User's Guide for Field Service

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Publication Information

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About this document

Understand the following concepts

- Maintenance concept, prediction and planning
- Reference Activities
- Service Order Processing
- Field Change Order
- Failure Analysis

To perform the following tasks

- To specify maintenance concept
- To generate maintenance prediction
- To generate maintenance planning
- To generate service orders
- To plan and release service orders
- To close service orders
- To cancel service orders

Document summary

This user's guide explains the various concepts and process available in the Field Service module.

How to read this document

This document is assembled from online Help topics. As a result, references to other sections in the manual are presented as shown in the following example:

For details, refer to Infor ERP LN Service Online Help.

Please refer to the Table of Contents to locate the referred section.

Underlined terms indicate a link to a glossary definition. If you view this document online and you click on underlined text, you jump to the glossary definition at the end of this document.

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Chapter 1
Introduction

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This chapter provides a brief introduction of the Preventive Maintenance and Service Order Control functionality available in Field Service module.

Preventive Maintenance

This module enables you to use preventive maintenance (Service Planning and Concepts SPC) for assets in an effective and efficient way. These assets can belong to your customers or can be your own internal assets. The planned activities can be covered by service contracts. These activities could be agreed with the customers and, therefore, must be automatically controlled by the service order system.

You can define a unique maintenance concept for each product. The supported preventive maintenance policies are as follows:

- Usage-based maintenance (UBM), based on periods or based on counter readings.

A trigger for service can be based on the number of kilometers, mileage, or working hours. After a specified usage, the predefined service activities must be carried out. Measurements can be used to track the usage and to plan next activities. Agreements can be based on the usage of assets.

- Condition-based maintenance (CBM) based on visits and measurements or reported measurements.

Condition-based maintenance depends on the condition of the asset, including components, or configuration lines. You can register several measurements to describe the condition of the asset. You can carry out condition monitoring based on the reports generated from inspections or inspection history, which you can obtain from Service Order Control.

To support the definition of maintenance concepts, a library with (reference) maintenance concept can be consulted. For items, (reference) maintenance concepts can be defined and stored in a library for ease of use. When the

maintenance concept is set up and agreed upon, the corresponding Maintenance Predictions can be generated, and maintenance planning can subsequently be generated.

The following figure provides an overview of the SSA ERP Service Planning and Concepts (SPC) module.
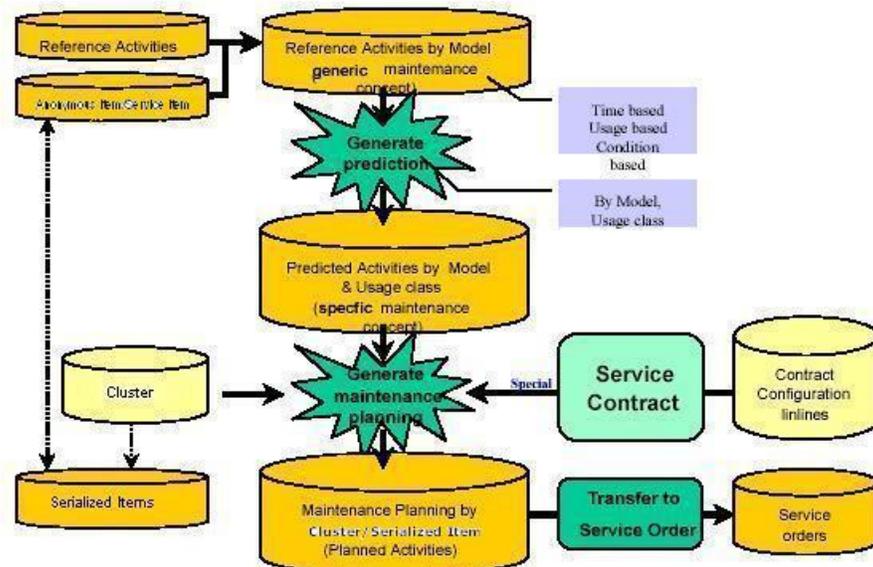
At the upper-left corner of the figure, you see two key elements that serve as a basis for setting up maintenance concepts. Maintenance concepts are sets of activities that must be carried out in line with a particular maintenance policy, which includes reference activities and anonymous items or service items. Reference activities identify the type of work and the resources required for carrying out specific maintenance activities. You can link these reference activities to specific anonymous items or service items. Maintenance concepts are used to plan preventive maintenance activities.

You can use the generic maintenance concept to generate a prediction of the activities that must be carried out. This prediction contains, on a relative time scale, the expected moments for these activities. You can generate these predictions by anonymous item, by usage class, and by combinations of anonymous item and class. This generation results in a more specific maintenance concept, which in turn can be used for the actual maintenance planning.

Maintenance planning can be triggered from the Planning and Concepts (SPC) module. However, configurations that are linked to contracts must be initiated from the Contract Management (CTM) module.

For each of the selected clusters, SSA ERP checks what serialized items are linked to the clusters. If serialized items are found, the related anonymous items or service items can be identified, through which the maintenance concepts that must be used can also be found. The generated planning provides the activities that must be carried out. When the planned activities are released, these activities can be transferred into actual service orders.

Service Order Control (SOC)

You can use the Service Order Control module to create the order quotations, plan the order, and monitor the execution of the order, and then process the order, book costs, and trigger invoicing.

Various types of orders exist:

- Internal and external orders
- Scheduled and non-scheduled orders
- Inspections and customer visits
- Preventive and corrective work

These various types of orders must be handled in the service environment. This module distinguishes several procedures:

- External maintenance: Preventive orders
- External calls: Corrective orders
- Internal maintenance: Preventive orders but no invoicing
- Internal calls: Corrective orders but no invoicing
- Help desk: Orders for telephone support by an expert
- Return material authorization: RMA procedure to ship items back to the warehouse
- Tool maintenance: Preventive maintenance concerning tools
- Field change order (FCO) procedure: Orders to change a component in the installed base
- Other procedure: Orders for training, installing equipment, and so on

Based on these procedures, you can create user-definable service type These names can be tailored to the environment of the service & maintenance organization. Activities can belong to one of these service types. If planning constraints are met, activities can be grouped together in one service. Preventive Maintenance (PM) activities, (breakdown) calls, contractual visits, field change orders, manual created orders with or without a quotation can be handled in this module.

The service engineers must carry out the service orders taking into account various types of constraints, such as the working hours of engineers, holidays, the availability of the item to serve, and so on. The required materials have to

be planned, allocated, purchased, or manufactured. Warehouse Management handles the spare parts, which can be transferred into the engineer's van. The service order must be controlled. As a result, several statuses can be distinguished (from Free to History). The costs spent, such as labor, material, travel costs, and so on, can be booked.

The invoice is made, depending on the contract and warranty terms valid for the maintained item. If an order is made from a quotation, invoicing can be based on the terms of the quotation.

The analysis data related to the item (for problem management) can be stored as a reported problem, an established problem, a proposed solution, or a solution. The proposed solution may result in an activity.

Based on the failure analysis, a component that fails too often can be recalled from the field. This process is supported by **Field Change Order (FCO)** functionality. A selection can be made of all outstanding components using the item code. An order is made to control the FCO, the costs can be charged to the production or sales department by using separate ledger accounts.

The **Graphical Planning Board** is an external application for viewing the service order details and for planning of the service orders. A service engineer after completing a service order can update the status in Mobile Service, which will update the ERP LN data. The data, such as purchases made to run the order, hours spent by the service engineer, materials used, and so on, can be entered in the Mobile Service by the engineer and the same will be updated in ERP LN data base.

Chapter 2
Preventive Maintenance Concepts

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This chapter provides a brief description of the concepts available in preventive maintenance.

Maintenance concept, prediction, and planning

A maintenance concept is a non-customized maintenance plan for manufactured products or purchased products on which service is carried out. A maintenance concept consists of a list of reference activities that must be carried out on an item. You can specify material, labor, and other requirements and their related costs. If you want to specify more than one maintenance concept for an item, you can add a usage class to an item.

If the items are sold, you can generate maintenance planning for a cluster, based on the maintenance concept.

To generate maintenance planning directly based on a maintenance concept, you can specify the following:

- **A frequency:** The frequency indicates the number of times per unit of time a reference activity must be carried out on an item.

- **A measurement type:** The measurement type indicates when a reference activity must be carried out, based on an actual value and a predefined norm value. Maintenance planning can be created for the maintenance concept based on the pattern of the measurement type and the frequency.

You can also use a maintenance concept to create a maintenance prediction and subsequently generate maintenance planning. A prediction is a fine-tuned maintenance concept for an item. In the maintenance prediction, you can define the relative moments that the reference activities must be carried out for the duration of the item's maintenance cycle.

Example

For example, in your maintenance concept you have decided to carry out maintenance activities on item A each month. However, item A is a large ice machine and therefore not used much during winter. In your maintenance prediction you decide to carry out maintenance on item A twice a month during summer, and once a month during winter.

In addition, the maintenance cycle the <u>maintenance prediction</u> is also based on predicted values. The predicted values are relative values, independent of time. The expected value for the <u>dependent variable</u> and the value for the <u>independent variable</u> is calculated for the reference activity that is triggered by a measurement type. Based on the maintenance cycle, the values can be adjusted when the prediction is generated to maintenance planning.

The prediction is not customized. The prediction is generated for items, not for clusters. If the items are sold, you can generate maintenance planning for a <u>cluster</u>, based on the prediction.

Note

- If you define a maintenance concept for an item, this concept is used to generate maintenance planning.
- If you also define a prediction for this item, the prediction is used instead of the maintenance concept if you generate a maintenance planning.
- The prediction is generated for the top level item (parent item) of an item breakdown, and takes into account all related sublevel items (child items) that are defined in the <u>item breakdown</u>. However, you must define a maintenance concept for each parent item and child item.

Reference activities

<u>Reference activity</u> define the work required to carry out specific maintenance activities, as well as the resources required to carry out the work. For every reference activity, you can register type of service type, the skills required, whether or not a checklist applies, relevant planning data, and so on. For planning reasons, you can also register the required material, labor, and any other requirements.
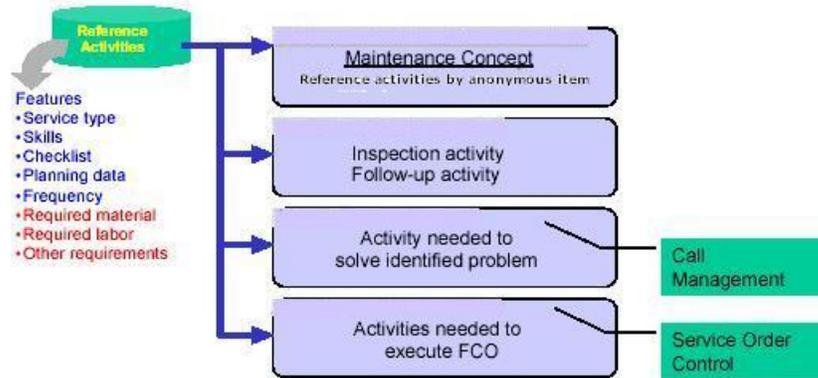
You can use reference activities to:

- Define <u>maintenance concept</u>

You can link reference activities to specific service items or models, which in turn enables you to use reference activities to define maintenance concepts.

- Create <u>inspection templates</u>

You can use an inspection template to specify that a specific measurement must be carried out. In the inspection template, you register the inspection activity itself, as well as the activity that must be carried out when the measured value is below the registered norm value. Both these activities must initially be defined as reference activities.

- Link activities to identified problems and solutions in Call Management (CLM).

When a call is transferred to a service order, any linked reference activity is also copied.

- Link activities to field change orders (FCOs).

SSA ERP enables you to register a number of activities that must be carried out when you execute field change orders. You must initially define these activities as reference activities.

- To define and maintain reference activities related to depot repair.

Labor rate procedure

The <u>labor rates</u> are specified in labor rate codes. The advantage is that the labor rates can be controlled centrally. This means that if the labor rate is changed, it is changed in every session in which that labor rate is used.

Labor rates are usually specified as hourly rates. At company level, you can set the time unit (other than hour) on which the labor rates are based. Use the Conversion Factors (tcibd0103m000) or Units (tcmcs0101m000) session for time units to calculate the labor rate for the specified time.

You can use labor rates to define the labor requirements lines for reference activities and planned activities, or to estimate the cost of activities related to service orders.

Because you can define labor rates at several levels, ERP LN selects the labor rates in the applicable sessions, as follows:

Reference Activity - Resource Requirements (tsacm2120m000)

1. The labor rate of the task that is linked to the reference activity.
2. The labor rate that is linked to the reference activity.
3. The labor rate of the service center that is linked to the reference activity.

Planned Activity - Labor Requirements (tsspc2111m000)

1. The labor rate of the task that is linked to the planned activity.
2. The labor rate that is linked the planned (reference) activity.
3. The labor rate of the skill that is linked to the planned activity.
4. The labor rate of the service center that is linked to the planned activity.

Service Order Estimated Labor Costs (tssoc2130m000)

You can link labor rates to the labor cost lines of service order quotations. When you copy the quotation to a service order, ERP LN copies the labor rates of the quotation's estimated labor lines. In all other cases, the Labor Rate remains empty.

Note

Estimate is one of the available search path values for actual labor rates in the search path fields of the Service Order Parameters (tssoc0100m000) session.

Service Orders Actual Labor Costs (tssoc2131m000)

In the search path fields of the Service Order Parameters (tssoc0100m000) session, you can specify a search path that ERP LN uses to determine the service order's actual labor rates. After you enter the spent labor hours for a service order in the Service Order Hours (bptmm1130m000) session, ERP LN enters the labor rates of the first available search path value.

Note

You can change the sales rate for an actual labor cost line manually. However, any changes or additions to the lines in the Service Order Hours (bptmm1130m000) session applicable for this line will use the sales rate found considering the search path.

The following formula will then be used to calculate the new sales rate:

$$\text{new sales rate} = \frac{\text{old total sales amount plus or minus new update amount}}{\text{new total quantity}}$$

If the new total quantity is zero, the total sales amount will also be zero. If the calculation of the new total sales amount results in a negative amount, the amount will be zero.

Note

If no labor rate is found for any of the search path values, ERP LN enters the following in the Service Orders Actual Labor Costs (tssoc2131m000) session:

- Zero (0) for the service order's labor sales rate.
- The employee's labor rate for the service order's labor cost rate.

