SAE AS9100 DOCUMENT

PRECISION SENSORS

QUALITY
ASSURANCE
MANUAL

THIS DOCUMENT IS CONTROLLED ONLY IF COPY IS STAMPED “CONTROLLED” IN RED INK
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CONTROL PAGE

QUALITY SYSTEM MANUAL

Manual Number: 1

Issued to: AS/ISO Management Representative

This manual is controlled
Precision Sensors Division of United Electric Controls Corporation

Precision Sensors (PSI) was founded in 1962 to service the needs of aerospace and defense customers. PSI became part of the United Electric Controls Company (UEC) in 1989. PSI operates from a 10,000SF facility in Milford, CT. The facility houses primary machining, assembly, and clean room operations as well as engineering, quality assurance, marketing, customer service, materials, purchasing, manufacturing and production engineering.

Precision Sensors (PSI) is a vertically integrated supplier of pressure, vacuum, liquid level, flow, altitude/airspeed switches and sensors to aerospace, military and semiconductor process markets. PSI delivers fundamental value in the form of cost effective, reliable threshold detection and continuous sensing products that are used to protect people, equipment and processes. PSI has the in-house capability to produce primary and secondary parts and assembles for the majority of products that it manufactures. Specialty machining to achieve 5Ra finishes for products sold to the semiconductor industry, EB and laser welding, and other chemical finishing processes are mostly performed by outside suppliers. PSI increases sales by developing new products for existing markets. PSI considers itself a time to market leader. Customers acknowledge that PSI products are the “best in their class”.

PSI has received source delegation (ship to stock) and supplier certification awards from leading aerospace/defense companies. Leading semiconductor equipment manufacturers have designated PSI as their “first choice” for pressure and vacuum switches.
PRECISION SENSORS
QUALITY POLICY AND OBJECTIVES

LOCATED IN ADDENDUM 2 TO

QUALITY ASSURANCE MANUAL
ORGANIZATIONAL CHART

Organizational Chart is located in Addendum to Quality Assurance Manual
INTERACTION OF PROCESSES

Process Map of Key Processes

Supporting Processes apply to all phases

Management Review

Training

Internal Audit

Preventive Action

Corrective Action

Continual Improvement
**SUMMARY OF CHANGES**

<table>
<thead>
<tr>
<th>Revision / DCN #</th>
<th>Change(s)</th>
<th>Effective Date</th>
<th>Approved by</th>
</tr>
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<tr>
<td>QAM 001 / 03-022</td>
<td>Original</td>
<td>October 20, 2003</td>
<td>Warren Root</td>
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<tr>
<td>QAM 002 / 03-028</td>
<td>Added to 4.1 &quot;Where an organization chooses to outsource...&quot;; Added to 4.3 ref. to document ES12; qualified servicing exclusion in 4.2.2 to read 7.5.1.5 (from 7.5); Added to 7.3.1 &quot;Precision Sensors defines the different design and development tasks to be carried out...&quot;; Identified in 7.4.3 how controls over outsourcing will be applied; and added to 8.2.4 &quot;When key characteristics have been identified, they are monitored and controlled.&quot; as per documentation audit. Removed reference to SAE AS9100 Rev. level in 4.1</td>
<td>Nov. 17, 2003</td>
<td>Warren Root</td>
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<tr>
<td>QAM 003 / 03-033</td>
<td>Revised 8.2.1 – See Record Copy</td>
<td>Dec. 10, 2003</td>
<td>Warren Root</td>
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<tr>
<td>QAM 004 / 08-014</td>
<td>Removed flow chart for sales process and replaced it with flow chart for Interaction of Processes</td>
<td>10/29/08</td>
<td>Warren Root</td>
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<tr>
<td>QAM 005 / 10-012</td>
<td>Revised manual in accordance with changes to ISO 9001:2008 with editorial and spelling corrections throughout. Moved Quality Policy and Objectives to Addendum 2 of QAM</td>
<td>10/27/10</td>
<td>Warren Root</td>
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<tr>
<td>QAM 007 / 13-011</td>
<td>Added Sections 9.7, 9.8 &amp; 9.9 to Addendum 1</td>
<td>5/1/13</td>
<td>Warren Root</td>
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4. QUALITY MANAGEMENT SYSTEM

4.1 General Requirements

Precision Sensors has established, documented, implemented and maintains a quality management system and continually improves its effectiveness in accordance with the requirements of SAE AS9100.

Precision Sensors’ quality management system also addresses customer and applicable statutory and regulatory quality management system requirements.

