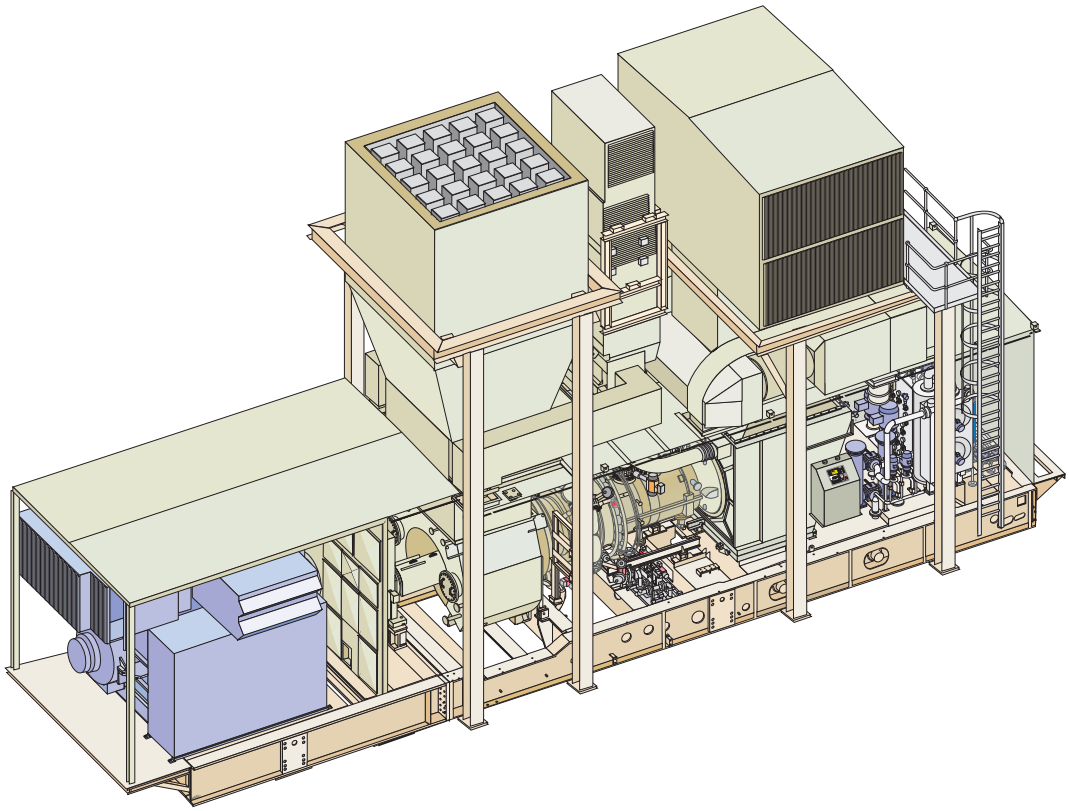
B698/B700 YAMAMA
Documentation Structure



Contents

General

This document gives information about Siemens Industrial Turbomachinery AB (SIT) Standard Customer documentation for a combined cycle power plant. Please observe that this description of the customer documentation is meant to describe a standard scope of documentation. Information will be included or excluded to fit each power plant.

The aim of the customer documentation is to

- Provide information about the purpose, location and operation and safety aspects of the various components of the equipment supplied by SIT.
- Provide information for start-up, normal operation, emergency shutdowns and maintenance of the equipment during operation and standstill.
- Provide information for trouble-shooting and the corrective measures required after alarm or trip incidents.
- Provide information concerning preventive periodic inspection and maintenance.

The following files are included in the final documentation (as built version):

- Documentation Overview
- Operator Documentation
- Maintenance and Technical Documentation
- Manufacturing Record Documentation

It is assumed that the operation and maintenance personnel have been introduced to the customer documentation during a training course prior to the preliminary takeover.

The customer documentation is structured according to the following:

General Structure

The customer Documentation is structured as follows:

- Operator Documentation – intended primarily for the operating personnel.
- Maintenance & Technical Documentation – intended primarily for the maintenance personnel.

The key information necessary for understanding the structure and finding the appropriate sections are provided in the Documentation Overview (See next page for YAMAMA documentationstructure.)