Measurements

Inspection

To measure the value of multiple situational variables (measurements) that relate to a serialized item, and compare these to preset boundary values. Inspections can establish the necessity of maintenance activities. Reference activity related to a set of measurement types.

Measurement

Determination of the value of a particular dependent variable of a serialized item in a specific situation, for example, cooling water intake temperature.

Unit of measurement

A measurable (physical) variable and an identification of the unit of this variable, for example, pressure in kPa.

Unit

The indication in which the unit of measurement is expressed.

Independent Variable

Unit of measurement, which determines the dependent variable. Also known as the x-variable.

Dependent Variable

Unit of measurement, which together with a norm value (and a start value)determines when maintenance activities must be carried out. The value of this variable is determined when the measurement is executed. Also y-variable, this variable depends on the x-variable; $y = f(x)$.

Use Trend

The estimated behavior of the value of the dependent variable, for example, the tread of a tire, as a function of the independent variable, for example, time. Possibilities include increasing, decreasing, cyclic increasing, cyclic decreasing, between limits, outside limits, or none.

Maintenance policies

Corrective Maintenance (CM) policy

The maintenance activity that is carried out to repair an item after a defect is identified. The item must be restored to the technical state required for it to fulfill its function properly. This policy is supported by the following modules:

- Call Management
- Service Order Control
- Maintenance Sales Control
- Work Control System

Periodic Maintenance (P)

Preventive maintenance that takes place at a constant interval or during certain times of the service period. The maintenance frequency is expressed in a time unit.

Counter Value (CV)

Preventive maintenance that takes place at a constant interval. This interval is expressed in a usage-related unit, *for example, operating hours or kilometers*. The actual moment of maintenance is when the norm value of the counter is reached. These actual moments can be predicted.

Periodic Maintenance (P) & Counter Value (CV)

You can use periodic maintenance and counter value policies in combination. Maintenance is carried out whenever one of both conditions is reached first. Maintenance is carried out at a particular time, unless a specified norm value is reached.

Example

A car can be serviced under warranty twice when usage is 10,000 km or six months, whichever comes first.

Predicted Activities (PA)

You can compare this method with Counter Value (CV). The maintenance intervals are based on the predicted progress of the value of a specific measuring quantity (dependant variable) based on measuring data from the past (history data). This method optimizes the intervals of maintenance. The data that is measured during maintenance can be sent to the history data again. As a result, the maintenance prediction is continuously amended to the latest measurements.

Inspections (PI)

During an inspection, a set of measurements is carried out for a specific item. Maintenance is required when the measured value of the dependent variable of each measurement type does not meet the norm value. Maintenance is carried out depending on the outcome of the inspection. Each measurement can result in a different activity. The inspection intervals can be based on the expected progress of the value of a specific measuring quantity (dependent variable).

Preventive Maintenance (PM) policy

All maintenance activity that are carried out before the item malfunctions. The aim is to keep the item in the technical condition that is required for correct

functioning. This Service Planning & Concepts module supports the policy. Preventive maintenance can be divided into:

- Use Based Maintenance (UBM)
- Condition Based Maintenance (CBM)

Periodic Maintenance (P)

Preventive maintenance that takes place at a constant interval or during certain times of the service period. The maintenance frequency is expressed in a time unit.

Counter Value (CV)

Preventive maintenance that takes place at a constant interval. This interval is expressed in a usage-related unit, for example, operating hours or kilometers. The actual moment of maintenance is when the norm value of the counter is reached. These actual moments can be predicted.

Periodic Maintenance (P) & Counter Value (CV)

Periodic Maintenance & Counter Value policies can be used in combination. Maintenance is carried out whenever one of both conditions is reached first. Maintenance is carried out at a particular moment in time, unless a specified norm value is reached.

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Use Based Maintenance (UBM)

Preventive maintenance that takes place after a certain period of use, independently of the condition of the item at that moment. Use Based Maintenance can be subdivided into:

- *Periodic Maintenance (P) (p. 2-?)*
- *Counter Value (CV) (p. 2-?)*
- *Periodic Maintenance & Counter Value (P & CV) (p. 2-?)*

Periodic Maintenance (P)

Preventive maintenance that takes place at a constant interval or during certain times of the service period. The maintenance frequency is expressed in a time unit.

Counter Value (CV)

Preventive maintenance that takes place at a constant interval. This interval is expressed in a usage-related unit, for example, operating hours or kilometers. The actual moment of maintenance is when the norm value of the counter is reached. These actual moments can be predicted.

Periodic Maintenance (P) & Counter Value (CV)

Periodic Maintenance & Counter Value policies can be used in combination. Maintenance is carried out whenever one of both conditions is reached first. Maintenance is carried out at a specific moment in time, unless a particular norm value is reached.

Example

A car can be serviced under warranty twice when usage is 10,000 km or six months, whichever comes first.

Predicted Activities (PA)

This method can be compared with Counter Value (CV). The maintenance intervals are based on the predicted progress of the value of a specific measuring quantity (dependant variable) based on measuring data from the past (history data). This method optimizes the intervals of maintenance. The data that is measured during maintenance can be sent to the history data again. As a result, the maintenance prediction is continuously amended to the latest measurements.

Inspections (PI)

During an inspection, a set of measurements is carried out for a specific item. Maintenance is required when the measured value of the dependent variable of each measurement type does not meet the norm value. Maintenance is carried

out depending on the outcome of the inspection. Each measurement can result in a different activity. The inspection intervals can be based on the expected progress of the value of a specific measuring quantity (dependent variable).

Condition Based Maintenance (CBM)

Preventive maintenance that takes place if a required measurement no longer meets the specified norm value. For example, if an engine has oil pressure less than value x, corrective action must be taken. Condition based maintenance can be subdivided into:

- *Predicted Activities (PA) (p. 2-?)*
- *Inspections (PI) (p. 2-?)*

Periodic Maintenance (P)

Preventive maintenance that takes place at a constant interval or during certain times of the service period. The maintenance frequency is expressed in a time unit.

Counter Value (CV)

Preventive maintenance that takes place at a constant interval. This interval is expressed in a usage-related unit, for example, operating hours or kilometers. The actual moment of maintenance is when the norm value of the counter is reached. These actual moments can be predicted.

Periodic Maintenance (P) & Counter Value (CV)

You can use periodic maintenance and counter value policies in combination. Maintenance is carried out whenever one of both conditions is reached first. Maintenance is carried out at a specific moment in time, unless a particular norm value is reached.

Example

A car can be serviced under warranty twice when usage is 10,000 km or six months, whichever comes first.

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Inspections (PI)

During an inspection, a set of measurements is carried out for a specific item. Maintenance is required when the measured value of the dependent variable of each measurement type does not meet the norm value. Maintenance is carried out depending on the outcome of the inspection. Each measurement can result in a different activity. The inspection intervals can be based on the expected progress of the value of a specific measuring quantity (dependent variable).

Dependent variable and norm value

The variable and the value that determine when maintenance activity must be carried out. The dependent variable is a unit of measurement.

Example

A copying machine must be serviced after every 15,000 copies. The dependent variable is the number of copies. The dependent norm value is 15,000.

- In case of predicted inspections (PI), the value of the dependent variable must be measured and compared with the norm values. If the measured value is outside the limits of the norm values (upper/lower limit), an activity must be carried out. You can do this immediately or as a follow-up activity.

Example

The norm value was not reached at the moment of maintenance. The next time the activity for this machine will be carried out, is one month later. The prediction is changed.

- In case of counter value (CV) and predicted activity (PA): Maintenance must be carried out when the norm value is reached. As a result, this value determines whether the activity must be carried out. Note: If a car must be inspected every 2,000 km, the first norm value is 2,000 km, the second norm value is 4,000 km, and so on.

Chapter 3
Service Order Control Concepts

This chapter provides a brief description of the concepts available in service order control.

Field change orders (FCO)

A field change order (FCO) is an order to modify a part of a cluster that is installed at the customer site or in your own organization. You mainly use field change orders to solve production errors collectively, and to introduce product modifications. You can also subcontract the execution of the FCO.

You mainly use Field Change Orders (FCOs) to solve production errors collectively (product recalls) or to modify a product. In the case of production errors, the costs are usually at the service organization's expense.

Field Change Orders
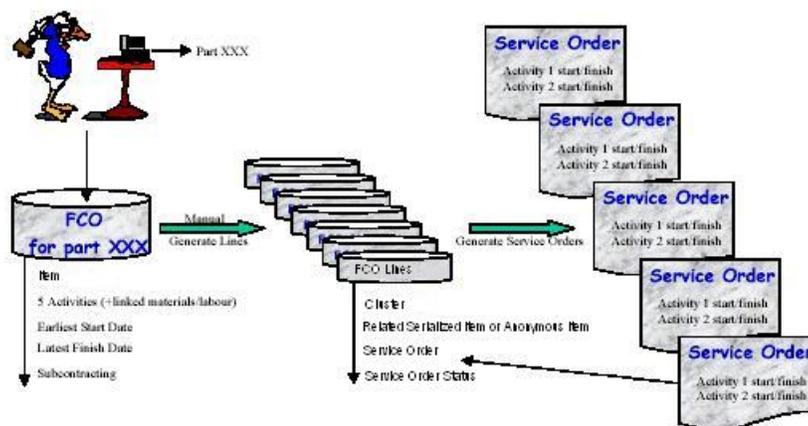
Use the Field Change Orders (tssoc5100m000) session to define a field change order. Organizations that play roles in manufacturing and servicing can use this session. If a manufacturing defect is found with an item that has been used as a part of clusters, a field change order is raised for global replacement of such defective items. The item to be serviced and the activities to be performed are registered in this entity.

FCO Lines

After you create the FCO header, in which the anonymous item or <u>serialized item</u> and the related activities that you want to replace are specified, you can either manually define FCO lines or have the lines generated automatically.

Each FCO line represents one specific serialized item or one anonymous item in a cluster. The advantage of automatic generation is that ERP LN checks all related clusters, taking the active dates into account. You can use the **Generate FCO Lines (tssoc5210m000)** session to generate lines automatically for a range of FCOs, sold-to business partners, and clusters or <u>serial numbers</u>.

Generate Service Orders for FCO

You can generate <u>service orders</u> for field change orders (FCOs). The planned start time on the service order is the planned start date entered in the **Generate Service Orders for FCO (tssoc5220m000)** session. To determine the planned finish time on the service order, you add the sum of all reference activities' durations to the planned start time.

Functionality to generate Field Change Order

- The first time you define an FCO, the FCO receives the status Free.
- In the Field Change Orders (tssoc5100m000) session, you can define up to five activities for an FCO. When you generate a service order for an FCO, ERP LN generates a service order activity line for each of the FCO's activities.
- In the Field Change Orders (tssoc5100m000) session, you select the item code to which the FCO applies, and in the FCO Lines (tssoc5110m000) session you specify the serialized items (which must have this item code) on which the FCO's activities will be carried out.
- You can manually enter the serialized item(s) to which the FCO applies in the FCO Lines (tssoc5110m000) session. Alternatively, you can run the Generate FCO Lines (tssoc5210m000) session, in which ERP LN generates FCO lines for all serialized items derived from the item code entered on the FCO. The FCO's status changes from Free to Lines Generated when you create the FCO's first FCO lines.
- You can generate service orders for a range of FCOs using the Generate Service Order (tssoc5220m000) session. When you generate the first

service orders for an FCO, the FCO's status changes from Lines Generated to Execution.

- In the Service Order Parameters (tssoc0100m000) session, the <u>service type</u> selected determines the service type of service orders that you generate from FCOs. This service type also determines the service order's <u>coverage type</u>, so you can, therefore, define a <u>contract coverage</u> for FCOs.

- After all of an FCO's service orders are finished, in other words, if the status orders of the service items are either Closed or Canceled, the FCO's status can be Closed. You can then remove the FCO and its FCO lines from ERP LN.

Subcontracting

Often, one company does not deliver the entire offering of Service, as is the case of products. In some cases, the entire service of a product is subcontracted to a supplier. The customer still has the advantage of one main contractor as contact.

The following functionality handles activities carried out by a <u>subcontractor</u> in Service Order Control:

- A procedure is available that automatically generates a purchase order for subcontracting purposes. This procedure proceeds synchronously with the purchase procedure for materials that are acquired by purchase (see delivery type: By Purchase Order).

- The subcontractor who will carry out the activity, and the item that identifies the subcontracting in purchase, can be recorded for each activity.

- The purchase order is generated when subcontracting is defined as another cost line in the Service Order Estimated Other Costs (tssoc2140m000) session. The global SRP automatically generates the purchase order when additional purchase data is entered.

- The agreed period in which the subcontracting must be realized and can be recorded as an appointment under the activity.

Note

- You cannot include these time boundaries as purchase data.
- You can define subcontracting as <u>other requirement by planned activity</u>.
- If you only enter the item in the Item field and you leave the Buy-from B.P. field empty, a vendor rating/selection can be carried in Purchase Control.

Service order processing

Service orders are generated from the **Call Management** module, **Planning & Concepts** module, and Project. However, you can also create service orders manually. If required, you can create the service order from a quotation. Another way to create a service order is to generate orders out of the FCO functionality. Service orders can be defined and processed on active PCS projects, or on already delivered PCS projects.

The service order can have several statuses throughout the order life cycle, ranging from Free to Closed. These statuses enable you to control the service order. Interruption is a sub-status that you can use for parts nonavailability or because the customer's asset is not available or any other reason.

The following statuses are available with the following meaning:

- **Free:** The order is currently not planned or scheduled. Everything can be changed.
- **Planned:** To enable Global SRP to plan the order, which means that the parts required be allocated to the warehouse or purchased. The activities are soft allocated to the preferred service engineers for a configuration.
- **Blocked:** The order is blocked for credit reasons; the financial department must investigate further.
- **Released:** When the order reaches this status, the order is ready to be executed. If intelligent scheduling is required, this can be achieved by service scheduler or by service scheduler assistant. Alternatively, if fixed (preferred) engineers are allotted to service orders, a batch process can be run to plainly release a service order. In any case, this step would release warehouse material, if stock is available, and enables you to start execution of the orders. Emergency calls can be transferred to service orders in Released status directly.
- **Interrupted:** For some reason, the order cannot be carried out, for example, hold for parts or asset not available, which is a sub-status in status Released.
- **Ready (or Completed).** The job is finished, material used, hours used, and so on, and can be entered in ERP LN.
- **Costed:** All costs and expenses are booked to the service order, the auditor can check the order. Contractual obligations and warranty obligations are checked to calculate the invoice price. This also means that costs are properly booked and the invoices for these service orders can be sent.
- **Closed:** The invoice process is also carried out, which means that the order is entirely processed and, therefore, can be closed and deleted. However, before orders can be closed the reconciliation processes in Financials must be carried out.
- **History:** Orders that are costed can be posted to history.