Precision Sensors:

a) determines the processes needed for the quality management system and their application throughout the organization,
b) determines the sequence and interaction of these processes (see Interaction of Processes),
c) determines criteria and methods needed to ensure that both the operation and control of these processes are effective,
d) ensures the availability of resources and information necessary to support the operation and monitoring of these processes,
e) monitors, measures where applicable, and analyzes these processes, and
f) implements actions necessary to achieve planned results and continual improvement of these processes.

Precision Sensors manages these processes in accordance with the requirements of SAE AS9100.

For items c-f above, refer to the process analysis turtle diagrams for production realization processes.

When choosing to outsource any process that affects product conformity to requirements, Precision Sensors will ensure control over such processes. Control of these outsourced processes are identified within the quality management system.

4.2 Documentation Requirements

4.2.1 General

The quality management system documentation includes:

a) documented statements of a quality policy and quality objectives,
b) a quality manual,
c) documented procedures and records required by SAE AS9100, and
d) documents, including records, determined by Precision Sensors to be necessary to ensure the effective planning, operation and control of our processes.

Personnel have access to, and are aware of, relevant quality management system documentation and changes.
4.2.2 Quality Manual

This manual is issued to describe the Quality Management System and related processes employed in all operations by Precision Sensors. This manual and the systems and processes it describes serves to

- ensure conformance to customer requirements,
- implement Precision Sensors’ Quality Policy and Quality Objectives,
- address the intent and requirements of SAE AS9100.

The scope of this manual includes requirements for controlling the following:

- Controlled documents
- Records
- Management responsibility (including an organizational chart, quality policy and quality objectives)
- Quality planning
- Responsibility of authorities
- Customer focus and customer satisfaction
- Resource management and provisions
- Training and skills requirements
- Infrastructure and work environment
- Product realization
- Quality Assurance testing
- Internal Auditing
- Control of Measuring Devices (calibration)
- Control of Nonconforming Product
- Data Analysis
- Continuing Improvement
- Corrective and Preventive Action
- Process analysis of production realization processes in the form of turtle diagrams.
- References to supporting second-level documentation, as applicable.

Excluded from the scope of this manual:

- Clause 7.5.1.4, Post-Delivery Support, as Precision Sensors does not currently provide after-market servicing of any kind.

4.2.3 Control of Documents

SOP 4.2.3 has been established to control documents required by the quality management system. Records are controlled according to the requirements given in 4.2.4.

SOP 4.2.3 defines the controls needed

- to approve all documents prior to issue,
- to review, update and re-approve all documents as necessary,
- to ensure that changes and the current revision status of documents are identified,
d) to ensure that relevant versions of applicable documents are available at points of use,
e) to ensure that documents remain legible and are readily identifiable,
f) to ensure that documents of external origin determined to be necessary for the planning and operation of the quality management system are identified and their distribution controlled, and
g) to prevent the unintended use of obsolete documents, and to apply suitable identification to them if they are retained for any purpose.

Precision Sensors has a system to ensure the review, disposition, implementation, and maintenance of all authorized and released controlled documentation quarterly. Document changes are coordinated with customers and/or regulatory authorities in accordance with contract or regulatory requirements.

4.2.4 Control of Records

Records established to provide evidence of conformity to requirements and of the effective operation of the quality management system are controlled.

SOP 4.2.4 defines the controls needed for the identification, storage, protection, retrieval, retention and disposition of records in addition to the method for controlling records that are created by and/or retained by suppliers.

Records will remain legible, readily identifiable and retrievable.

5. Management Responsibility

5.1 Management Commitment

Top management is committed to the development and implementation of the Quality Management System and continually improving its effectiveness by

a) communicating to employees the importance of meeting customer and statutory and regulatory requirements,
b) establishing a clearly defined quality policy,
c) ensuring quality objectives are established,
d) conducting management reviews, and
e) ensuring availability of resources.

5.2 Customer Focus

Top management ensures that the customer requirements are determined and met with the aim of enhancing customer satisfaction.

Top management ensures that product conformity and on-time delivery performance are measured and appropriate action is taken if planned results are not, or will not be, achieved.

5.3 Quality Policy

Top management at ensures that the quality policy

a) is appropriate to the purpose of the organization,
b) includes a commitment to comply with requirements and continually improve the effectiveness of the Quality Management System,
c) provides a framework for establishing and reviewing quality objectives,
d) is communicated and understood within the organization, and
e) is reviewed for continuing suitability.

5.4 Planning

5.4.1 Quality Objectives

Top management ensures that quality objectives, including those needed to meet requirements for product, are established at relevant functions and levels within the organization. The quality objectives are measurable and consistent with the quality policy.