Documentation Structure

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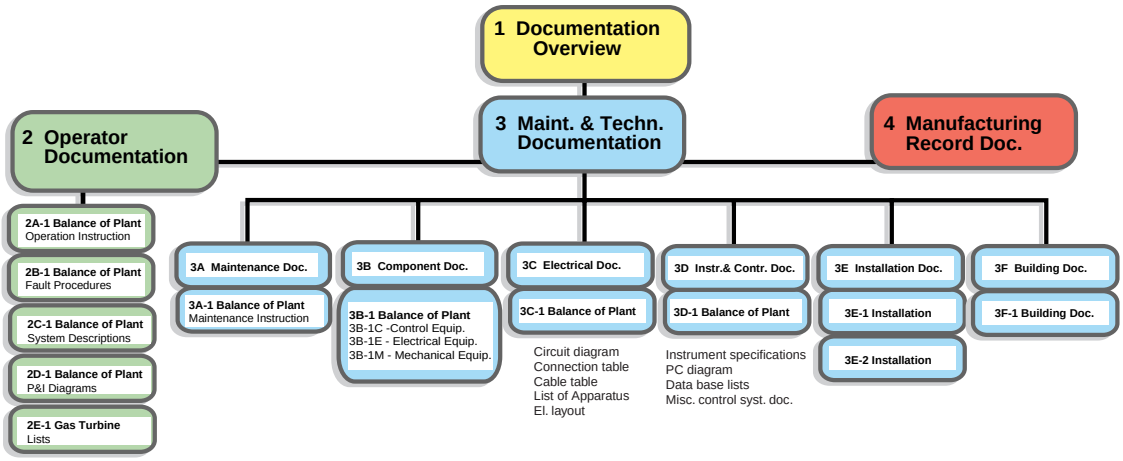
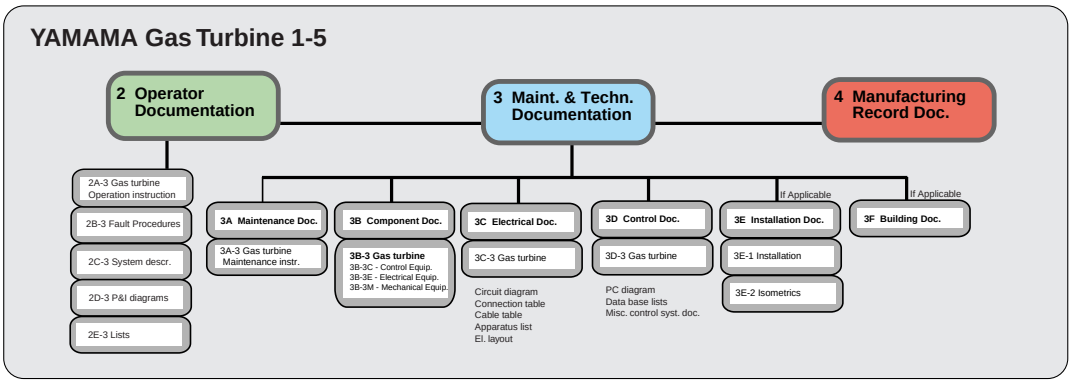
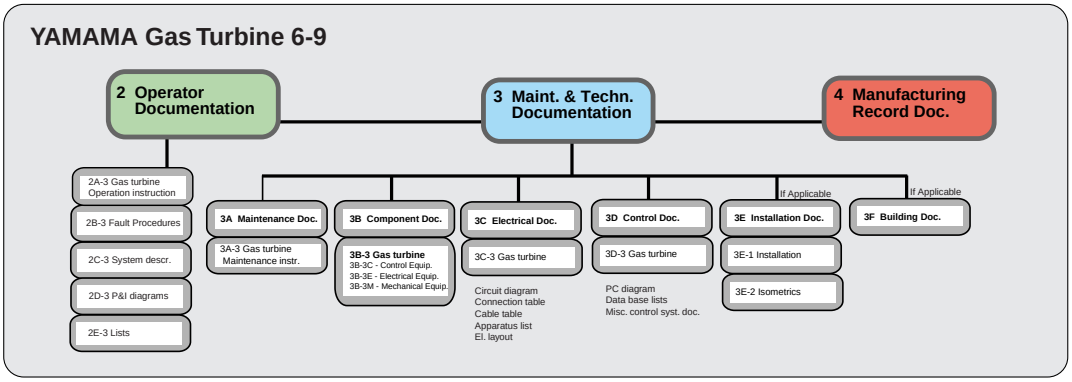
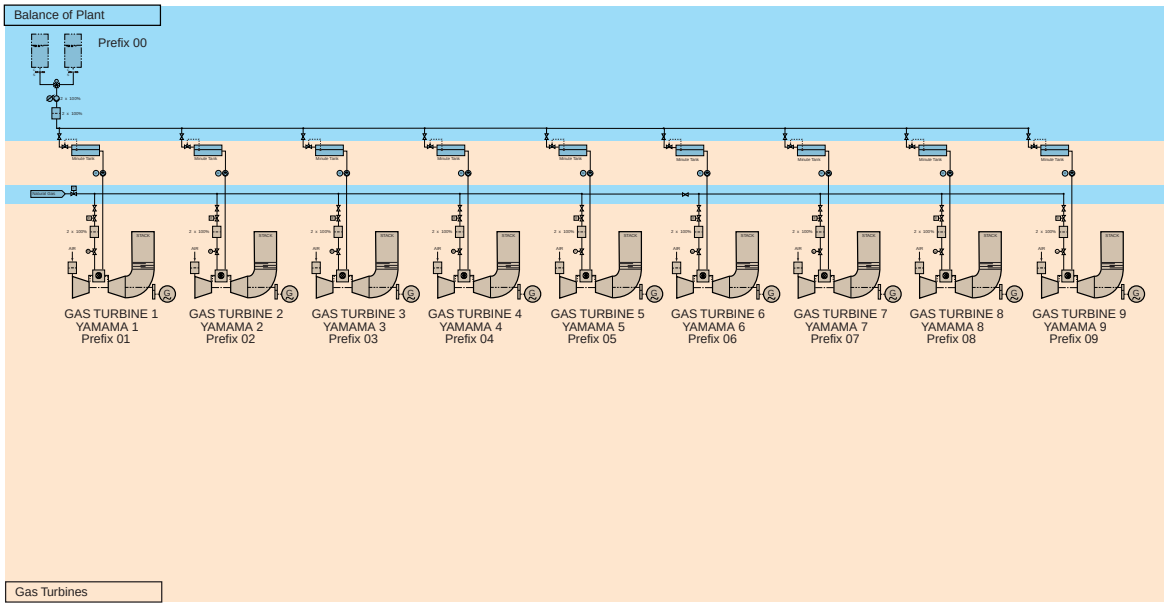