The steps to carry out also depend on the service procedures that were selected. If, for example, the Preventive Maintenance for Plant (Internal) Maintenance service procedure is selected, no invoice is created but Service costs are booked.

If a warranty is valid for an asset, either no invoice is made or discounts are offered based on the agreements, but possibly a more detailed report about the problem will be required from the engineer. Repair warranty can be made applicable based on the company policies or based on a selection by you by means of a Service type. Repair warranty offers 100 percent coverage.

Service resource planning

In the first stage, at the global service resource planning of the service order, materials are allocated to the selected warehouse or purchase orders are entered. In addition, the preferred engineers are soft allocated for the orders that must be carried out. In the second stage, the SRP or the batch process, the service orders are released if engineers are already allocated to the orders.

To schedule and release a service order more logically, you can use tools such as SSA ERP Service Scheduler 2.3 or SSA ERP Service Scheduler Assistant 1.2 constraints such as skills, availability, locations, and so on. These tools feature various planning constraints to use the engineers most efficiently and have high visibility of field service activities.

You can create a service order from the service quotation.

The following planning constraints and resource checks can be valid for the whole planning cycle. Bear in mind that you define the plan bucket yourself.

- **Area or service center:** The service engineer can be responsible for an area.
- **Combine service activities:** The service activities carried out on one configuration and/or location can be combined to work more efficiently, especially with calls.
- **Response time:** The response time agreed in the contract, warranty, service order, or call to fix the problem.
- **Skills engineer:** Without the right skills, the engineer may not be able to fix the problem.
- **Locations/sites:** Service activities can apply to a whole location/site.
- **Calendar functionality:** To check the working hours of an engineer or work center.
- **Appointment confirmations:** In the Call Management and Maintenance Planning Concepts modules, you can make appointments with the customer.

- **Preferred engineers:** An engineer linked to a customer asset is responsible in the first place, second place, and third place. For scheduling, these engineers must be checked first.
- **Overtime:** Overtime allowed for an engineer is another check that can be done.
- **Available parts:** Without available parts concerning the service order that must be carried out, you cannot reach a high first time fix rate. If the right part is not available, an alternative part can be delivered.
- **Service kit allocation:** To carry out a service order, sometimes a service kit is required and, therefore, must be planned and allocated.
- **Asset calendar:** A calendar in which the availability of an asset can be checked, for example, machines for plant maintenance or customer assets.
- **Planned maintenance:** The machines must be available (no usage is planned).

Service Order Costing

All actual costs, such as material labor, tools used, and travel costs, can be registered. Declarations, hotel expenses, and so on can also be related to a service order. Expenses such as hotel invoices are first paid by the Accounts Payable module (Financials) and can be charged to the service order. Subcontracting costs can also be charged to a service order.

Hours spent on general issues such as car replenishment, car maintenance, collection of parts, personal problems, such as doctor's visit and so on, can also be reported.

The costs can also be entered in the remote service application such as Mobile Service. For possible invoicing, which depends on the contract or warranty agreed, you can transfer the costs by remote access to Service from the field directly.

Order costs/amounts can be covered by any applicable/valid agreements, such as service contracts, warranty, repair warranty, service order quotations, or FCO based on the applicable discounts in each case.

The user can have a visibility into the gross margin or net margin per order, and take actions based on the perceived profitability of the order. Online margin control also makes it possible to get a quick overview of the costs on the service orders.

Service Order Invoicing

The invoice process is triggered when you set the order or activity status to Costed. The cost lines that underlie the order or the activity are sent to Central Invoicing, from where further processing is carried out to send the invoices to the customer sites.

Depending on the case at hand, an order can be costed at once, costed at an activity level, or each cost line can be costed individually. Taxes applicable for each country are applied at the time of invoicing.

The invoice from a contract (installments) or an invoice from a maintenance sales order can be combined with a service order, into a collect invoice to prevent a bureaucratic burden in the financial department. In the background, the ledger accounts in Financials are updated. The order information is held until the financial reconciliation is carried out.

Failure Analysis

Failure Analysis explains about gathering up-to-date data related to confirmed failures, providing failure reports at right points, the results of a selected analysis, and providing primary or preliminary causes of failures in various instances. An assumption is made here that the report would be as good as the data captured, so if the data gathered were inaccurate the report on failure analysis also would be inaccurate.

You can use Service Resolution - Failure Analysis (tsclm3170m000) session to register failure on a material line on any of the following order:

- Service order – material lines
- Maintenance sales order – Part delivery/receipt lines
- Work order – material resource lines

You can use Service Resolution History - Failure Analysis (tsclm4100m000) session to view total failure history in an Organization.

You can use Consolidated Failure Analysis (tsclm4110m000) session to view the failure data of both active and history failure analysis data.

Integration of Project with Service

To handle service requirements of a completed project and of projects in progress, **Project** is integrated with **Service**.

Handling service requirements of completed projects involves providing service to a part or the entire project, as per the contract. This is made possible by transferring the project structure and the materials consumed in the project to **Service**.You can copy the activity or the element structure and the material cost lines of the actual consumed material items, to Service so that these items become part of the physical breakdown structure. This enables identifying the items that need service and maintenance.

To handle service requirements of projects in progress, you can generate service orders for the project, in **Project**. The cost incurred for the service performed, is transferred from **Service** to **Project**. To generate service orders, the reference activity from Service is linked to the activity or element labor budget lines in Projects.

When the service order is set to Costed in **Service**, the cost is transferred to **Project** and is aggregated as labor cost. You cannot close a project with outstanding service orders or if all the service orders linked to the project are not costed.

Repair Warranty

When a **Service Order Control** or **Maintenance Sales Order Control** are generated/created from bad fix calls, manual service orders, or planned activities, based on the service type parameter set, **SSA ERP** covers the Order under Repair Warranty. The service type that is defaulted to the service-order activity line or the Part maintenance line is the service Type repair warranty. The service type repair warranty is defined in Service Order Parameters (tssoc0100m000) session or in the Maintenance Sales Control Parameters (tsmsc0100m000) session.

If the service type on the Part Maintenance line is equal to the one defined in the **Maintenance Sales Order Parameters (tssoc0100m000)** session for Repair Warranty, the pricing method on the Maintenance Sales Order Line (tsmsc1110m000) session is automatically set to Repair Warranty, indicating that Repair warranty coverage is applicable for the Part Maintenance line. You can modify (other than Repair warranty) the pricing method, by changing the Service type, which is not equal to the one that is defined in **Maintenance Sales Order Parameters (tssoc0100m000)** session for Repair Warranty, which in turn means that repair warranty coverage is not applicable.

When a new **Service Order Activity** is created **SSA ERP** checks, if there are any previous activity undertaken either in Service Order Control or to Maintenance Sales Order Control within the Repair Warranty duration specified under the serialized item. **SSA ERP** defaults the service type meant for repair Warranty (SOC) into the new Activity. If the parameter Service type for repair warranty is empty, **SSA ERP** leaves the Service Type empty and Repair Warranty is not applied for this activity.

When a new Maintenance Sales Order Control line (Part maintenance) is created **SSA ERP** checks, if they fall with in the repair warranty duration defined in Serialized Items (tscfg2100m000) session. **SSA ERP** defaults the pricing method as Repair Warranty. **SSA ERP** defaults the Service Type meant for repair warranty (MSC) into the maintenance sales order lines. If this parameter is not present, **SSA ERP** leaves the Service Type empty and Repair Warranty is not applied.

Note

The automatic repair warranty service type is applied when the Serialized item on which the service orders activity or the Part Maintenance line is within the Repair warranty duration mentioned in the serialized item.

Repair warranty is applicable only for part maintenance line in Maintenance Sales Order.

The financial transaction for Repair Warranty is included as Repair Warranty Costs in service order or a maintenance sales order as the Transaction Origin.

When an Invoice Report is printed in Central Invoicing, this Repair Warranty Coverage amount is printed along with other coverages.

Coverage procedure

Use the following sessions to register and modify the costs incurred during the execution of a service order:

- Service Order Estimated Material Costs (tssoc2120m000)
- Service Order Actual Material Costs (tssoc2121m000)
- Service Order Estimated Labor Costs (tssoc2130m000)
- Service Orders Actual Labor Costs (tssoc2131m000)
- Service Order Estimated Other Costs (tssoc2140m000)
- Service Order Actual Other Costs (tssoc2141m000)

These cost lines specify the used materials, labor, and other costs during the execution of a service-order activity. If you define the estimated cost data in the Service Order Estimated Material Costs (tssoc2120m000) session, ERP LN automatically defines the actual cost data in the Service Order Actual Material Costs (tssoc2121m000) session.

ERP LN displays the specified item's inventory data in the Service Order Estimated Material Costs (tssoc2120m000) session and the Service Order Actual Material Costs (tssoc2121m000) session.

Coverage actual costs

The Coverage tab of the actual costs sessions indicates how the cost line is financially covered. After you enter or change the Total Sales Amount field on an actual cost line, ERP LN automatically determines the coverage. You can always manually change the coverage.

Coverage amounts determined by ERP LN:

- service contract
- warranty
- service-order quotation
- field change order (FCO)
- Service-order invoicing

User-defined coverage amounts:

- Other costs

Note

ERP LN determines the coverage for the registered costs in the following sequence:

1. Warranty
2. Service contract
3. Service-order invoicing

Change coverage manually

If the cost line is not financially approved, you can manually change the coverage. There is no coverage if you clear the check boxes for the coverage of service contracts, service-order quotations and warranties. These check boxes are selected by default. If you change one of these check boxes, the coverage that is stored in the sales amount fields is zero. In this case, ERP LN transfers the sales amount to another coverage amount. You can manually change the following fields:

- **Others**
- **Invoice Sales Amount**

Until the cost line is financially approved, ERP LN handles the coverage as allocated costs and not as actual spent costs. For this reason, you can manually change the coverage for service contracts, service-order quotations and warranties.

Cost amounts

ERP LN determines the cost amounts for the coverage, which the user cannot maintain. The cost amount fields are necessary because the cost amounts are

posted to Financials. If you manually change the sales coverage, ERP LN calculates the cost amounts in a similar and proportional way.

Warranty

The warranty becomes active if it is related to a serialized item for which the activity must be carried out. In the Configuration Control module you can link the warranty to the serialized item. If no warranty is related to the given serialized item, ERP LN checks if a warranty is related to a parent serialized item. If a warranty is valid for the serialized item, ERP LN determines which part of the Total Sales Amount is covered by warranty terms. The amount covered by warranty is stored in the Warranty field. If the total sales amount is not fully covered by warranty, ERP LN checks if service contract coverage applies.

Service contract

If an active service contract is linked to the cluster on the service-order header, ERP LN uses data stored in the Contract Management module to determine the sales amount that is covered by the service contract. This amount is stored in the Contract field.

Service-order quotation

You can generate a service order from a service-order quotation. The service-order quotation number is stored in the service-order header. ERP LN uses the procedure for service order invoicing to invoice the fixed amounts that are agreed for the service-order quotation. For this reason, ERP LN creates a special activity when you generate the service order. This activity has no meaning for the normal order procedure. To exclude this activity from the order procedure, the activity status becomes Completed. The service-order quotation amounts that are agreed with the customer and that are defined by cost type, are copied to actual cost lines and stored as amounts to be invoiced (in the **Invoice Sales Amount** field). When you register the actual costs for the service order, ERP LN automatically checks for each actual cost line if:

- The entire actual sales amount is covered by the service-order quotation.
- The sales amount must be entirely or partly invoiced because the service-order quotation does not cover the amount.

Field change order

If a service order is generated from a field change order, the field change order number is stored in the service order header. The actual costs that are registered for the service order are financially covered by a special budget for field change orders. The entire actual sales amount is stored in the **Sales Amount Field Change Orders** field.

Other

In the Others field you can enter a coverage amount that the customer is exempt from paying, which cannot be classed as one of the predefined coverage categories:

- Warranty
- Service contract
- Quotation
- FCO

Note

If you enter a negative value in this field, the value is added to the invoice amount. This enables you to charge a customer for a field change order.

Service-order invoicing

ERP LN stores the sales amount that is not covered by the warranty or the service contract in the **Invoice Sales Amount** field, if the service procedure for the service type that is related to the service-order activity is:

- External Problem
- External Maintenance
- Tools Maintenance

For all the other service procedures, ERP LN stores the sales amount in the **Others** field.

Location

A physically recognizable area in a maintenance shop, a service department or a work center where parts are temporarily stored. You can also use a location to store parts that belong to a specific work order.

A location can be, for example:

- A floor of a service department or work center that is subdivided by means of a coordinate system
- A shelf or a part of a shelf in a cupboard

Shop location and work order location

You can use a shop location and a work order location to store the following:

- Incoming parts that are waiting to be processed
- Parts that must be delivered after they are processed
- Parts that are waiting to be processed in a specific work center

- Parts that are processed in a work center, and that must be delivered to another work center

The locations in a shop or work center are identified by the service department to which they belong.

Locations for Follow-up work orders

A location that is used for a follow-up work order is a temporary delivery location for dissasembled parts that are processed separately and subsequently must be assembled.

If all dissasembled parts are stored in one location, the default work order location is used. This is the delivery location on the initial work order. If one or more disassembled parts are stored in a different location, a follow-up work order is defined for each part. The delivery location of the initial work order is then used as the default delivery location for all related follow-up orders.

Follow-up work order are generated from the material resource lines of the initial work order. The delivery type of this work order material resource line is Delivery to Follow-up Work Order. At the same time, a work order material resource line is added to a selected assembly activity that has the Delivery from Follow-up Work Order delivery type.

Alternative Item

Alternative items serve as a substitute for the standard item when the standard item cannot be delivered or is being replaced. If several items can be substituted for a standard item, you can assign a priority code to each alternative item.

You can specify alternative items for the components in an item breakdown under different parent items. You can select the correct alternative item based on the parent item

When you delete an item breakdown relation then the corresponding alternative items are also deleted. When there is a change in the item breakdown then the corresponding item in the alternative items must be updated.