5.4.2 Quality Planning

Top management ensures that

a) the planning of the Quality Management System is carried out in order to meet the requirements given in 4.1 as well as quality objectives, and
b) the integrity of the Quality Management System is maintained when changes to it are planned and implemented.

5.5 Responsibility, Authority and Communication

5.5.1 Responsibility and Authority

Top management ensures that responsibilities and authorities are defined and communicated to all employees with an organizational chart and clearly defined job descriptions.

5.5.2 Management Representative

Top management has appointed the Quality Assurance Manager as the AS/ISO Management Representative who, irrespective of other responsibilities, has responsibility and authority that includes

a) ensuring that the processes as needed for the Quality Management System are established, implemented and maintained,
b) reporting to top management on the performance of the Quality Management System and any need for improvement,
c) ensuring the promotion of awareness of customer requirements throughout the organization, and
d) the organizational freedom and unrestricted access to top management to resolve matters pertaining to quality management.

5.5.3 Internal Communication

Top management ensures that appropriate communication processes are established within the organization and communication takes place regarding the effectiveness of the Quality Management System by holding departmental and full employee meetings.
5.6 Management Review

5.6.1 General

Management reviews are conducted at least annually to review the quality management system to ensure its continuing suitability, adequacy and effectiveness. The review included assessing opportunities for improvement and the need for changes to the quality management system, including the quality policy and quality objectives. Minutes of management reviews are maintained.

5.6.2 Review Input

Management review inputs includes:

a) results of audits,
b) customer feedback,
c) process performance and product conformity,
d) preventive and corrective action reports,
e) follow-up actions from previous management reviews,
f) changes that could effect the Quality Management System, and
g) recommendations for improvement.

5.6.3 Review Output

Management review outputs may include decisions and actions relating to

a) improvements of the effectiveness of the Quality Management System and its processes,
b) improvements to products related to customer requirements, and
c) resource needs.

6. Resource Management

6.1 Provisions of Resources

Precision Sensors determines and provides resources needed

a) to implement and maintain the Quality Management System and continually improve its effectiveness, and
b) to enhance customer satisfaction by meeting customer requirements.

6.2 Human Resources

6.2.1 General

Precision Sensors employees performing work affecting conformity of product requirements are competent on the basis of appropriate education, training, skills and experience.
6.2.2 Competence, Training and Awareness

Precision Sensors

a) determines the necessary competence for personnel performing work affecting product requirements (see SOP 6.2.2),
b) where applicable, provides training or takes other actions to achieve the necessary competence and assures that personnel are qualified to perform specific tasks on the basis of previous experience, education and/or on the job training,
c) evaluates the effectiveness of actions taken,
d) ensures personnel are aware of the relevance and importance of their activities and how they contribute to the achievement of the quality objectives, and
e) maintains appropriate records of education, training, skills and experience.

As part of new employee orientation, employees shall be informed of the following:

- Quality Policy
- Safety
- Plant procedures (hours, lunch and other breaks, absenteeism)
- Hazard Communication Standard

6.3 Infrastructure

Precision Sensors determines, provides and maintains the infrastructure needed to achieve conformity to product requirements. Infrastructure includes, as applicable

a) building, workspace and associated utilities,
b) process equipment (both hardware and software), and
c) supporting services (such as transport, communication or information systems).

6.4 Work Environment

Precision Sensors determines and manages the work environment needed to achieve conformity to product requirements, with special emphasis on factors that may affect the conformity of product.

7. Product Realization

7.1 Planning of Product Realization

Processes needed for product realization are planned and developed. Planning of product realization is consistent with the requirements of the other processes of the Quality Management System. While planning product realization, the following is determined as appropriate:

a) quality objectives and requirements for the product,
b) the need to establish processes and documents and to provide resources specific to product,
c) required verification, validation, monitoring, measurement, inspection and test activities specific to the product and the criteria for product acceptance,
d) records needed to provide evidence that the realization processes and resulting product meet requirements,
e) configuration management appropriate to the product,
f) resources needed to support the use and maintenance of the product.

The output of this planning shall be in a form suitable for our method of operations.

7.1.1 Project Management

Product realization is planned and managed, as appropriate to the organization and product, in a structured and controlled manner to meet requirements at acceptable risk, within resource and schedule constraints.

7.1.2 Risk Management

A risk management process has been established, implemented and to achieve applicable requirements as appropriate to our organization and product including

a) the assignment of responsibilities for risk management,
b) the definition of risk criteria,
c) the identification, assessment and communication of risks throughout product realization,
d) the identification, implementation and management of actions to mitigate risks that exceed the defined risk acceptance criteria,
e) the acceptance of risks remaining after implementation of mitigating actions.