Prefix used for Balance of Plant and Gas Turbines



Balance of plant

For the Balance of Plant documentation "00" will be used as prefix. See illustration above. The binder for Balance of Plant will be marked 2A-1, 2B-1, 2C-1 etc.

Gas Turbine

The Gas Turbine documentation will be separated with "YAMAMA 1" to "YAMAMA 9. See illustration above. The binder for the Gas Turbines will be marked YAMAMA 1-9 and 2A-3, 2B-3, 2C-3 etc.

1 Documentation Overview

The Documentation Overview is an introduction to the customer documentation structure and comprises key information on how to recognise and find the appropriate documents and also to understand the typical symbols used in the documentation.

General Introduction

Provides information about the final documentation for the plant.

Revision Routine

This document describes how to revise a copy of the customer documentation.

General Safety

Highlights the major aspects of safety during operation and maintenance of the plant.

Plant Documentation Structure

Gives a total overview of the customer documentation structure.

General list of documents

Lists all the major documents included in the customer documentation.

General list of components

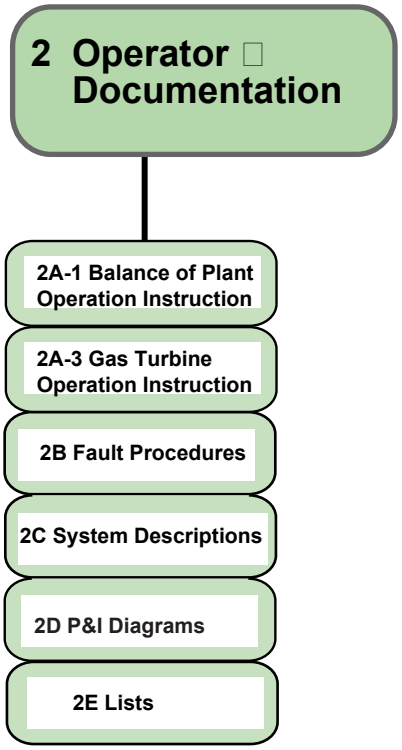
Lists all components in designation system order and gives a reference to the binder in which a particular part is covered.

KKS Designation System

Gives a brief description of the designation system generally used for designation of systems and components.

2 Operator Documentation

The Operator Documentation serves as the instruction for operation of the combined cycle power plant and for handling the unit in emergencies. In addition, the System Descriptions and the P&ID form an appropriate level of information for understanding the basic system design and operation.