ATP

An item master plan contains ATP (ATP) information. You can use the ATP information to determine the quantity available and to support order acceptance.

You can use the information to :

- Determine the availability of the stock of the spare part.

■ Identify warehouse in which it is available

■ Determine the date when the spare part can be promised to determine the service execution dates and service delivery dates.

Impact of ATP Date

When an ATP check is performed successfully there is an impact of the ATP date on Earliest Start Time(EST), Planned Start Time(PST) , Planned Finish Time(PFT), Latest Finish Time (LFT) and Planned Delivery Date(PDD).

The below table displays the Earliest Start Time(EST), Planned Start Time(PST) , Planned Finish Time(PFT), Latest Finish Time (LFT) and Planned Delivery Date(PDD), when the ATP check is not performed:

EST	PST	PDD	PFT	LFT
5-Apr-07	7-Apr-07	7-Apr-07	10-Apr-07	11-Apr-07

When the ATP check is performed and in case the ATP Date is greater than the Planned Delivery Date then following is the impact of the ATP date:

■ The EST date is reset to the ATP date.

■ The LFT date increases by the same number of days as the difference between the EST and the new EST as shown in the table below:

ATP Date	EST	New EST	PST	New PST	PDD	New PDD	PFT	New PFT	LFT	New LFT
8-Apr-07	5-Apr-07	8-Apr-07	7-Apr-07	8-Apr-07	7-Apr-07	8-Apr-07	10-Apr-07	9-Apr-07	11-Apr-07	14-Apr-07

When the ATP check is performed and ATP is greater than PDD and the new EST is greater than PST date then following is the impact :

■ The EST date is reset to the ATP date.

■ The PST date is reset to the ATP date.

■ The PDD also reset to the ATP date.

■ The PFT date increases by the same number of days as the difference between the PST and the new PST.

■ The LFT date increases by the same number of days as the difference between the EST and the new EST as shown in the table below:

ATP Date	EST	New EST	PST	New PST	PDD	New PDD	PFT	New PFT	LFT	New LFT
8-Apr-07	5-Apr-07	8-Apr-07	7-Apr-07	8-Apr-07	7-Apr-07	8-Apr-07	10-Apr-07	11-Apr-07	11-Apr-07	14-Apr-07

Note

The delivery date on the Maintenance Sales Order line is updated with the ATP date when an ATP check is performed successfully.

Chapter 4
Master Data Setup

4

This chapter describes the steps you must follow to set up master data for Field Service module.

Master Data Setup (PM)

Before you start to use the Preventive Maintenance (Service Planning and Concepts) module, you must set up or check some static data. This process includes checking planning parameters, defining measurement types, and defining activity groups.

Planning and Concepts setup sessions

Enter the Planning and Concepts data in the following sessions:

- Set planning parameters in the **Service Planning and Concepts Parameters (tsspc0100m000)** session.
- Define units of measure in the **Measurement Units (tsmdm0160m000)** session.
- Define measurement types in the **Measurements (tsmdm0165m000)** session.
- Define activity groups in the **Activity Groups (tsacm0110m000)** session.
- Define usage classes in the **Usage Classes (tsspc0130m000)** session.

The following sections describe each of these sessions.

Service Planning and Concepts Parameters (tsspc0100m000)

Use the **Service Planning and Concepts Parameters (tsspc0100m000)** session to check the default settings, because the time units are used in Planning and Concepts (SPC). If you intend to use counter-value maintenance or condition-based maintenance, make sure the **Use Measurements** check box is selected. If this check box is not selected, only usage maintenance is valid.

Note

- ■ Determine the time units that are appropriate to your planning requirements
- ■ Make sure that the required time units and their conversions are entered into the logistic tables of ERP LN Common Data.

Measurement Units (tsmdm0160m000)

Use the session to define units of measurement that counters can use to plan maintenance activity.

Note

Before you enter data in this session, check if the required units exist in the logistic tables of Common Data. You can add units that are not present in the **Units (tcmcs0101m000)** session. You cannot define any conversions for units that you add.

Measurements (tsmdm0165m000)

The counter value and the condition-based maintenance policies depend on the use of measurement types. Measurement types define the way in which a measurement is carried out. Characteristics used to define a measurement type include:

- ■ An independent variable.
- ■ A dependent variable.
- ■ A norm value.

Example

> The copier needs service at 15,000 copies, and you must estimate the time (independent variable) before a copier reaches that 15,000 level (dependent variable). If you link a measurement type to an item, the measurement type specifies that counter value maintenance must be performed. If you link a measurement type to a reference activity, you will perform periodic inspection maintenance.

Activity Groups (tsacm0110m000)

> Use this session to define activity groups. Reference activities that are similar can be assigned to a common group. Assigning activities enables you to plan for the activity group rather than including multiple single activities in a maintenance plan.

Usage Classes (tsspc0130m000)

> A usage class is a categorization of usage based on environmental factors. You can use usage classes to define more than one maintenance concept for an object or a model.

Example

> The usage class of a truck can be national or international. The required maintenance for national use will be different than for international use.

Master Data Setup (SOC)

> Before you start to use the **Service Order Control (SOC)** model, you must set up or check some static data. This includes checking service order parameters, defining <u>reference activity</u>, <u>activity group</u> and <u>checklist</u>.

Service Order Control setup sessions

> Enter the Service Order Control data in the following sessions:
>
> - Set parameters in the **Service Order Parameters (tssoc0100m000)** session.
> - Define reference activities in the **Reference Activities (tsacm1101m000)** session.
> - Define activity groups in the **Activity Groups (tsacm0110m000)** session.
> - Define checklists in the **Checklists (tsmdm0140m000)** session.

Service Order Parameters

Use the **Service Order Parameters (tssoc0100m000)** session to define Service Order Control (SOC) settings.

General tab

The number group for service orders and service quotations. This number group defines the available series numbers that can be used. You can also activate gross margin control, and set upper and lower margins based on cost of sales or sales.

Orders tab

The number group for service orders and service quotations. This number group defines the available series numbers that can be used. In addition to defining number groups for service orders and service-order quotations, you can define number groups for costing sheets and field change orders. You can set up the default service type and cost component that are used, when calls are transferred to service orders.

Blocking tab

You can set parameters for service order blocking and signaling. If the associated check boxes are selected, ERP LN carries out the blocking functionality when the order status changes to Planned or Released. The blocking functionality is also carried out each time a new service order is created. You can set blocking and signaling parameters for any of the following conditions:

Costing tab

The Costing tab enables you to define what costs your organization uses, the cost component that is used for capturing those costs, and the default used by hours accounting when dealing with travel time. The Generate Return Deliveries area is used to handle goods that were issued to the service order, but were not consumed. Service generates return deliveries based on the delivery types selected.

Reference Activity

Use the **Reference Activities (tsacm1101m000)** session to define reference activities. Reference activities are defined in a library of activities, and can be linked to service orders, either manually or by means of maintenance concepts. If you define reference activities, you can link material, labor, and other requirements used during execution of the activity. When the activity is linked to a service order, defaults such as the reference activities' material and labor, are loaded on the service order. In addition, you can enter the cluster and serialized item to which the activity applies.

Activity Groups

Use **Activity Groups (tsacm0110m000)** session to maintain reference activity groups. You can use reference activity groups to select reference activities in printing or processing sessions.

Checklists

Use **Checklists (tsmdm0140m000)** session to define checklists. You can define a checklist for service engineers to make certain that all required maintenance activities are carried out. The checklist contains questions that must be answered by the service engineer. The checklist can be printed with the service order and be used for additional supporting documents. The checklist serves as a paper document that can be used to hold information about the activity performed. Checklists can be linked to a maintenance activity, or manually entered onto the service order.

Chapter 5
Field Service Procedures

5

This chapter describes the field service procedures.

To specify maintenance concepts

Maintenance concepts are <u>item</u>-specific reference activities, or predicted activities that are linked to an item. To do this, specify for each item which <u>reference activities</u> are required, and the number of times these activities must be carried out. You can specify the <u>requirements</u> for each reference activity.

You can define maintenance concepts in the following sessions:
- Maintenance Concepts - Item (tsspc1120m000)
- Maintenance Concept - Predicted Activities (tsspc1125m000)

If you define a <u>maintenance concept</u>, you can make use of the functionality offered by the multilevel serialized item structure. If, for example, a maintenance activity is required for several products of one product family, the product family can be included in the serialized item structure. The family is included as a serialized item under which the common maintenance activities are defined.

The <u>usage class</u> enables you to define more than one maintenance concept for an item.

How to define a maintenance concept

Step 1: Reference Activities

You must define the reference activity, which is the basic element of a maintenance concept, in the **Reference Activities (tsacm1101m000)** session. You can use these reference activities to create a maintenance concept, a maintenance prediction, or a maintenance planning.

The reference activity always contains a service type. This service type has an important role when a maintenance plan must be defined. For more details about service types, refer to the Master Data Management (MDM) module procedure.

Step 2: Inspection Templates

If a measurement type is linked to a reference activity, the measurement type is called a measurement inspection. This measurement inspection must be performed as a part of the reference activity. When the measurement is carried out and norm values are exceeded, one or more activities must be performed. Therefore, the follow-up activity must be available to be inserted in the **Reference Activities - Measurement Types (tsacm3160m000)** session. A measurement is the value of a specific variable (measuring quantity) of an object in a specific situation.

Step 3: Maintenance Concepts - Item

Maintenance concept is a list of activities to be carried out on a anonymous item as a part of maintenance policy. The frequency at which, the activity has to be carried out is also specified. You can specify various maintenance concepts for the same anonymous item. To enable this, you can use the entity usage class.

Use the **Maintenance Concepts - Item (tsspc1120m000)** session to list the reference activities that constitute an item's maintenance concept. On the **Specific** menu, click **Generate Predictions** to start the **Generate Prediction (tsspc1225m000)** session, which you can use to generate a list of predicted activities for the item, based on the item's reference activities listed in this session. You can click **Resource Requirements** to start the **Reference Activity - Resource Requirements (tsacm2120m000)** session, which you can use to view the list of resource requirement for the particular reference activity.

```
                                              +-----------+
                                              | Measuring |
                                              | quantity  |
                                              +-----+-----+
                                                    |
    +-----------+  +-----------+  +-----------+  +-----+-----+
    | Activity  |  |   Skill   |  | Coverage  |  | Measurement |
    | group     |  |           |  |   type    |  | type        |
    +-----+-----+  +-----+-----+  +-----+-----+  +-----+-----+
          |              |        +-->---+ +---<--+       |
          +---------->---------+   |  |  | +--------<--------+
                              |    |  |  |  |
                          ++--+--+--+--++
                          | Reference   |
                          | activity    |
                          +-----+---+---+
                                |               +-------------+
                                +----------->|Material     |
                                |               |requirement  |
                                |               +-------------+
    +---------+  +-------+       |               +-------------+
    |Serialzd.|  | Usage |      |               +----------->|Labor        |
    | item    |  | class |      |               |requirement  |
    ++-+-+-+-++  +--+--+-+       |               +-------------+
     | | |  |       |           |               +-------------+
     | | |  +-------->-------+   |  +----------->|Other        |
     | | |                   |   |  |           |requirement  |
     | | |                   |   |  |           +-------------+
    ++-+--+---+    ++-+-+-----+
    |Physical |    | Reference |
    |breakdown|    | activity  |
    +---------+    | by item   |
                   +-----+-----+
                         |
                   +-----+-----+
                   | Maintenance |
                   | prediction  |
                   +-----+-----+
```
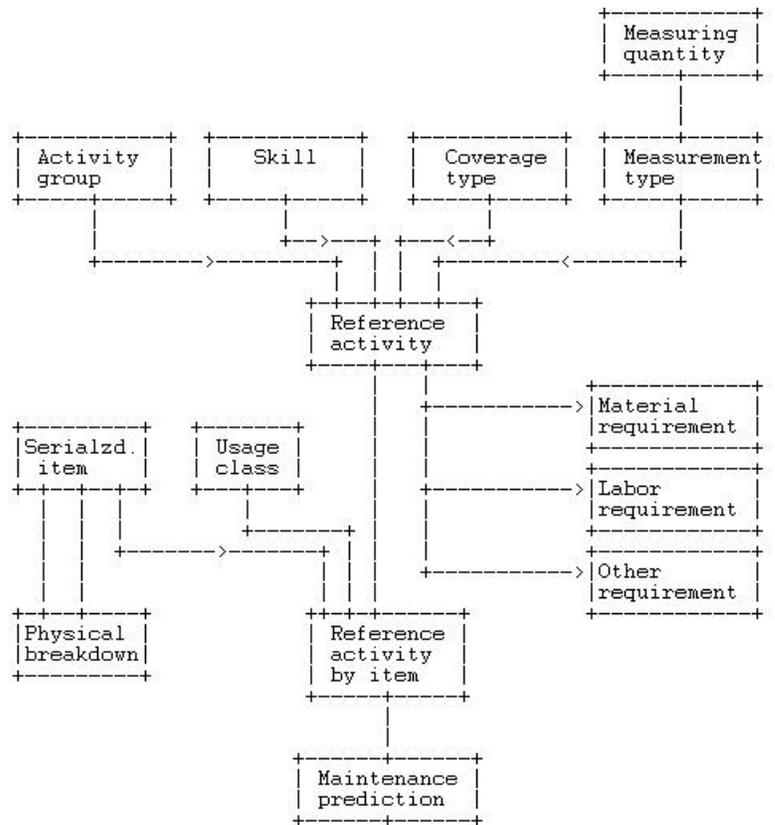
Data Diagram Maintenance Concepts

To generate maintenance prediction

Maintenance prediction is a forecast and activities that must run during the maintenance cycle, along with the relative moments. When prediction is carried out for a anonymous item, the entire service BOM for that anonymous item is taken into account. Activities are predicted for all underlying anonymous items.

You can create a maintenance prediction in the following ways:

- Manually in the Maintenance Concept - Predicted Activities (tsspc1125m000) session.
- Automatically in the Generate Prediction (tsspc1225m000) session. The prediction is made for one year. The results can appear in the Maintenance Concept - Predicted Activities (tsspc1125m000) session.

How to generate maintenance prediction

Step 1: Define item data

Use the Items - Service (tsmdm2100m000) session to define default service values for items. You must define information such as measurements, life cycle, and maintenance cycle.