For the product realization process, risk identification and actions to mitigate the risks has been made an integral part of the process analysis. Key processes where risk analysis is quantified, is the design and development, where mean time between failure is calculated to ensure that customer requirements are met or exceeded as appropriate.

7.1.3 Configuration Management

A configuration management process has been established, implemented and maintained that includes, as appropriate to the product

a) configuration management planning,
b) configuration identification,
c) change control,
d) configuration status accounting, and
e) configuration audit.

Details of Precision Sensors configuration management procedures are outlined in internal documents ES17, ES12, ES2, SOP 7.5.3, WI 3.1, WI 3.2 and WI 3.3.

7.1.4 Control of Work Transfers

If work is temporarily or permanently transferred, a process will be established, implemented and maintained to control it and verify the conformity of the work to requirements.
7.2 Customer-Related Processes

7.2.1 Determination of Requirements Related to the Product

Precision Sensors determines

a) requirements specified by the customer, including the requirements for delivery and post-delivery activities,
b) requirements not stated by the customer but necessary for specified or intended use, where known,
c) statutory and regulatory requirements applicable to the product, and
d) any additional requirements we consider necessary.

7.2.2 Review of Requirements Related to the Product

Requirements related to the product are reviewed before our commitment to supply a product to the customer (see SOP 7.2.2) and ensures that

a) product requirements are defined,
b) contract or order requirements differing from those previously expressed are resolved,
c) the organization has the ability to meet the defined requirements,
d) special requirements of the product are determined, and
e) risks have been identified.

Records of the results of the review and actions arising from the review are maintained.

The customer requirements are confirmed prior to acceptance when the customer provides no documented statement of requirement.

7.2.3 Customer Communication

Effective arrangements for communicating with customers are determined and implemented in relation to

a) product information
b) enquiries, contracts or order handling, including amendments, and
c) customer feedback, including customer complaints.

7.3 Design and Development

7.3.1 Design and Development Planning

Design and development of product is planned and controlled per SOP 7.3.1.

During design and development planning, Precision Sensors determines

a) the design and development stages,
b) the review, verification and validation that are appropriate to each design and development stage, and
c) the responsibilities and authorities for design and development.

Where appropriate, design and development efforts are divided into distinct activities and, for each activity, tasks, necessary resources, responsibilities, design content, input and output data and planning constraints are defined.

The different design and development tasks to be carried out are based on the safety and functional objectives of the product in accordance with customer, statutory and regulatory requirements.

Design and development planning considers the ability to produce, inspect and test the product.

Interfaces between different groups involved in design and development are managed and effective communication and clear assignment of responsibilities is ensured.

Planning output is updated, as appropriate, as the design and development progresses.

7.3.2 Design and Development Inputs

Inputs relating to product requirements are determined and records maintained. Inputs include

a) functional and performance requirements,
b) applicable statutory and regulatory requirements,
c) where applicable, information derived from previous similar designs, and
d) other requirements essential for design and development.

Inputs are reviewed for adequacy. Requirements are complete, unambiguous and not in conflict with each other.

7.3.3 Design and Development Outputs

The outputs of design and development are in a form suitable for verification against the design and development input and are approved prior to release.

Design and development outputs

a) meet input requirements for design and development,
b) provide appropriate information for purchasing and production,
c) contain or reference product acceptance criteria,
d) specify the characteristics of the product that are essential for its safe and proper use, and
e) specify, as applicable, any critical items, including any key characteristics, and specific actions to be taken for these items.

Data required is defined to allow the product to be identified, manufactured, inspected, used and maintained, such as drawings, parts lists, test procedures, supplementary instructions, assembly control cards and other items necessary to define requirements and ensure product conformity.
7.3.4 Design and Development Review

At suitable stages, systematic reviews of design and development are performed in accordance with planned arrangements

a) to evaluate the ability of the results of design and development to meet requirements,
b) to identify any problems and propose necessary actions, and
c) to authorize progression to the next stage.

Participants in design and development reviews include representatives of functions concerned with the stage being reviewed.

7.3.5 Design and Development Verification

Verification is performed in accordance with planned arrangements to ensure that the design and development outputs have met the design and development input requirements. Records of the results of the verification and any necessary actions are maintained.

7.3.6 Design and Development Validation

Design and development validation is performed in accordance with planned arrangements to ensure that the resulting product is capable of meeting the requirements for the specified application or intended use, where known. Wherever practicable, validation is completed prior to the delivery or implementation of the product. Records of the results of validation and any necessary actions are maintained.