2A-1 Operation Instruction for Balance of Plant

Balance of Plant Introduction

Gives information on how to use the Operation Instruction of Balance of Plant.

Plant Operating instructions

Gives instruction that contains the essential details for normal safe operation of the plant.

Also includes instruction for disturbance handling.

Operating instruction-system level

An instruction that contains the essential details for normal safe operation of the system. Also includes instruction for disturbance handling.

Operating Instruction Plant HMI System

This document describes displays, with its indications and manoeuvres, in the HMI (Human-Machine Interface) used for the Yamama power plant. Here displays for Balance of Plant and electrical systems are covered.

2A-3 Operation Instruction for Gas Turbine

Gas Turbine Introduction

Gives information on how to use the Operation Instruction for Gas Turbine.

Operating Safety

Informs about the necessary precautions to ensure a safe operation without risking personal health or machine damage.

Requirements

Gives information on requirements concerning the selection and handling of fuel, lubrication oil etc.

Operating Instruction

Specifies step-by-step how to start, operate and stop the gas turbine, including the necessary checks to be performed prior to these procedures. The procedures also include cancelling of shutdown order, restart actions and measures to be taken if a longer standstill period is planned.

Periodic Checks

Contains information needed by the operator to perform routine readings at start-up and continuous operation. Continuous operation readings are specified for different periods, e.g. daily, weekly and monthly and serve as basic information for analysis. They also includes information on how to perform the registration of the operating statistics. In this section information is also given on operation maintenance schedule, which lists all maintenance actions needed during operation and standstill of the gas turbine. The different parts of this section are:

- Routine Readings

- Operation Statistics
- Operation Maintenance Schedule

HMI Description

Describes handling of the Human-Machine Interface (HMI), how the operator communicates with the gas turbine and its system and also a description of the basic layout of the Advant displays.

Display Description

Describes the interactive process displays of the operator station and explains abbreviations used in the displays.

Base Position List

Specifies setting of valves before start-up of the gas turbine after a long term shutdown.

2B Fault Procedures for Balance of plant and Gas Turbine

Fault Procedures

This document gives instructions on how to act when an alarm or trip occurs.

Alarm and Trip List

Describes the cause of the alarm or trip signal referred to the displayed alarm designation, the possible reason for the alarm or trip and the recommended primary measures.

2C System Descriptions for Balance of plant and Gas Turbine

The System Descriptions are based on and closely related to the P&ID. Besides an overall description, explaining the normal system function and the function in the event of disturbances, the main electrical and control aspects are described and a technical specification is given.

2D Process and Instrumentation Diagrams for Balance of plant and Gas Turbine

The Process and Instrumentation Diagrams (P&ID) show the system components and intermediate piping including measuring points, designations, design data and terminal points. The descriptions cover the systems included in the scope of supply. All components are identified by unique component numbers and connected to the component documentation through the General list of Components in the Documentation Overview binder and through the Aggregate List.

2E Lists for Balance of plant and Gas Turbine

The documents under this heading are structured in system and component designation order according to P&ID.

Setting List

Instrument List

Aggregate List

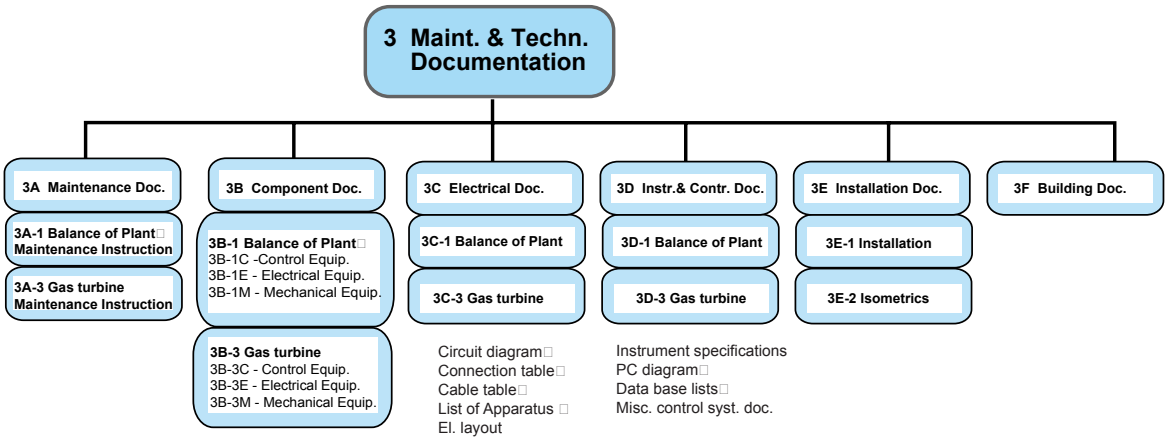
Valve List

Pipe List

Electrical Load List

3 Maintenance and Technical Documentation

The Maintenance and Technical Documentation contains detailed technical information and maintenance instructions. The technical part is further divided into documentation related to components-, electrical-, instrument & control-, installation and building items.



