involved.

Chapter 12

What is the basis for continual improvements?

Quality is no coincidence, it is the result of systematic commitment.

Continual improvement and enhancement is an established part of the working routine for all employees of E+E Elektronik , whether they work directly on products for the benefit of clients or render a more indirect contribution to the product and service quality of the company. Identifying weaknesses never leads us to search for culprits but does provide an incentive to eliminate problems in a realistic way.

How are improvement measures triggered?

When something works like it should, how can we make it simpler?

The following table provides an overview of the main triggers of improvement measures for the company.

Database	Remarks	Responsibilities
Customer feedback	Travel reports, complaints, etc.	Management, Sales, business areas, QM
Fault evaluations	Data/records in Production	Production, Sensor Development, Process Development, QM
Tracking of cost factors	Using cost accounting software	Management, Controlling, all managerial staff
Target agreements	Measures and targets based on management review	Management, managerial staff
Processing problems	Difficulties in applying defined rules	All employees
Audit findings	Jointly identified potential for improvement	QM
Company suggestion scheme (CSS)	CSS with defined assessment and incentive procedure	Management, CSS Officer
Continuous improvement process (CIP)	CIP with defined procedure	Management, CIP Officer

How are improvement suggestions processed?

All managers are responsible for introducing improvement measures. Defined improvement projects are implemented and tracked on the basis of existing data evaluations or observed events. In the process, we take care to ensure major improvements are assigned to responsible persons in line with existing processing resources, with agreed processing dates confirmed. Precise deadline tracking, documentation of measures and appropriate effectiveness reviews distinguish ‘strategic’ improvement measures from the usual periodic tracking of actions.

How are the benefits of the Management System reviewed?

As the sole organisational system of E+E Elektronik , the purpose of the integrated Management System is to support the attainment of corporate goals as effectively as possible through practical rules governing collaboration between the various divisions and interested partners. The Management System is thus deployed as a tool of management that aims to **safeguard** and **optimise corporate processes** with a view to enhancing the company’s overall performance. The Management System is reviewed and developed by means of internal audits, which are **applied** at the **higher level** of critical system and product checks. The old approach of reviewing the application of instructions periodically is now of low significance in the internal auditing of E+E Elektronik. Given the long-standing routines of all managers in the Management System, the focus for many years has been on benefits from system audits that can be implemented internally.

How can customers and suppliers suggest improvements?

Feedback of all kinds is important to us!

Last but not least, we would like to use this handbook to encourage our business partners to provide us with feedback so that we can also work on those potential areas of improvement which, while being extremely important, have so far eluded us despite our best efforts due to a certain unavoidable ‘tunnel vision’. QM, which oversees the Management System, is always pleased to receive feedback of this nature.

Quality Management

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Appendix

As well as answering general questions on the Management System of E+E Elektronik in an easy-to-read form, the content of this handbook is tailored to regulatory elements.

The following overview has been included in this handbook to facilitate reviewing of the Management System in the course of audits. The regulatory elements addressed in the various sections of this handbook are assigned accordingly; however, full information on how the corresponding **regulatory requirements** are incorporated into the Management System is only available in conjunction with the stated references to additional system documents.

Chapter no.	**Element ISO 9001**	**Element ISO 14001**	**Element IEC 80079-34**	**Element IATF 16949**
1	4.3, 5.1, 7.4, 7.5	4.3, 5.1, 7.4, 7.5	4.3, 5.1, 7.4, 7.5	4.3, 5.1, 7.4, 7.5
2	4.1, 4.2, 4.4, 5.1, 5.2, 6.1, 6.2, 6.3, 9.1, 9.3	4.1, 4.2, 4.4, 5.1, 5.2, 6.1, 6.2, 9.1, 9.3	4.1, 4.2, 4.4, 5.1, 5.2, 6.1, 6.2, 6.3, 9.1, 9.3	4.1, 4.2, 4.4, 5.1, 5.2, 6.1, 6.2, 6.3, 9.1, 9.3
3	5.3, 7.1, 7.4	5.3, 7.1, 7.4	5.3, 7.1, 7.4	5.3, 7.1, 7.4
4	4.4, 7.1, 7.3, 7.4, 7.5, 8.1, 8.2	4.4, 7.1, 7.3, 7.4, 7.5, 8.1	4.4, 7.1, 7.3, 7.4, 7.5, 8.1, 8.2	4.4, 7.1, 7.3, 7.4, 7.5, 8.1, 8.2
5	7.1, 7.2, 7.3	7.1, 7.2, 7.3	7.1, 7.2, 7.3	7.1, 7.2, 7.3
6	6.1, 7.3, 8.1	6.1, 7.3, 8.1, 8.2	6.1, 7.3, 8.1	6.1, 7.3, 8.1
7	6.1, 7.4, 8.1, 8.2	6.1, 7.4, 8.1	6.1, 7.4, 8.1, 8.2	6.1, 7.4, 8.1, 8.2
8	5.1 6.1, 8.1, 8.2, 8.3, 8.4, 8.6	5.1 6.1, 8.1	5.1 6.1, 8.1, 8.2, 8.3, 8.4, 8.6	5.1 6.1, 8.1, 8.2, 8.3, 8.4, 8.6
9	6.1, 7.1, 7.4, 8.1, 8.4, 8.6, 8.7	6.1, 7.1, 7.4, 8.1	6.1, 7.1, 7.4, 8.1, 8.4, 8.6, 8.7	6.1, 7.1, 7.4, 8.1, 8.4, 8.6, 8.7
10	8.1, 8.4, 8.5, 8.6, 8.7	8.1	8.1, 8.4, 8.5, 8.6, 8.7	8.1, 8.4, 8.5, 8.6, 8.7
11	8.2, 8.7, 9.1, 10.1, 10.2	9.1, 10.1, 10.2	8.2, 8.7, 9.1, 10.1, 10.2	6.1, 8.2, 8.7, 9.1, 10.1, 10.2
12	6.3, 9.1, 9.2, 10.1, 10.3	9.1, 9.2, 10.1	6.3, 9.1, 9.2, 10.1, 10.3	6.1, 6.3, 9.1, 9.2, 10.1, 10.3
Appendix	4.4	4.4	4.4	4.4

Assignment of the elements EN ISO/IEC 17025 for the restricted area of the **Calibration Laboratory** is documented in a separate handbook for the Calibration Laboratory. The Calibration Laboratory of E+E Elektronik acts as a recognised '**independent third party**' within the **scope of accreditation**.

The diagram below provides a general **overview** of the main established **processes and activities** within the company. It depicts interrelationships through assignment as management or support elements, along with the special focus on customer requirements and expectations. To oversee and optimise implementation continuously, the defined **processes** (following represented as arows) are measured and **improved in a purposeful manner**.