7.3.6.1 Design and Development Verification and Validation Testing

Tests necessary for verification and validation are planned, controlled, reviewed and documented to ensure and prove the following

a) test plans or specifications identify the product being tested and the resources being used, define test objectives and conditions, parameters to be recorded and relevant acceptance criteria,
b) test procedures describe the method of operation, the performance of the test and recording of the results,
c) the correct configuration of the product is submitted for test,
d) the requirements of the test plan and the test procedures are observed, and
e) the acceptance criteria are met.

7.3.6.2 Design and Development Verification and Validation Documentation

At the completion of design and/or development, Precision Sensors ensures that reports, calculations, test results, etc., demonstrate that the product definition meets the specification requirements for all identified operational conditions.

7.3.7 Control of Design and Development Changes
Design and development changes are identified and records maintained. Changes are reviewed, verified and validated, as appropriate, and approved prior to implementation. The review of design and development changes include evaluation of the effect of the changes on constituent parts and product already delivered. Records of the results of the review of changes and any necessary actions are maintained. Design and development changes are controlled in accordance with the configuration management process.

7.4 Purchasing

7.4.1 Purchasing Process

Precision Sensors ensures that purchased product conforms to specified purchase requirements (see SOP 7.4). The type and extent of control applied to the supplier and the purchased product depends upon the effect of the purchased product on subsequent product realization or the final product.

Precision Sensors

a) maintains a register of suppliers that includes approval status and the scope of approval,
b) periodically reviews supplier performance; the results of these reviews are used as a basis for establishing the level of controls to be implemented,
c) defines the necessary actions to take when dealing with suppliers that do not meet requirements,
d) ensures, where required, that both Precision Sensors and all suppliers use customer-approved special process sources,
e) defines the process, responsibilities and authority for the approval status decision, changes of the approval status and conditions for controlled use of suppliers depending on the supplier’s approval status, and
f) determines and manages the risk when selecting and using suppliers

7.4.2 Purchasing Information

Purchasing information describes the product to be purchased, including, where appropriate

a) requirements for approval of product, procedures, processes and equipment,
b) requirements for qualification of personnel,
c) quality management system requirements,
d) the identification and revision status of specifications, drawings, process requirements, inspection/verification instructions and other relevant technical data,
e) requirements for design, test, inspection, verification, use of statistical techniques for product acceptance, and related instructions for acceptance, and as applicable, critical items including key characteristics,
f) requirements for test specimens for design approval, inspection/verification, investigation or auditing,
g) requirements regarding the need for the supplier to
   - notify us of nonconforming product,
   - obtain approval for nonconforming product disposition,
   - notify us of changes in product and/or process, changes of suppliers, changes of manufacturing facility location and, where required, obtain approval, and
   - flow down to the supply chain the applicable requirements including customer requirements,
h) records retention requirements, and
i) right of access by us and our customer and regulatory authorities to the applicable areas of
all facilities, at any level of the supply chain involved in the order and to all applicable
records.

The adequacy of specified purchase requirements are ensured prior to communicating them to the
supplier.

7.4.3 Verification of Purchased Product

Inspection or other activities necessary for assuring that purchased product meets specified purchase
requirements have been established and implemented.

Purchased product released for production use pending completion of all required verification
activities will be identified and recorded to allow recall and replacement if it is subsequently found that
the product does not meet requirements.

Where Precision Sensors delegates verification activities to our supplier, the requirements for
delegation will be defined and a register of delegations maintained.

Where Precision Sensors or our customer intends to perform verification at our supplier’s premises,
the intended verification arrangements and method of product release in the purchasing information
will be stated.

7.5 Production and Service Provision

7.5.1 Control of Production and Service Provision

Precision Sensors plans and carries out production and service provision under controlled conditions.
These conditions include, as applicable,

a) the availability of information that describes the characteristics of the product,
b) the availability of work instructions, as necessary,
c) the use of suitable equipment,
d) the availability and use of monitoring and measuring equipment,
e) the implementation of monitoring and measurement,
f) the implementation of product release, delivery and post-delivery activities,
g) accountability for all product during production,
h) evidence that all production and inspection/verification operations have been completed as
planned, or as otherwise documented and authorized,
i) provision for the prevention, detection and removal of foreign objects,
j) monitoring and control of utilities and supplies to the extent they affect conformity to
product requirements, and
k) criteria for workmanship, specified in the clearest practical manner.

Planning considers, as appropriate,

- establishing, implementing and maintaining appropriate processes to manage critical items,
including process controls where key characteristics have been identified,
- designing, manufacturing and using tooling to measure variable data,
- identifying in-process inspection/verification points when adequate verification of
conformance cannot be performed at later stages of realization, and
special processes.

7.5.1.1 Production Process Verification

First article inspection on new parts or assemblies is performed to verify that the production processes, production documentation and tooling are capable of producing parts and assemblies that meet requirements. This process is repeated when changes occur that invalidate the original results.