3A-1 Maintenance Instruction for Balance of Plant

Balance of Plant Introduction

Gives information on how to use the Maintenance Instruction.

Maintenance Instructions

Describes step-by-step how different maintenance actions, normally carried out by the operation and maintenance personnel, shall be performed.

Spare part list

List of ordered spare parts

3A-3 Maintenance Instruction for Gas Turbine

Gas Turbine Introduction

Defines the criteria on which the maintenance documentation is based.

Maintenance Safety

Highlights the precautions necessary to ensure safe maintenance of the gas turbine without risking personal health or machine damages.

Maintenance Instructions

Describes step-by-step how different maintenance actions, normally carried out by the operation and maintenance personnel, shall be performed.

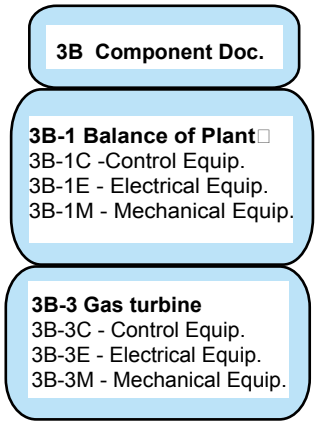
- Compressor Washing Instructions – Off-line Washing
- Lubrication Oil System Instruction
- Lubricant List
- Gas Fuel Filter Change Instructions
- Liquid Fuel Filter Change Instructions
- Liquid Fuel Test Instruction
- Dump and Load of Software

Storage and Conservation

Describes the measures to be taken if the gas turbine is to be at standstill for a longer period of time.

3B Component Documentation for Balance of plant and Gas Turbine

The component documentation contains the documentation delivered by the sub suppliers of SIT and their operation and maintenance procedures. The components are structured in KKS designation order and are structured in lists such as General list of Component (Documentation Overview), Aggregate List and Instrument List (Lists). These documents interact with the P & I Diagrams and form an information base to facilitate the finding of correct information in the sub-suppliers documentation.
The sub-suppliers documentation are grouped in categories Balanced of Plant and Gas turbine. The categories are sorted in C-Control, E-Electrical and M-Mechanical equipment as follows:



3C Electrical Documentation for Balance of plant and Gas Turbine

General

Technical documents describing the electrical equipment of the plant, such as switchgears, cabling and connections, electrical power consumers etc. The extent of the technical document set is depending on the scope of delivery.

Electrical load list

Listing of all loads connected to the low voltage system. Shows the power supply and electrical load of electrically connected components according to KKS designations.

Circuit Diagrams

Diagrams describing electrical circuits for supplied equipment and components. Cover electrical and instrument field equipment.

Single Line Diagrams

Gives an overview of the complete electrical distribution in the plant as well as details in different sub-systems.

Cable list

Describes all cables, both for electrical and instrument equipment, in the plant with cable type and start and end points.

Connection table internal

A document defining each connection internal in a cubicle or component during manufacturing

Connection table external

A document specifying each connection internal in a cubicle or component during manufacturing.

Cable Interconnection Tables

Describes wiring terminal connections for the cable cores in electrical and instrument field cables. Terminal points for signals are listed and identified by their item designations. (Only when field wiring is included in the delivery.)

Internal Interconnection Tables

Defines the connection points for wires internally in electrical equipment such as cubicles, junction boxes and switchgears.

List of Apparatus

Defines electrical apparatus in the delivery with technical information as well as ordering information.

Electrical Layout drawings

Show the general arrangement of electrical equipment and main cable routing.

Assembly Drawings

Show main dimensions, weight and shape of various electrical equipment, such as AC generators and switchgears and electrical cabinets etc.

Instrument & Junction box layout

A layout drawing showing where instruments and junction boxes are located in the plant.

3D Instrumentation and Control Documentation for Balance of plant and Gas Turbine

General

Technical documents describing the instrument and control equipment of the plant, such as measuring device, cabling and connections, control systems etc. The extent of the technical document set is depending on the scope of delivery.