Step 2: Define bill of material

Define the bill of material in the Item Breakdowns (tscfg1110m000) session.

Step 3: Reference Activities

You must define the reference activity, which is the basic element of a maintenance concept, in the **Reference Activities (tsacm1101m000)** session. You can use these reference activities to create a maintenance concept, a maintenance prediction, or a maintenance planning.

The reference activity always contains a service type. This service type has an important role when a maintenance plan must be defined. For more details about service types, refer to the Master Data Management (MDM) module procedure.

Step 4: Inspection Templates

If a measurement type is linked to a reference activity, the measurement type is called a measurement inspection. This measurement inspection must be performed as a part of the reference activity. When you perform the measurement and norm values are exceeded, you must perform one or more activities. Therefore, the follow-up activity must be available to be inserted in the **Reference Activities - Measurement Types (tsacm3160m000)** session. A measurement is the value of a specific variable (measuring quantity) of an object in a specific situation.

Step 5: Maintenance Concepts - Item

A maintenance concept is a list of activities to be carried out on a anonymous item as a part of maintenance policy. The frequency at which, the activity must be carried out is also specified. You can specify various maintenance concepts for the same anonymous item. To enable this, you can use the entity usage class.

Use **Maintenance Concepts - Item (tsspc1120m000)** session to list the reference activities that constitute an item's maintenance concept.

Step 6: Generate Prediction

On the Item Breakdowns (tscfg1110m000) menu in the **Maintenance Concepts - Item (tsspc1120m000)** session, click Item Breakdowns (tscfg1110m000) to start the **Generate Prediction (tsspc1225m000)** session, which enables you to generate a list of predicted activities for the item, based on the item's reference activities listed in this session. You can click **Resource Requirements** to start the **Reference Activity - Resource Requirements (tsacm2120m000)** session, which you can use to view the list of resource requirement for the particular reference activity.

Step 7: Maintenance Concept - Predicted Activities

Use the **Maintenance Concept - Predicted Activities (tsspc1125m000)** session to view the list of activities predicted for the preventive maintenance of an item. The item's predicted activities are either generated in the **Generate Maintenance Plan (tsspc2200m000)** session, based on the reference activities listed in the item's maintenance concept, or are entered manually in this session.

To generate maintenance planning

Use the Generate Maintenance Plan (tsspc2200m000) session to generate maintenance planning. You can plan maintenance activity for the cluster and serialized item that the service organization manages. You can schedule and display the activities in the Planned Activities (tsspc2100m000) session. The maintenance planning provides the maintenance activities that must be carried out in the long term.

The operational planning of the maintenance activities is based on the service order planning. All the operational (service) activities are carried out by means of service orders.

The maintenance concepts are copied to the planned activities.

How to generate maintenance planning

Step 1: Service contract

If any service contract is active for the cluster, the planning is not generated for that cluster.

Step 2: Serialized items

Select all top serialized items that are active during the specified **Date-From** and **Date-To** period. If the **Date-From** is earlier than the start date of the top serialized item, the **Date-From** becomes the start date. If the end date

of the top serialized item is later than the **Date-To**, the **Date-To** becomes the end date.

Step 3: Planned Activities

The planned activities are generated for the serialized items that are valid between these two dates. ERP LN also generates the planned activities for the child serialized items that are related to the top serialized item. The child serialized items must also be valid.

Step 4: Usage Class

The usage class that you must use when planned activities are generated is selected in the following order:

1. The usage class of the serialized item
2. The usage class of the first parent serialized item
3. The usage class of the cluster
4. The usage class

Step 5: Predicted Activities

ERP LN first checks whether predicted activity are present for the item of the serialized item in the Maintenance Concept - Predicted Activities (tsspc1125m000) session. If present, the child serialized items of this serialized item are no longer traversed and the predictions are copied to planned activities.

Step 6: Reference Activities

If no predicted activities are present, ERP LN checks if reference activities linked to the item in the Maintenance Concepts - Item (tsspc1120m000) session are present. If present, the reference activities are used to generate the planned activities.

Step 7: Maintenance Cycle

The maintenance planning can be carried out in three different ways, based on the start of the maintenance cycle:

- **Start Date of Serialized Item**: The start date of the maintenance cycle is equal to the start date of the serialized item.
- **Time from in Selection Range**: The maintenance cycle starts on the Date-From that the planned activities will be generated.
- **1st of January**: The maintenance cycle starts on the first of January.

The relative movements are transferred into the actual dates based on the value of the **Maintenance Cycle** field in the Items - Service (tsmdm2100m000) session.

After receiving the start date, the first workable date receives the actual planned start date. The activity duration is added to this date to determine the end date. If the activity is derived from a prediction, and the prediction has the child item specified, the corresponding serialized item is found by traversing the tree below it. If more than one serialized item derived from the same item is found, the prediction is ignored.

To find the first workable date and plan forward, the search path for calendars is:

■   The calendar of the serialized item.
■   The calendar of the service department that is linked to the cluster.

Earliest start time =

$$\frac{\text{planned start time + planned end time}}{2} - \text{tolerance period} * 0.5,$$

For each planned activity that is generated, the requirement lines are copied from the Reference Activity - Resource Requirements (tsacm2120m000) session to one of the following sessions:

■   Planned Activity - Material Requirements (tsspc2110m000)
■   Planned Activity - Labor Requirements (tsspc2111m000)
■   Planned Activity - Other Requirements (tsspc2112m000)

Process Report: List of planned activities generated.

Error Report: List of errors.

Defaults:

■   The **Date From** is the current date.
■   The **Date To** is the current date + one year.

To transfer planned activities to service orders

Use this process to create planned activities and transfer the planned activities to service order.

How to generate planned activities and transfer planned activities to service order

Step 1: Define Maintenance Concept

Use the **Maintenance Concepts - Item (tsspc1120m000)** session to list the reference activity that constitute an item's maintenance concept. On the **Specific** menu, you can click **Generate Predictions** to start the **Generate Prediction (tsspc1225m000)** session, which you can use to generate a list of predicted activities for the item, based on the item's reference activities listed in this session. You can click **Resource Requirements** to start the **Reference Activity - Resource Requirements (tsacm2120m000)** session, which you can use to view the list of resource requirement for the particular reference activity.

Step 2: Generate Predictions

Use the **Generate Prediction (tsspc1225m000)** session to generate a maintenance prediction for a range of items based on the reference activities listed for the items in the **Maintenance Concepts - Item (tsspc1120m000)** session.

Step 3: Generate Planning

Use the **Generate Maintenance Plan (tsspc2200m000)** session to generate maintenance planning for a range of cluster.

Step 4: Transfer Planning to Service Order

To run the planned maintenance activity, you must make a service order from the activity. To transfer planned activities to a service order, you can use the Transfer Maintenance Plan to Service Order (tsspc2220m000) session.

The planned activities must meet the following conditions:
- The Service Order field must be empty.
- The status of the planned activity must be Released or Final.
- The Planned Start Time must be in the specified range.

If a service order is generated:
- The activities and requirements are automatically copied to the service order.
- The status of the planned activity is updated to Final. The Service Order field and the Activity Line Number field are filled for the planned activity.

Abbreviation	Description
Act	Activities
ESO	By Existing Service Orders
AG	By Activity Group
Loc	By Location
Tdm	In Tandem
DST	By Different Start Time

Legend

	Act	ESO	AG	Loc	Tdm	DST	Description and Order Duration
1	Yes	No	No	No	No	No	All the planned activities that have the same planned start time are grouped into one service order. Equal to the longest duration of all the activities.
2	Yes	Yes	No	No	No	No	Activities are not grouped among themselves, but each activity, when transferred to a service order, are checked against the existing service orders on particular conditions, such as department, business partner, location, planned start time, and so on, and are grouped under the same service order. Equal to the sum of all the activities duration.
3	Yes	No	Yes	No	No	No	All the planned activities that have the same reference activity group

							and te same planned start time are grouped into one service order. Equal to the longest duration of all the activities.
4	Yes	No	No	No	No	Yes	For every planned activity, the remaining planned activities are checked to see if the activities fall within the time difference specified and are grouped accordingly with the first planned activity.
5	Yes	No	Yes	No	No	Yes	All the planned activities must have the same reference activity group and, for every planned activity, the remaining planned activities are checked to see if they fall within the time difference specified and are grouped accordingly with the first planned activity.
6	Yes	No	No	No	Yes	No	All the activities that have the same planned start time are grouped into a single service order. The next activities have their planned start time changed to the planned finish time of the previous activity. Equal to the sum of all the activities duration.
7	Yes	No	Yes	No	Yes	No	All the activities that have the same planned start time and reference activity group are grouped into one service order, but activities from the second one onwards have get their planned start time changed to the planned finish time of the previous activity. Equal to the sum of all the activities duration.

8	Yes	No	No	No	Yes	Yes	For every planned activity, the remaining planned activities are checked to see if the activities fall within the time difference specified and are grouped accordingly with the first planned activity, but activities from the second activity onwards have their planned start time changed to the planned finish time of the previous activity.
9	Yes	No	Yes	No	Yes	Yes	All the planned activities must have the same reference activity group and, for every planned activity, the remaining planned activities are checked to see if the activities fall within the time difference specified and are grouped accordingly with the first planned activity, but activities from the second activity onwards have their planned start time changed to the planned finish time of the previous activity.
10	Yes	No	No	Yes	No	No	All the planned activities that have the same planned start time and same location(either of the cluster or of the serialized item) are grouped into a single service order. Equal to the longest duration of all the activities.
11	Yes	No	Yes	Yes	No	No	All the planned activities that have the same planned start time and same location, either of the cluster or of the serialized item, and the same reference activity is grouped into a single service order. Equal to the longest duration of all the activities.

12	Yes	No	No	Yes	No	Yes	For every planned activity, the remaining planned activities are checked to see if the activities fall within the time difference specified and, if the activities belong to the same location, either of the cluster or of the serialized item, are grouped accordingly with the first planned activity.
13	Yes	No	Yes	Yes	No	Yes	Activities that have the same reference activity group, activities that belong to the same location, either of the cluster or of the serialized item, and for every planned activity, the remaining planned activities are checked to see if the activities fall within the time difference specified, and are then grouped accordingly with the first planned activity.
14	Yes	No	No	Yes	Yes	No	All the activities that have the same planned start time and the same location are grouped into a single service order, but the service order activities from the second activity onwards have their planned start time changed to planned finish time of the previous one. Equal to the sum of all the activities duration.
15	Yes	No	Yes	Yes	Yes	No	All the activities that have the same planned start time, same reference activity group, and same location are grouped into a single service order, but service order activities from the second activity onwards have their planned start time changed to the planned finish time of the previous activity.

						Equal to the sum of all the activities duration.
16	Yes	No	No	Yes	Yes	Yes	For every planned activity, the remaining activities are checked if the activities fall within the time difference specified (behind/beyond) and belong to the same location, and are grouped accordingly with the first planned activity, but service order activities from the second activity onwards have their planned start time changed to planned finish time of the previous activity.
17	Yes	No	Yes	Yes	Yes	Yes	For every planned activity, the remaining activities will be checked if the activities fall within the time difference specified (behind/beyond) and have the same reference activity group and run in the same location, the activities are grouped accordingly with the first planned activity, but service order activities from the second activity onwards have their planned start time changed to planned finish time of the previous one.

Grouping Planned Activities

> **Note**
>
> - To start the Transfer Maintenance Plan to Service Order (tsspc2220m000) session, you must define defaults for your login in the User Profiles (tsmdm1150m000) session.
> - If a <u>service contract</u> is linked to the planned activity by means of the cluster, and the contract is active for that cluster, a warning message appears.

To generate Field Change Order (FCO) and Field Change Order lines

Use this process to generate <u>field change order (FCO)</u>, add activities to the field change order and generate FCO lines manually or automatically.

How to generate Field Change Order and Lines

Step 1: Define Field Change Order

Use the **Field Change Orders (tssoc5100m000)** session to define field change order. The field change order (FCO) procedure is defined as a separate service procedure in the **Service Types (tsmdm0130m000)** session. Therefore, you can define <u>contract coverage</u> for FCOs. FCOs are intended for collective changes on <u>serialized item</u> in multiple clusters. For each FCO, you can define up to five activities. If service orders are generated for FCOs, ERP LN automatically generates a service order activity line for each of these activities. If you define the FCO, the FCO receives the status Free.

Step 2: Generate FCO Lines

After you create the FCO header, in which the anonymous item or <u>serialized item</u> and the related activities that you want to replace are specified, you can either manually define FCO object lines or have the lines generated automatically. Use the Generate FCO Lines (tssoc5210m000) session to generate <u>FCO lines</u> automatically for a range of:

- FCOs
- Sold-to business partners
- Clusters
- Business partner's serial numbers

You can specify the date on which serialized items must be active. You can also select if a process report or error report must be printed.

> **Note**
>
> - You can run this session more than once for the same FCO. For example, when you generate FCO lines for each sold-to business partner.
> - A line is only generated if the serialized item is not yet created for the FCO.
> - The sold-to business partner, on the line of the serialized item, is derived from the serialized item.
> - For internal maintenance, only the Cluster and Serial Number fields are filled on the FCO line.
> - If the lines are generated, the status of the FCO is set to Lines Generated. If you run the session more than once, the status remains Lines Generated.

> ■ FCO lines are also generated for independent serialized items, that is, serialized items that do not belong to clusters.

Use the **FCO Lines (tssoc5110m000)** session to generate FCO lines manually.

Preliminary conditions to generate FCO lines for serialized items

ERP LN generates FCO lines for serialized item if following conditions are met:

- The serialized item is part of a cluster as a line in the Cluster - Lines (tsbsc1110m000) session:
    - If the <u>cluster lines</u> status is Installed and the status time is equal to or later than the Active From date entered in the Generate FCO Lines (tssoc5210m000) session.
- The serialized item is part of a cluster but not as a line in the Cluster - Lines (tsbsc1110m000) session:
    - The serialized item is present as a child item in the Physical Breakdowns (tscfg2110m000) session.
    - In the Physical Breakdowns (tscfg2110m000) session, the child item status is Installed and the status time is equal to or later than the Active From entered in the Generate FCO Lines (tssoc5210m000) session
- Independent serialized items:
    - The Include Independent Serialized Items check box is selected.
    - The serialized item status is Active in the Serialized Items (tscfg2100m000) session

Preliminary conditions to generate FCO lines for items

ERP LN generates FCO lines for item if following conditions are met:

- In the Items - Service (tsmdm2100m000) session, the value of the Configuration Controlled field for the item must be Anonymous or Not Applicable.
- The item is part of a cluster as a line in the Cluster - Lines (tsbsc1110m000) session:
    - If the cluster line status is Installed and the status time is equal to or later than the Active From date entered in the Generate FCO Lines (tssoc5210m000) session.
- The item is present as a child item in the Physical Breakdowns (tscfg2110m000) session:
    - In the Physical Breakdowns (tscfg2110m000) session, the child item status is Installed and the status time is equal to, or later than, the Active From entered in the Generate FCO Lines (tssoc5210m000) session.