7.5.1.2 Control of Production Process Changes

Personnel authorized to approve changes to production processes have been identified on the “Authorized Change(s) List.

Changes affecting processes, production equipment, tools or software programs are controlled and documented.

The results of changes to production processes are assessed to confirm that the desired effect has been achieved without adverse effects to product conformity.

7.5.1.3 Control of Production Equipment, Tools and Software Programs

Production equipment, tools and software programs used to automate and control/monitor product realization processes are validated prior to release for production and are maintained.

Storage requirements, including periodic preservation/condition checks, are defined for production equipment or tooling in storage.

7.5.2 Validation of Processes for Production and Service Provision

Any processes for production and service provision where the resulting output cannot be verified by subsequent monitoring and measurement and, as a consequence, deficiencies become apparent only after the product is in use or the product has been delivered are validated to demonstrate the ability of these processes to achieved planned results.

Arrangements are established for these processes including as applicable,

a) defined criteria for review and approval of the processes,
b) approval of equipment and qualification of personnel,
c) use of specific methods and procedures,
d) requirements for records, and
e) revalidation.

7.5.3 Identification and Traceability

Where appropriate, product is identified by suitable means throughout product realization (see SOP 7.5.3).
Identification of the configuration of the product is maintained in order to identify any differences between the actual configuration and the agreed configuration.

Product status with respect to monitoring and measurement requirements is identified throughout product realization.

Controls have been established for acceptance authority media, such as stamps, electronic signatures and passwords.

The unique identification of the product is controlled and records maintained when traceability is a requirement.

7.5.4 Customer Property

Care is exercised with customer property while it is under our control or being used by us (see SOP 7.5.4). Customer property for use or incorporation into the product is identified, verified, protected and safeguarded. If any customer property is lost, damaged or otherwise found to be unsuitable for use, we will report it to the customer and maintain records.

7.5.5 Preservation of Product

Product is preserved during internal processing and delivery to the intended destination in order to maintain conformity to requirements. As applicable, preservation includes identification, handling, packaging, storage and protection. Preservation also applies to the constituent parts of a product.

Preservation of product also includes, where applicable in accordance with product specifications and applicable statutory and regulatory requirements, provisions for

a) cleaning,
b) prevention, detection and removal of foreign objects,
c) special handling for sensitive products,
d) marking and labeling including safety warnings,
e) shelf life control and stock rotation, and
f) special handling for hazardous materials.

7.6 Control of Monitoring and Measurement Equipment

Precision Sensors determines the monitoring and measurement to be undertaken and the monitoring and measuring equipment needed to provide evidence of conformity of product to determined requirements (see SOP 7.6).

Precision Sensors maintains a register of monitoring and measuring equipment and defines the process employed for their calibration/verification including details of equipment type, unique identification, location, frequency checks, check method and acceptance criteria.

Processes have been established to ensure that monitoring and measurement can be carried out and are carried out in a manner that is consistent with the monitoring and measurement requirements.

Environmental conditions are suitable for the calibration, inspection, measurement and testing being carried out.
Where necessary to ensure valid results, measuring equipment is

a) calibrated or verified, or both, at specified intervals, or prior to use, against measurements standards traceable to international or national measurement standards; where no such standards exist, the basis used for calibration or verification is recorded,
b) adjusted or re-adjusted as necessary,
c) identified in order to determine its calibration status,
d) safeguarded from adjustments that would invalidate the measurement result, and
e) protected from damage and deterioration during handling, maintenance and storage.

A process for the recall of monitoring and measuring equipment requiring calibration and verification has been established, implemented and is maintained.

When the equipment is found not to conform to requirements, the validity of the previous measuring results are assessed and recorded. Appropriate action is taken on the equipment and any product affected.

Records of the results of calibration and verification are maintained.

If computer software is used in the monitoring and measurement of specified requirements, its ability to satisfy the intended application will be confirmed. It will be undertaken prior to initial use and reconfirmed as necessary.

8. Measurement, Analysis and Improvement

8.1 General

The monitoring, measurement, analysis and improvement processes needed are planned and implemented

a) to demonstrate conformity to product requirements,
b) to ensure conformity of the quality management system, and
c) to continually improve the effectiveness of the quality management system.

This includes determination of applicable methods, including statistical techniques, and the extent of their use (see SOP 8.1).

8.2 Monitoring and Measurement

8.2.1 Customer Satisfaction

Information relating to customer perception to determine if we have met their requirements is monitored. Methods for obtaining and using this information have been determined.