Instrument list

List describing measuring device and measuring data, such as calibration range, measuring unit etc.

Setting list

Lists presenting operational settings for instrument and control equipment.

Instrument and hook-up specification

Data sheet for each instrument showing technical details regarding installation and impulse piping.

Internal Interconnection Tables

Defines the connection points for wires internally in instrument equipment such as cubicles and junction boxes.

Instrument layout drawings

Show the general arrangement of instrument equipment and main cable routing.

Plant control description

Functional description presenting the control philosophy of the plant.

Plant sequences

Functional description presenting start- and stop sequences for the plant.

PC program symbols
Definition of used PC program symbols

Control system license
License documents.

Plant control block diagram
Block diagram showing the plant control principals.

Data base list
Automatically generated control system documentation listing the process and control system object configuration.

Control system program
Automatically generated control system documentation showing logical diagrams of the application software.

3E Installation Documentation for Balance of plant and Gas Turbine

Installation
Gives information on the installation of the plant e.g. layouts, installation drawings, pipe lists and voltage analysis.

Isometrics
Gives information on installation of pipe work and dimensions of the pipes.

Electrical Load List
Is used as a key for searching information on electrical power consumers.

Valve List
Is used as a key for searching information on a valve.

Installation Drawing

Is used during design and site installation work

Detailed Isometrics

Information for purchase of pipes and pipe installation

3F Building Documentation for Balance of plant and Gas Turbine

Layout/ Installation Drawings

Shows the installation of the equipment:

- General arrangement drawing of the supplied equipment with main mechanical and electrical equipment shown. Main dimensions and locations of larger pipes and components are given
- Piping including isometric drawings of major piping installation and a piping list
- Support including support load specification showing the loads, torques and movements from the pipe to the support
- Hazardous zones drawings showing all hazardous areas

Architect Drawings

Shows the layout of the building.

Building Construction

Shows the concrete and steel structure including:

- concrete floor
- foundation
- piling
- prefabricated floor and ceiling
- walls including cladding
- steel framework
- steel floors

Necessary calculations are provided. An outline drawing showing holes, cable routings and location of foundation embedded steel and bolts is included. The foundation drawing also contains complete information for the turbine foundation(s).

Building Drawing List

Lists all drawings from the civil contractor

Escape Routes

Confirm safety and escape routes

Hazordous Zone drawing

A drawing showing all hazardous areas.

Load Specification Civil

To specify load on building construction and specification for building contractor.

Heating, Water, Ventilation and Sanitation

Installation drawings showing equipment for heating, water, ventilation and sanitary systems, i.e. sewers, ponds, ventilation ducts etc

Lighting

Drawing showing the installation of normal and emergency lighting.

Earthing

Shows the installation of equipment for earthing.

Fire Fighting

Fire zone layout drawing marked with fire sections, environmental class and emergency exits.

Fire Protection Plan

For authority and customer approval. For classification of building structure.

Overhaul and Lifting Plan

Used during erection, maintenance and repair work

Lifting Equipment

Shows the installation of major lifting equipment like cranes, trolleys and telphers, their location and capacity.

Room number list

Is used to show fire and environmental classifications used during erection work.

Door list

Specification for building contractor. Basis for communication inside and into the buildings. Designation for lock and key system.

4 Manufacturing Record Documentation

4 Manufacturing Record Doc.

Release Note

Verifies that the equipment has been Inspected and Tested acc.to the suppliers standard procedures and Inspection and Test Plans for the equipment.

Certificate of Conformance with P.O. and Regulatory Directives

Verifies that the supplied product conform to the purchase order and all applicable regulatory directives. Includes the CE-marking for products to be placed in EEC.

Certificate according to Statutory Regulations

Design, Inspection and Test Certificates of equipment as required by statutory regulations, codes and standards.

Certificate of Type Test

Type Approval Certificates for hazardous area and Software License Certificate

Performance / Run Test and Functional Test Reports

Performance or Run Test Reports of the following equipment:

Turbine

Generator or Compressor

Commissioning Report

The Commissioning Report which contain Checklists, Test Protocols and Setting Lists, is compiled in paper format in one book and it will be handed over to the client on site after completed commissioning.

Inspection and Verifying documentation, an option to the P.O.

All inspection and test reports, material lists and weld plan acc.to the contractual Inspection and Test Plans may be compiled to a Manufacturing Record Book in paper format and supplied on request.

REVISION

Rev. ind.	Page (P) Chapt. (C)	Description	Date Dept. / Init.