To generate service orders for FCOs

Use this process to generate <u>service order</u> for <u>field change order (FCO)</u>.

How to generate Service Order for Field Change Order

Use Generate Service Order (tssoc5220m000) session to generate a <u>service order</u> for a <u>field change order (FCO)</u>.

Step 1: Sold-to BP

Enter the range of sold-to business partners for which you want to generate service order.

Step 2: FCO

The FCO number for which service order is being generated appears.

Step 3: Line Number

Enter the FCO line number for which service order is generated.

Step 4: Cluster

Enter <u>cluster</u> for which service order is being generated.

Step 5: FCO Valid on

ERP LN displays the validity of the FCO header. If FCO orders fall between the Earliest Start Time and Latest Finish Time, these FCO Lines are selected to generate service orders.

Step 6: Use Parallel Planning of Activities

If this check box is selected, the service order activities are planned at the same time rather than one after the other.

Step 7: Click Generate

Click Generate to generate the service order.

Service Order

For each FCO line that meets your selection criteria, ERP LN generates a service order.

The generated service orders have the following attributes:

■ Status is Free.

■ Service Type is the value selected in the Service Order Parameters (tssoc0100m000) session.

■ Planned Start Time is the **Earliest Start Date** that you entered in the Field Change Orders (tssoc5100m000) session.

■ Planned Finish Time is the sum of all the FCOs reference activity durations added to the Planned Start Time.

■ Service department, is copied from the FCO.

■ Subcontractor for the service-order activity lines copied from the FCO.

■ Activity line data is copied from the FCOs reference activities. The number of service order activities generated for the service order equates to the number of reference activities listed for the FCO.

After you generate a service order from an FCO:

■ ERP LN fills the FCO line's Service Order field.

■ When you generate the first service orders for an FCO, the FCO's status changes from Lines Generated to Execution.

Note

ERP LN generates a service order for each serialized item.

To create service order quotations

Use this process to create service order quotations.

If price agreements are required only once, service-order quotation are used instead of service-contract quotations. You can easily amend the service-order quotation to optimize the agreements with the customer, which is the advantage of first creating a service-order quotation rather than creating a service order first.

How to create service order quotations

Step 1: Define Service Order Quotations

Use the Service Order Quotations (tssoc1100m000) session to create and maintain service order quotations. You can easily amend the service-order quotation to optimize the agreements with the customer. This functionality has the advantage of first creating a service order quotation instead of first creating a service order.

Step 2: Define the serialized item/activity lines

Use the Service Order Quotation Configuration Lines (tsctm1110m400) session to maintain the item, serialized item, and reference activity covered by the service-order quotation. ERP LN copies the reference activity's requirement lines, if defined, from the Service Planning & Concepts module to the service-order quotation's cost terms.

Step 3: Define additional coverage term

You can manually define additional coverage terms in:

- Service Order Quotation Traveling Terms (tsctm1130m400)
- Service Order Quotation Material Terms (tsctm1131m400)
- Service Order Quotation Labor Terms (tsctm1132m400)
- Service Order Quotation Other Terms (tsctm1136m400)

Step 4: Define coverage phase

Define the coverage phase in the Service Order Quotation Coverage Terms (tsctm1120m400) session for the cost terms.

Step 5: Define surcharge/discount terms

You can define the surcharges/discount terms in the Service Order Quotation Configuration Line Totals (tsctm1502m400) session. You can define surcharges/discounts for each service-order quotation, as well as for each coverage type, or both.

Step 6: Print service-order quotation document

Use the Print Service Order Quotation Documents (tssoc1400m000) session to print the service-order quotation documents after you enter all the coverage/cost terms, coverage phases, and surcharge/discount terms.

Step 7: Accept service order quotation

If the sold-to business partner has accepted the service order quotation, you can change the status to Accepted. To accept the service order quotation, open the Service Order Quotations (tssoc1100m000) session, and on the Specific menu, click Approval and, in the dialog box that appears, click **Accept**.

Step 8: Modify service order quotation

If the sold-to business partner wants to have some changes to the service-order quotation, to modify the quotation, you can change the service order quotation status to Free. To modify the service order quotation, start the Service Order

Quotations (tssoc1100m000) session and, on the Specific menu, click Correction and in the dialog box that opens, click Modify. You can now continue from Step 3 to amend the service-order quotation contents.

Step 9: Reject service order quotation

If the sold-to business partner rejects the service-order quotation, you can change the service order quotation status to Canceled to reject the quotation. To reject the service order quotation, start the Service Order Quotations (tssoc1100m000) session and, on the Specific menu, click **Approval...** and in the dialog box that appears, click **Accept**. You can now move the service-order quotation to history.

To process service-order quotations to service orders

Use this process to transfer an accepted <u>service-order quotation</u> to a service order.

If the business partner accepts the service order quotation, you can use the Process to Service Orders (tssoc1200m000) session to transfer the service order. You can select a range of quotations to be processed to a service order.

Preliminary conditions

A service-order quotation can only be processed to a service order if the following conditions are met:

- The status of the business partner (BP) must be Active.
- The invoice-to BP and ship-to BP must be entered on the service-order quotation.
- The status of the service-order quotation must be Accepted.

What gets copied to service orders?

The planning dates are copied to the service order. The terms that are linked to the service-order quotation are copied to the estimated cost lines of the service order. These terms are defined in the following sessions:

- Service Order Quotation Material Terms (tsctm1131m400)
- Service Order Quotation Labor Terms (tsctm1132m400)
- Service Order Quotation Traveling Terms (tsctm1130m400)
- Service Order Quotation Other Terms (tsctm1136m400)

ERP LN copies:

- The material terms to the Service Order Estimated Material Costs (tssoc2120m000) session.
- The labor terms to the Service Order Estimated Labor Costs (tssoc2130m000) session.
- The remaining terms to the Service Order Estimated Other Costs (tssoc2140m000) session.

Reports

You can select the following reports:

- Process report: This report lists all quotations that are successfully processed to a service order, and also shows the service order number.
- Error report: This report lists the quotations that are not processed to a service order, and shows the reason why the quotations are not processed to a service order.

To move service-order quotations to history

Use this process to move service-order quotations to history.

Use the Copy Service Order Quotations to History (tssoc1205m000) session to archive and to delete service-order quotations. The serialized item and activity lines are also posted and deleted. You can specify a range of quotations that must be processed. The choice to print a process report or an error report is optional.

Preliminary conditions

Only the service-order quotations with the following status can be posted to historical data and then be deleted:

- **Canceled**: No restrictions are applicable.
- **Processed**: For service-order quotations that are processed to a service order, the status of the related service order must be Closed or Canceled.

If service order quotations and related lines are transferred to history, you can update the following history sessions:

- History Service Order Quotations (tssoc8510m000)
- History Service Orders (tssoc8551m000)
- History Service Order Activity Lines (tssoc8552m000)
- History Service Order Material Costs (tssoc8555m000)
- History Service Order Labor Costs (tssoc8556m000)

■ History Service Order Other Costs (tssoc8557m000)

To generate service orders

This process aims to create a <u>service order</u>. The service order can be initiated from various origins. A <u>call</u> can be transferred into a service order for execution. A job quotation (<u>service-order quotation</u>) after being accepted by the customer must be converted to a service order for execution. Similarly, for preventive maintenance, all the generated planned activities must be transferred to service orders for execution. <u>Field change order (FCO)</u> are intended for repair or replace of <u>serialized item</u> that are parts of the <u>cluster</u> installed at customer bases must also be transferred into service orders for execution.

When the service orders are generated, the origin is to be identified and actions to be taken according to the origin. The service order activities are also created along with the service orders. While you perform a service for a customer, you might need to use a tool that, at the end of the order, requires a service. In which case, a service order is created from the Tool Requirement Planning module of Manufacturing, or can be created automatically when you cost the service order. Some predefined requirements must be maintained for the automatic generation of the service order. You must define a predefined activity (reference activity) for a service type for Tool Refurbishment.

Ways to create service orders

You can create service orders in the following ways:

■ Define the <u>service orders</u> manually in the Service Orders (tssoc2100m000) session.

■ Transfer the <u>planned activities</u> in the Transfer Maintenance Plan to Service Order (tsspc2220m000) session.

■ Transfer <u>service order quotations</u> in the Process to Service Orders (tssoc1200m000) session.

■ Transfer the <u>field change orders</u> in the Generate Service Order (tssoc5220m000) session.

■ Transfer <u>calls</u> from the Call (tsclm1100m000) session by means of the Transfer to Service Order command.

How to define Service Orders manually

Step 1: Service Orders

Run the **Service Orders (tssoc2100m000)** session to create service orders. The service order is a cluster of activities that can be selected from a library or defined at the moment the service order is made. The service order consists of

a header, order lines and estimated cost lines. In the header, you can enter general information, including customer, cluster, site/location, and start and end dates. Each order line is a cluster of activities that you can link to the item. Each activity/order line can have:

- A problem
- A description
- Activity start and end date
- Estimated cost lines, such as:
  - Tasks to solve the problem
  - Materials required for repair
  - Any other requirements

Step 2: Service Order Activities

Use the **Service Order Activities List (tssoc2511m000)** session to display the service order activities that are linked to the service order. If the service order status is Free, Planned, or Released, you can add new activity lines. New activities are created with the status Free. The information that is recorded about the activity is used to specify what type of work is performed. You can record information such as what the work is performed on, for example, item, anonymous item, or serial number, when the work is performed, what skills are required to perform the work, and any changes that will occur to the cluster based on the work performed. The information for the activity can be defaulted if linked to a reference activity.

Step 3: Service Order Estimated Material Costs

Use the **Service Order Estimated Material Costs (tssoc2120m000)** session to list, create, and maintain the estimated labor costs that are associated with reference activities defined on a service order.

You can create or maintain the estimated labor costs, if the service order status is Free or Planned. If the service order status is Released, you cannot update these costs. You can only change the estimated costs for service order activities with Free or Planned status. If you add estimated costs, ERP LN copies the costs immediately to the actual costs. A cost component must be related to every estimated cost. Cost components are used as a method for cost control.

Step 4: Service Order Estimated Labor Costs

Use the **Service Order Estimated Material Costs (tssoc2130m000)** session to list, create, and maintain the estimated material costs that are associated with reference activities defined on a service order.

Step 5: Service Order Estimated Other Costs

Use the **Service Order Other Material Costs (tssoc2140m000)** session to list, create, and maintain the estimated other costs that are associated with reference activities defined on a service order.

To estimate service order costs

You can specify a service order's <u>requirements</u> in the following sessions:

- Service Order Estimated Material Costs (tssoc2120m000)
- Service Order Estimated Labor Costs (tssoc2130m000)
- Service Order Estimated Other Costs (tssoc2140m000)

A <u>cost component</u>, used as a method for cost control must be related to every estimated cost line and actual cost line.

Purpose to estimate service order costs

- To budget the costs (that are task setting) of carrying out the service order when price agreements are fixed.
- To ensure that the materials are available by allocating or ordering the required materials.
- To ensure that the service engineers are available by allocating the required service engineers.
- To ensure that the tools are available by allocating the required tools.

Note

- If you add a <u>reference activity</u> to a service order, the reference activity's cost lines are copied to the service order's requirements.
- If you generate a service order from a <u>planned activities</u>, a call, or a field change order, the cost lines linked to the constituent reference activities are copied to the service order's requirements.

To Plan and Release Service Orders

After you create a <u>service order</u> with the appropriate labor and materials, you can plan the service order's execution. This planning consists of assigning the material, providing for the necessary inventory transactions to ensure that the material is available, allocating engineers, and checking the business partner's credit. Planning consists of two phases: <u>global ERP</u> and detailed ERP. Global

ERP makes the mid- to long-term plans, such as several weeks or months, while detailed ERP performs the detailed planning for a few days or weeks ahead.

Service Resource Planning

Planning for engineers and service orders is called service resource planning (SRP), and is controlled in the Service Order Control (SOC) module. The input for this planning are all service orders created in the other modules and the constraints defined in contracts, calls, and service master data.

You use the Run Global SRP (tssoc2260m000) session to carry out global SRP for a service order .

Preliminary conditions

To run global SRP successfully for a service order, the following conditions must be met:

- At least one activity must be present for the service order.
- The Planned Start Time and the Activity Duration fields for all activities of the service order must be filled.
- The serialized item for which the activities are planned must be valid.

If the First Order Procedure Step for Blocking field is set to Order Planning or Order Definition, in the Service Order Parameters (tssoc0100m000) session and global SRP is run, ERP LN carries out the following actions:

- If no parameters are set for service order blocking, no checks are carried out and all service orders is processed.
- If a service order's Blocked check box is selected in the Service Orders (tssoc2100m000) session and the service order blocking is still valid, ERP LN does not plan the service order.
- If the Blocked check box is selected and the service order blocking is no longer valid, ERP LN unblocks the service order, and the service order is planned.

If the service order's Blocked check box is not selected, ERP LN carries out the SRP. If a blocking reason limit is exceeded, the Blocked check box is selected, and ERP LN creates the service order blocking reason in the Blocking Reasons (tsmdm1101m000) session. The service order is not planned.

If you select the Process Report check box and the Error Report check box, the blocked service orders are printed on the error report, and the unblocked service orders are printed on the process report.

What attributes are affected?

When you run global SRP, and the required conditions are met, ERP LN processes the service order and service order activities with the following statuses:

- service orders with a Free, Planned, or Released status can be processed by the global SRP.
- service order activities with a Free status are planned. Activities with a Planned status are replanned if the Replan check box is selected.

The attributes of a service order and its related activities that are affected when you run global SRP depend on the status of the service order and its related activities.