Information monitored and used for the evaluation of customer satisfaction includes, but is not limited to, product conformity, on-time delivery performance, customer complaints and corrective action requests. Precision Sensors has developed and implements plans for customer satisfaction improvement that address deficiencies identified by these evaluations, and assesses the effectiveness of the results.
8.2.2 Internal Audit

Internal audits are conducted at planned intervals to determine whether the quality management system

a) conforms to the planned arrangements, to the requirements of AS9100 and to the quality management system requirements we have established, and
b) is effectively implemented and maintained.

An audit program is planned, taking into consideration the status and importance of the processes and areas to be audited, as well as the results of previous audits. The audit criteria, scope, frequency and methods shall be defined. The selection of auditors ensures objectivity and impartiality of the audit process. Auditors shall not audit their own work.

SOP 8.2.2 has been established to define the responsibilities and requirements for planning and conducting audits, establishing records and reporting results.

Records of the audits and their results are maintained.

The management responsible for the area being audited ensures that any necessary corrections and corrective actions are taken without undue delay to eliminate detected nonconformities and their causes. Follow-up activities shall include the verification of the actions taken and the reporting of verification results.

8.2.3 Monitoring and Measurement of Processes

Suitable methods for monitoring and, where applicable, measurement of the quality management system processes are applied. These methods demonstrate the ability of the processes to achieve planned results. When planned results are not achieved, correction and corrective action is taken, as appropriate.

In the event of process nonconformity,

a) appropriate action is taken to correct the nonconforming process,
b) the process nonconformity is evaluated to determine if it has resulted in product nonconformity,
c) we determine if the process nonconformity is limited to a specific case or whether it could have affected other processes or products, and

8.2.4 Monitoring and Measurement of Product

The characteristics of the product are monitored and measured to verify that product requirements have been met. This is carried out at appropriate stages of the product realization process in accordance with the planned arrangements. Evidence of conformity with the acceptance criteria is maintained (see SOP 8.2.4).
Measurement requirements for product acceptance is documented and includes

a) criteria for acceptance and/or rejection
b) where in the sequence measurement and testing operations are to be performed,
c) required records of the measurement results (at a minimum, indication of acceptance or rejection), and
d) any specific measurement instruments required and any specific instructions associated with their use.

When critical items, including key characteristics, have been identified, they are controlled and monitored in accordance with the established processes.

When sampling inspection is used as a means of product acceptance, the sampling plan is justified on the basis of recognized statistical principles and appropriate for use.

Where product is released for production use pending completion of all required measurement and monitoring activities, it is identified and recorded to allow recall and replacement if it is subsequently found that the product does not meet requirements.

Records indicate the person(s) authorizing release of product for delivery to the customer.

Where required to demonstrate product qualification, records provide evidence that the product meets the defined requirements.

The release of product to the customer does not proceed until the planned arrangements have been satisfactorily completed, unless otherwise approved by a relevant authority and, where applicable, by the customer.

All documents required to accompany the product are present at delivery.

**8.3 Control of Nonconforming Product**

Nonconforming product is identified and controlled to prevent its unintended use or delivery. SOP 8.3 has been established to define the controls and related responsibilities and authorities for dealing with nonconforming product. This procedure defines the responsibility and authority for the review and disposition of nonconforming product, and the process for approving personnel making these decisions.

Nonconforming product includes product returned from the customer.

Where applicable, nonconforming product is dealt with by one or more of the following ways:

a) by taking action to eliminate the detected nonconformity,
b) by authorizing its use, release of acceptance under concession by a relevant authority and, where applicable, by the customer;
c) by taking action to preclude its original intended use or application,
d) by taking action appropriate to the effects, or potential effects, of the nonconformity when nonconforming product is detected after delivery or use has started,
e) by taking actions necessary to contain the effect of the nonconformity on other processes or products.
Nonconforming product process control provides for timely reporting of delivered nonconforming product.

Dispositions of use-as-is or repair are only used after approval by an authorized representative of the organization responsible for design.

If the nonconformity results in a departure from contract requirements, dispositions of use-as-is or repair are only used if specifically authorized by the customer.

Product dispositioned for scrap is conspicuously and permanently marked, or positively controlled, until physically rendered unusable.

When nonconforming product is corrected it is re-verified to demonstrate conformity to the requirements.

Records of the nature of the nonconformities and any subsequent actions taken, including concessions obtained, are maintained.

### 8.4 Analysis of Data

To demonstrate the suitability and effectiveness of the quality management system, appropriate data is determined, collected and analyzed and an evaluation is conducted to determine where continual improvement of the effectiveness of the quality management system can be made. This includes data generated as a result of monitoring and measurement and from other relevant sources.