If the service order status is Free, ERP LN carries out actions on the following:
- Preferred engineer
- Planned dates of the service order (recalculated)
- Travel cost line
- Service order status
- Service order cost lines:
  - Purchase
  - Allocate material
  - Plan tools

If the service order status is Planned, ERP LN carries out actions on the following:
- Planned dates (recalculated)
- Service order cost lines:
  - Purchase
  - Replan tools

If the service order status is Released, ERP LN carries out no actions on the service order.

If the service order status is either Free, Planned, or Released, and the activity status is Free, ERP LN carries out actions on the:
- Subcontractor (buy-from business partner)
- Planned dates (recalculated)
- Coverage date
- Inspection lines
- Service order activity status
- Service order activity cost lines:
  - Purchase
  - Allocate material
  - Plan tools
  - Reallocate material
  - Replan tools if the service order status is Planned

If the service order status is Planned or Released, and the activity status is Planned, ERP LN carries out actions on the:

- Planned dates (recalculated)
- Service order activity cost lines:
  - Purchase
  - Replan tools

Actions of global SRP

When you run the Run Global SRP (tssoc2260m000) session, the actions ERP LN carries out on the attributes of a service order (SO) and/or, service order activity, if the status permits, are described in the following sections:

Preferred engineer

The Service Engineer field of the service order is filled with the cluster's Preferred Engineer 1, when:

- The Allocate Engineers during Global SRP check box in the Service Order Parameters (tssoc0100m000) session is selected.
- The service order order status is Free.

Note

The Service Engineer field of the service order is not be changed if this field is already filled.

Recalculated planned dates

If the activity status is Free or Planned, the Planned Finish Time field will be recalculated based on the serialized item and cluster calendars. If these calendars are not available, the engineer, work center or company calendars are used. If a serialized item or cluster calendar is available for the serialized item, the **Planned Finish Time** field on the service order header will also be recalculated. If the required capacity (time) is not available, ERP LN prints the following message in the process report: Required capacity for activity line %1$s not (completely) available.

Note

If you add, delete or change an activity line, the **Planned Finish Time** of the service order will be updated directly. Activities with the status Planned are only replanned if the Replan check box is selected in the Run Global SRP (tssoc2260m000) session.

Coverage date

If the **Coverage Time** field of the service order activity is empty, ERP LN enters the planned start time of the service order.

Travel cost lines

Estimated traveling cost lines are created in the Service Order Estimated Other Costs (tssoc2140m000) session, if the service order status is Free and the Travel Cost Method field in the General Service Parameters (tsmdm0100m000) session is not None.

On the Costing tab, in the Service Order Parameters (tssoc0100m000) session, if:

- Only the Distance check box is selected, ERP LN creates one cost line for the travel distance and one cost line for travel total.
- Only the Time check box is selected, ERP LN creates one cost line for travel time and one cost line for travel total.
- Both check boxes are selected, ERP LN creates one cost line for the travel time and one cost line for travel distance and one cost line for travel total.

Inspection lines

For each measurement type of the cluster/serialized item that is entered in the reference activity of the activity line, ERP LN creates an inspection line in the Inspections (tssoc2550m000) session.

Service order (activity) status

ERP LN updates the status of the service order or service order activity to Planned when the global SRP has been carried out successfully.

Purchase

- In Service, only global SRP creates the purchase-order lines, if required.
- ERP LN creates purchase orders for a service order's material cost lines whose delivery type is By Purchase Order and Estimated Quantity greater than zero (0).
- For a subcontracted service order activity, with the Service/Cost Item field entered, ERP LN creates a purchase order for the subcontractor's services.
- If the planned delivery date of a purchase item is later than the planned start date of the service order, the Required delivery date %1$u001 for item %2$s not feasible message is printed in the process report.
- The buy-from business partner for the purchase item is determined as follows:
    a. The buy-from business partner of the material line (Service Order Estimated Material Costs (tssoc2120m000).

b. The buy-from business partner of item/supplier information (Items - Purchase Business Partner (tdipu0110m000).

c. The buy-from business partner of the item purchase data (Items - Purchase Business Partner (tdipu0110m000).

> **Note**
>
> ■ The selected business partner or its parent business partner must also have a pay-to role. If this role does not exist, ERP LN prints a message on the error report and does not create the purchase order.
>
> ■ If the planned delivery date of a purchase item is later than the planned start date of the service order, ERP LN displays a message.

Materials

If the statuses of the service order and service-order activity are Free, global SRP creates soft allocations for the required items, which means:

■ Items with a delivery type of From Warehouse, From Warehouse in Car, From Warehouse by Transp., or From Service Kit are listed in the Order - Planned Inventory Transactions (whinp1501m000) session with the transaction type - (Planned Issue).

■ Items with a delivery type of either To Warehouse or Tom Warehouse by Transport (materials expected to be received) are listed in the Order - Planned Inventory Transactions (whinp1501m000) session with the transaction type + (Planned Receipt).

Tools

■ For other costs lines whose cost type is Tooling, the required tool is soft allocated, listed in the Estimated Tool Requirements (titrp0511m000) session, with a Tool Requirement Status of Requested for the period from the Earliest Start Time until the Latest Finish Time.

■ If these times are not available, the period from the Planned Start Time until the **Planned Finish Time** is used.

■ Tool allocation also takes place when a tool must be refurbished, which is when the selected serialized item of the service order activity is of item type Tool in the Item - General (tcibd0101s000) session. The Tool Requirements Planning check box in the Implemented Software Components (tccom0100s000) session must be selected to implement tooling.

Reports

■ Process report: Lists all the service orders that are successfully handled by the global SRP, as well as whether an earlier blocked service order is unblocked and processed. The current service order status also appears.

- Error report: Lists all the service orders that are not successfully handled by the global SRP, and the reason why. The current service order status also appears.

Service Order Status

After you plan the service order, ERP LN changes the service order status to Planned.

Parameters

The following parameters are used:

To create traveling cost lines:
- Travel Distance
- Travel Time

To allocate preferred engineers during service orders planning:
- Allocate Engineers during Global SRP

For service order signaling and/or blocking:
- If Credit Limit Is Exceeded
- If Credit Review Is Overdue
- If invoice Is Overdue
- If Business Partner Is Doubtful

For service order procedure step when service blocking must be carried out:
- First Order Procedure Step for Blocking

For traveling costs:
- Travel Cost Method

For implementing tooling:
- Tool Requirements Planning (TRP)

Release Service Orders

After you plan the service order, you can release the service order to service engineer to execute the order. Use the **Release Service Orders (tssoc2200m000)** session to release a group or a batch of service orders with Free or Planned statuses. You must have at least one activity linked to service order. An activity must have either one or more engineers assigned to it or a header engineer for the service order to be released.

Note

After you release the service order, ERP LN changes the service order status to Released.

To complete service order activities

Use this process to set the service order status to Completed.

How to complete the Service Order

After the service engineer completes the activities on the service order, you can change the service order status to Completed.

Step 1: Select Service order

Select the service order for which activities are completed by the service engineer, from the **Service Orders (tssoc2100m000)** session.

Step 2: Select the activities

Select the activities for which status must be set to Completed from the **Service Order - Lines (tssoc2100m100)** session. On the Specific menu, click Complete to set the service order activities status to Completed. If more than one activities are present for the service order, you must set the status of each activities to completed.

Step 3: Completed

When all the activities are set to Completed, the service order status changes to Completed.

Preliminary Checks

Before a service order activity status is set to Completed, ERP LN checks the following:

- All related warehouse orders must be Completed.
- All related purchase orders must be Completed.
- The service-order activity status must be Released.

What attributes gets affected?

If the service order activity is Completed, ERP LN carries out the following actions:

- Return material (RMA) deliveries are created for items that are indicated as Repairable, using the Repairable check box in the Items - Service (tsmdm2100m000) session.
- For the relevant delivery types, parameters are available in the Service Order Parameters (tssoc0100m000) session to control the automatic

generation of return deliveries for non-consumed spare parts. These parameters are:

If the service order activity is Completed, ERP LN carries out the following actions:

- **Delivery Type 'From Warehouse'**.
- **Delivery Type 'From Warehouse by Transport'**.
- **Delivery Type 'From Purchase Order'**.

The quantity of a spare part to be returned is calculated by subtracting the actual delivered quantity from the estimated quantity. If an activity is Completed, ERP LN generates the warehouse orders for the quantity to be returned.

Automatic return deliveries are possible for the following delivery types:

- **From Warehouse**: For external service type a warehouse transfer is generated. For internal service type the warehouse order is defined as planned receipt.
- **From Warehouse by Transport**: A warehouse transfer order must be generated.
- **By Purchase Order**: A warehouse transfer order must be generated.

To control planned start/finish time of service order (activity)

Global SRP and the edit options on the graphical planning board controls these dates.

You can replan as follows:

1. Shift the service order on the graphical planning board.
2. Change the planned start or finish date of the service order in the Service Orders (tssoc2100m000) session.
3. Select the **Replan** check box in the Run Global SRP (tssoc2260m000) session, if you run the global SRP.

The following restrictions to change the planned start date of a service order apply:

- You can shift the service order between the limits of the planned start and latest finish dates.
- You cannot plan the start date before the current date.

If the planned start date of a service order activity is changed, the planned finish date is determined by the service order activity duration and by checking the calendar data.

If you change the start date of an activity, ERP LN checks if the planned start and finish dates of the service order must be changed. The planned start date of the service order is the earliest planned start date of the service order activity

that is related to the service order. The planned finish date of the service order is the latest planned finish date of the service order activity that is related to the service order.

Note

You can replan the service order if the status is Free, Planned, or Released. If the start date changes for an existing service order, ERP LN recalculates the planned start and finish dates of all the related activities.

To close service orders

You can close a service order in the Close Service Orders and Copy to History (tssoc2201m000) session. In this session, you can set the status of the order, the related activity lines, and the related cost lines to Closed. The service order and related lines can be posted to history or can be deleted.

Note

To post the service-order data to history, you must select the Service Order History check box in the Service Order Parameters (tssoc0100m000) session.

If you select the Delete Service Order check box, the specified range of orders is also removed from the Service Orders (tssoc2100m000) session.

Only orders that have a Costed or Canceled status can be processed. If these orders and related lines are posted to history, the following history sessions are updated:

- History Service Orders (tssoc8551m000)
- History Service Order Activity Lines (tssoc8552m000)
- History Service Order Material Costs (tssoc8555m000)
- History Service Order Labor Costs (tssoc8556m000)
- History Service Order Other Costs (tssoc8557m000)

If you close an order, ERP LN performs the following checks:

1. The order must not be blocked.
2. All order cost lines must have the Posted to Finance status.
3. If the order is part of a project, the status of the project must be Closed or Canceled. Refer to the Project Status (tipcs2102m000) session.
4. If tools are required to carry out the order, all tools must be returned. The tool requirements must have been deleted from the Estimated Tool Requirements (titrp0511m000) session.

If one of these conditions is not met, the order will not be closed and will not be posted to history.

To cancel service orders

With the Cancel Service Order (tssoc2204m000) session, you can cancel a single <u>service order</u> or cancel all service orders that are defined for a <u>service contract</u>. You must enter a cancel reason and cancel date. Additional cancel text is optional. Printing a process and an error report is optional.

To cancel a service order, you must ensure the following:

■ No actual costs and revenues are recorded on the service order.

■ The service order and related activity lines have a Planned or Released status.

■ If the service order is created for a service contract, the status of the service contract must be Active or Canceled.

After you cancel a service order, the following applies:

■ The status of the service order is Canceled.

■ The reason code, cancel text, and cancel date are filled on the service order.

■ The status of the service order activity is Canceled.

■ The materials that are allocated for the service order are canceled.

■ The warehouse orders that are created for the service order will be canceled if the items/materials are not issued or received yet. If the items/materials are issued or received, return deliveries are created (warehouse orders of type Transfer).

■ If the service order is created from a call, the status of the call is Solved.

■ If tools are needed to carry out the sales order, the tool requirements are deleted from the Estimated Tool Requirements (titrp0511m000) session.

Note

Service orders that are blocked cannot be canceled.

To print service order documents

The following service order (SO) documents can be printed: Internal documents:

Internal documents:

■ <u>Service order sheets</u>
■ <u>Inspection reports</u>
■ <u>Checklists</u>

External documents

■ <u>Acknowledgement sheets</u>

- <u>Appointment sheets</u>
- <u>Repair reports</u>

The external documents are printed in the business partner's language.

You can print the following on the service order (SO) document:

- <u>Service order</u> (SO)
- Sold-to business partner
- <u>Cluster</u>
- <u>Service type</u>
- <u>Service department</u>
- <u>Service engineer</u>
- Order status
- Planned start time
- Latest finish time

Service order header

You can select the <u>service order header</u> or service order activity details to be printed. You can also print the estimated service order <u>requirement lines</u>. The engineer can fill in the actual cost-line data on each estimated requirement line. You can also print a number of blank cost lines for material, labor, and traveling costs. The number of blank lines can be given.

Checklist

The <u>checklist</u> is filled in by engineers after the activity is carried out.

Acknowledgement/appointment sheet and repair report

You can define a user-dependent layout (template) of the acknowledgement sheet, the appointment sheet, and the repair report in the Service Order Parameters (tssoc0100m000) session.

An appendix (standard layout) is printed for each activity. This appendix is printed in the business partner's language.

To define appointments for service orders

To define appointments, in the Service Order Activities (tssoc2110m000) session, click **Appointment** to register the appointment in the Appointments (tsmdm0123m000) session. The <u>slack time</u> is reduced or reverts to zero.

If appointments are defined, ERP LN fills the **Earliest Start Time** and the **Latest Finish Time** fields with the appointed times.

The **Planned Start Time** and **Planned Finish Time** are planned at the start of the appointed period. The **Appointment** check box will also be selected.

- In planning tools, appointed service orders are handled as firm planned.
- The **Appointment** check box can always be maintained by the user. If you clear the check box, the existing appointment is deleted.

Note

If an appointment is defined for a service-order activity, the entire service order is handled as an appointment. ERP LN selects the **Appointment** check box in the Service Orders (tssoc2100m000) session.

To block service orders

In the Service Order Parameters (tssoc0100m000) session, you can set the parameters for service-order blocking. The checks for blocking can be performed at each step in the service order procedure. Select the First Order Procedure Step for Blocking check box to indicate at how many stages a service order must be checked to see if the service order meets any of the selected signaling and blocking parameters and, if so, ERP LN blocks the service order.