The analysis provides information relating to

- a) customer satisfaction,
- b) conformity to product requirements,
- c) characteristics and trends of processes and products, including opportunities for preventive action, and
- d) suppliers.

### 8.5 Improvement

#### 8.5.1 Continual Improvement

Precision Sensors continually improves the effectiveness of the quality management system through the use of the quality policy, quality objectives, audit results, analysis of data, corrective and preventive actions and management review.

The implementation of improvement activities are monitored and evaluated for effectiveness of the results.

#### 8.5.2 Corrective Action

Actions are taken to eliminate the causes of nonconformities in order to prevent recurrence. Corrective actions are appropriate to the effects of the nonconformities encountered.

SOP 8.5.2 has been established to define requirements for
a) reviewing nonconformities (including customer complaints),
b) determining the causes of the nonconformities,
c) evaluating the need for action to ensure that nonconformities do not recur,
d) determining and implementing action needed,
e) records of the results of action taken,
f) reviewing the effectiveness of the corrective action taken,
g) flowing down corrective action requirements to a supplier when it is determined that the supplier is responsible for the nonconformity,
h) specific actions where timely and/or effective corrective actions are not achieved, and
i) determining if additional nonconforming product exists based on the causes of the nonconformities and taking further action when required.

8.5.3 Preventive Action

Actions are determined to eliminate the causes of potential nonconformities in order to prevent their occurrence. Preventive actions will be appropriate to the effects of the potential problems.

SOP 8.5.3 has been established to define requirements for

a) determining potential nonconformities and their causes,
b) evaluating the need for action to prevent occurrence of nonconformities,
c) determining and implementing action needed,
d) records of results of action taken, an
e) reviewing the effectiveness of the preventive action taken.
ADDENDUM 1

Section 9.0 This addendum addresses the requirements set forth by the Federal Aviation Administration for PMA parts manufactured by Precision Sensors.

Section 9.1 REPORTING OF FAILURES, MALFUNCTIONS AND DEFECTS

9.1.1 Precision Sensors has a documented procedure for reporting failures, malfunctions and defects of FAA-PMA parts to the FAA. (Reference W.I. 21.1)

Section 9.2 REQUIRED DESIGN CHANGES FOR PMA PARTS

9.2.1 Precision Sensors has a documented procedure for the submittal of required design changes of PMA parts to the FAA. (Reference W.I. 21.2)

Section 9.3 AIRWORTHINESS DIRECTIVES

9.3.1 Precision Sensors has documented procedures for implementing Airworthiness Directives. (Reference W.I. 21.3)

Section 9.4 FAA-PMA MARKING INSTRUCTIONS

9.4.1 Precision Sensors has a documented procedure for marking FAA-PMA parts. (Reference W.I. 21.4)

Section 9.5 APPROVAL OF MINOR / MAJOR DESIGN CHANGES OF PMA PARTS

9.5.1 Precision Sensors has a documented procedure for the approval of major and minor changes of PMA parts.

Section 9.6 CUSTOMER NOTIFICATION (CUSTOMERS, FAA, GOVERNMENT)

9.6.1 Precision Sensors has a documented procedure for customer notification of relocation or expansion. (Reference W.I. 21.6)

Section 9.7 FAA PMA INSPECTION AND TESTS

9.7.1 Precision Sensors has a documented procedure for FAA PMA Inspection and Tests. (Reference W.I. 21.7)

Section 9.8 FAA PMA RESPONSIBILITY OF HOLDER

9.8.1 Precision Sensors has a documented procedure for FAA PMA Responsibility of Holder. (Reference W.I. 21.8)

Section 9.9 FAA PMA CHANGES IN QUALITY SYSTEM

9.9.1 Precision Sensors has a documented procedure for FAA PMA Changes in Quality System. (Reference W.I. 21.9)
ADDENDUM 2

PRECISION SENSORS
QUALITY POLICY

Precision Sensors promises our customers that we will distinguish ourselves as a supplier of first-rate solutions, high quality products and prompt services.

This goal will be achieved through continuous improvement of the Quality Management System and

“A United Commitment to Quality”

PRECISION SENSORS
QUALITY OBJECTIVES

1) Reduce customer returns, deemed Precision Sensors responsibility, to less than 1%.

2) Improve employee productivity 10%.
   (Target = $16 in sales per $1 of DL)

3) Improve on time delivery by 25%.

________________________________________
Tim Straub, Vice President & General Manager

________________________________________
Warren Root, Quality Assurance Manager

________________________________________
Paul Zaczkowski, Production Manager

Q347  10/03
ADDENDUM 3

PRECISION SENSORS

ORGANIZATIONAL CHART