If a service order blocking parameters is selected, ERP LN carries out the blocking functionality when the order status changes to Free, Planned, or Released. The blocking functionality is also carried out each time a new service order is created.

The blocking reasons appear in the Blocking Reasons (tsmdm1101m000) session.

A service order can be blocked for one or more of the following reasons:

- The credit limit of the invoice-to business partner is exceeded.
- The invoice-to business partner has overdue invoices.
- The credit review period has been exceeded, and the invoice-to business partner still has overdue invoices.
- The status of the invoice-to business partner is Doubtful.

Note

- The activities and the cost lines of the service order cannot be blocked.
- You cannot exclude specific service orders from blocking, if service-order blocking is used.
- If no blocking parameters are set, service order blocking is disabled.

Templates for external service order documents

To create a template for <u>external service order documents</u>, take the following steps:

1. Start the Service Order Parameters (tssoc0100m000) session.
2. Click the Orders tab.
3. Click Text Editor button. The Texts dialog box appears.
4. Select the appropriate template item:
    - <u>Acknowledgement sheet</u> template
    - <u>Appointment sheet</u> template
    - <u>Repair report</u> template
5. Define the template with the variables supported in the selected template item, as listed below.
6. Save the template and exit.

Template variables

Variables for the contact of cluster:

```
$conf.titl     Title
$conf.init     Initials
$conf.bfsn     Before Surname
$conf.surn     Surname
$conf.suff     Suffix
$conf.name     Name
```

Variables for the contact of the sold-to business partner:

```
$ordr.titl     Title
$ordr.init     Initials
$ordr.bfsn     Before Surname
$ordr.surn     Surname
$ordr.suff     Suffix
$ordr.name     Name
$curr.date     System Date while printing
$order         Order Number
$ordr.desc     Order Description
$clus          Cluster Code
$clus.desc     Cluster Description
$project       Project
$project.desc  Project Description
$svcn.desc     Service department Description
$engineer      Service engineer
$duration      Duration of Service Order
```

```
$unit          Unit of Duration
$appo          Appointment (yes/no)
$el.st.tm      Earliest Start Time
$pl.st.tm      Planned Start Time
$pl.fn.tm      Planned Finish Time
$lt.fn.tm      Latest Finish Time
$employee      Sales Employee
$empl.dep      Sales Employee Department Description
$empl.tel1     Sales Employee Telephone 1
$empl.tel2     Sales Employee Telephone 2
$empl.mail     Sales Employee E-mail
$refa          Reference A
$refb          Reference B
$contract      Contract Code
$cntr.desc     Contract Description
$city1         City 1 of Company
$city2         City 2 of Company
$numb.app      Number of Appendices (applicable for repair
reports)
```

Example

Title: $conf.titl Initials: $conf.init Before Surname: $conf.bfsn Surname: $conf.surn Suffix: $conf.suff Name: $conf.name Skill: $skla.desc $city1, $curr.date

Dear customer,

Please be informed that the service order $order $ordr.desc must be carried out on the $pl.st.tm.

This service order will be carried out for the cluster: $clus - $clus.desc.

This service order is part of the $project $project.desc project.

The service order will be carried out by the $engineer engineer of the $svcn.desc service department and will take approximately $duration $unit to be accomplished.

This order falls financially under contract $contract $cntr.desc.

Yours sincerely, $employee $empl.dep Tel. 1: $empl.tel1 Tel. 2: $empl.tel2 E-mail: $empl.mail

Detailed information:

Appointment: $appo

Earliest Start Time: $el.st.tm Planned Finish Time: $pl.fn.tm Latest Finish Time: $lt.fn.tm

Reference A: $refa Reference B: $refb

Service-order quotation process

```
            Start                      Status
              |
   +----------+----------+
   | Create Service      |
   | Order Quotation     |             Free
   | (tssoc1100m000)     |
   +----------+----------+
              |
   +----------+----------+
   | Order Quotation     |
   | Config. Lines       |             Free
   | (tsctm1110m400)     |
   +----------+----------+
              |
   +----------+----------+
   | Define              |
   | Coverage Terms,     |             Free
   | Cost Terms          |
   | (tsctm1120m400)     |
   | (tsctm1130mX00)     |
   +----------+----------+
              |
   +----------+----------+
   | Print Service       |
   | Order Quotation     |             Printed
   | Documents           |
   | (tssoc1400m000)     |
   +----------+----------+
              |
   +----------+----------+
   | Accept Service      |
   | Order Quotation     |             Accepted
   | (tssoc1100m000)     |
   +----------+----------+
              |
   +----------+----------+
   | Process Service     |
   | Order Quotation     |             Processed
   | to Service Order    |
   | (tssoc1200m000)     |
   +----------+----------+
              |
   +----------+----------+
   | Move Service        |
   | Order Quotation     |             Not Applicable
   | to History          |
   | (tssoc1205m000)     |
   +----------+----------+
              |
             End
```

To use overtime

To use the overtime functionality, you must define the following:

- The Overtime check box in the Service Orders (tssoc2100m000) session is intended for service applications on which maintenance activities cannot be carried out during normal working time. The check box is not inteded for call solution, which in urgent cases must be carried out in overtime.

- On a <u>service contract</u> header, a service-contract quotation, or a <u>service-order quotation</u>, you can also specify that overtime is applicable. The consequence of using overtime is that the customer usually must pay more. You can specify this when you select a labor rate in which overtime costs are calculated.

- If a service contract or a service-order quotation is specified in the <u>service order header</u>, the default value for overtime is copied from the service contract or the service-order quotation.

- In the Employees - Service (tsmdm1140m000) session, you can specify the Maximum Overtime per Day for a service employee.

Appendix A
Glossary

acknowledgment sheet

A letter about a service order that is planned to be carried out, used to inform the business partner. For this purpose, a user-dependent layout (template) can be defined in the Service Order Parameters (tssoc0100m000) session.

activity group

A user-defined category created to group reference activities or planned activities, based on their common features.

Example

A group of assembly activities.

appointment sheet

Appointment sheets can be printed if in the order header it is stated that an appointment has been made. This letter can be sent to the business partner. For this document a template can be defined in the SOC parameters.

ATP

The item quantity that is available to be promised for a customer either immediately, or at a specific time in the future.

ATP check

A check on the quantity that can be promised to a customer based on the allowed demand. The main purpose of the ATP check is to reserve a certain quantity of the spare part or item.

call

A question, complaint, or malfunction that is communicated to the party responsible for the service or maintenance of the item concerned.

checklist

Lists the points to which the service engineer must pay attention during the execution of a service activity. Checklists are used to group specific checks so that more than one check can be defined for a reference activity. According to the answers expected from the check, space is provided when printing the document related to the service order.

cluster

A set of serialized items that have the same location and are owned by the same business partner. Grouping serialized items into a cluster enables you to maintain them collectively.

cluster lines

The list of (serialized) items that belong to a cluster.

contract coverage

The method indicating how the service order costs are covered by the contract.

contract quotation

A quotation to a business partner for the provision of a service contract.

cost component

A cost component is a user-defined category for the classification of costs.

Cost components have the following functions:

- To break down an item's cost price, sales price, or valuation price.
- To create a comparison between the estimated production order costs and the actual production order costs.
- To calculate production variances.
- To view the distribution of your costs over the various cost components in the Cost Accounting module.

Cost components can be of the following cost types:

- **Material Costs**
- **Operation Costs**
- **Surcharge on Material Costs**
- **Surcharge on Operation Costs**
- **WIP Transfer Costs**
- **General Costs**

> **Note**
>
> If you use Assembly Control (ASC), you cannot use cost components of the **General Costs** type.

cost terms

A detailed specification of a coverage term.

cost type

Categories that are used to register the type of costs. Cost types enable you to have a more detailed view of the source of costs.

counter value

Preventive maintenance takes place at a constant interval. This interval is expressed in a usage-related unit, for example, operating hours, kilometers. The actual moment of maintenance is when the norm value of the counter is reached. These actual moments can be predicted.

Example

A car that must be serviced every 20,000 km.

coverage phases

A coverage term can be phased in time or it can be made dependent on the counter value of an item. It is possible to specify for each phase another covering method.

coverage type

A financial classification that indicates to what extent work is covered under warranty or contract, and what part of the activities can be charged.

credit limit

The maximum financial risk that you accept or are insured against concerning an invoice-to business partner, or that an invoice-from business partner accepts concerning you.

When you create orders, ERP LN continually checks that the total amount of created and invoiced orders does not exceed the credit limit. When you exceed the limit, ERP LN gives a warning message.

credit review period

Within this period the invoice-to business partner must pay his invoices. This can be seen as a so-called overdue invoice period.

dependent norm value

The dependent norm value determines the moment when maintenance is required for an item in a configuration.

- In case of predicted inspections (PI): If the measured value does not meet the norm value, a maintenance activity is required. You can immediately plan a service order that carries out the required maintenance, or a follow-up activity.
- In case of counter value (CV) and predicted activities (PA): The maintenance must be carried out when the norm value is reached.

Example (CV): If a car must be inspected every 20,000 km. the first norm value is 20,000 km, the second 40,000 km, and so on.

dependent variable

A unit of measurement, which together with a norm value (and start value) determines when maintenance activities must be carried out.

external maintenance

Preventive maintenance (PM) activities of an item done by a service engineer at the customer's site. This activity is defined in a contract.

external service-order documents

External service order documents include announcement sheets, appointment sheets, and repair reports.

field change order (FCO)

An order to collect and modify, repair, or replace an item (for example, a product recall). You can apply the order to one or more customers. The order can be created by marketing, sales, or manufacturing.

field change order object lines

A field change order line specifies the serialized item that must be modified by the field change order (FCO), and the sold-to business partner who owns it. If a service order has been created for the FCO, the service order's number is displayed on the FCO line.

global SRP

Global service resource planning (SRP) is the long-term planning phase for service orders that are defined in Service, and planned for the mid-to-long term (months).

help desk

A direct support center, staffed by maintenance engineers who solve customer's questions and problems.

independent variable

In the case of counter values (CV) or predicted activities (PA), the measurement type's independent variable of a will be of type time. In case of predicted inspections (PI), it can also be usage related.

Example

A tire has two variables: the number of kilometers traveled, and the depth of its tread. Each kilometer traveled by the tire decreases its tread depth. In this case, the independent variable is the number of kilometers traveled by the tire, and is usage related. The dependent variable is the tire's tread depth.

inspection

A specific activity that is carried out to determine the condition and the status of a (part of a) configuration or process. Inspection activities can be based on inspection norms that are specified in documents. The inspection activities and inspection intervals are specified in the maintenance program.

inspection report

A report that can be used to register the measured values on an item in case an inspection must be carried out.

inspection templates

A set of measurements that you must carry out on items during an inspection. Inspection templates include the norm values that trigger the reference activities. If an inspection is carried out and the norm value that is defined for the dependent variable is exceeded, one or more reference activities must be performed.

internal maintenance

The maintenance activities carried out on internal production devices.

item

A standard maintenance item.

item breakdown

A standard item's list of constituent components. The item breakdown can be displayed as a multilevel structure or as a single-level structure, and can be used as input for a physical breakdown.

labor rate

The labor rate code, defined in the Labor Rate Codes (tcppl0190m000) session in People. A sales rate and cost rate can be specified in this labor rate code.

You can assign labor rates on a wider scale to, for example,

- A service department, for all work done by the service department.
- A cluster, for all work carried out on the cluster.

In the Service Order Parameters (tssoc0100m000) session, default labor rate search paths can be set for the following:

- Estimated sales rate
- Estimated cost rate
- Actual sales rate
- Actual cost rate

location

A physical, recognizable area in a maintenance shop, a service department, or a work center where parts are temporarily stored. Inbound and outbound handling is not registered in ERP LN.

maintenance activity

The smallest unit of work that form the base for all maintenance to be carried out.

maintenance concept

A maintenance specification for non-customized items, stating which activities must be carried out during the maintenance cycle of the item.

Also, the requirements needed to carry out the activities can be specified. A single specific concept can cover various maintenance policies.

A maintenance concept serves as a reference for long-term maintenance planning of configurations and items.

maintenance planning

The list of activities planned for serialized items/clusters for the purpose of long term preventive maintenance.

maintenance prediction

The expected moments, on a relative timescale, when a specific measurement type does not meet specific norm values. As a result, specific reference activities must be carried out by way of preventive maintenance. A maintenance prediction can be a part of a maintenance concept, and is used for condition-based maintenance (CBM) in the first place, and for fine-tuning the maintenance concept in the second place. Maintenance predictions are optional to use. If present, maintenance predictions serve as input for the maintenance plan.

maintenance sales order

Orders that are used to plan, carry out, and control the maintenance on customer-owned components, products and the logistic handling of spare parts.

maintenance sales order lines

Lines that store all details of the items that must be maintained, loaned, replaced, delivered, or received.

measurement type

A particular measurement that is used to determine the value of an item's variable (measuring quantity) in a specific situation. Example: Tire tread depth.

measurement unit

Units used to express measurements. The unit can be user-defined or selected from the list of units in Common Data.

other

> All service activities that are not covered by the following service types: help desk, internal problem, external problem, internal maintenance, external maintenance, depot repair, and claim processing.

other requirements by planned activity

> All other requirements (such as, tooling, traveling, and subcontracting) for carrying out the activity on the item.

overdue invoice

> The invoice that has been left unpaid too long.

planned activities

> The fixed moments on which preventive maintenance, by means of planned activities, must be carried out on serialized items/clusters. Service maintenance planning shows the demand of service activities in the long term and can be used as input for the service order procedure. Maintenance planning can be generated from the maintenance concept.

predicted activity

> On a relative timescale the expected moments that certain measurement types do not meet their norm values. As a result, certain reference activities must be carried out as a matter of preventive maintenance. A maintenance prediction can be a part of a maintenance concept. A maintenance prediction is used for condition-based maintenance (CBM) in the first place and to fine-tune the maintenance concept.

> The maintenance intervals are based on the predicted progress of a specific measuring quantity's value (dependent variable). This value is based on measuring data from the past (history data). This method optimizes the maintenance intervals. The measuring data that is obtained during maintenance can be filled into history again. So, the maintenance prediction is continuously amended with the latest measurements. You can compare the predicted activities with counter value (CV) activities.

> You can also use service maintenance concepts as a reference for the service maintenance planning of items.

> The effectivity period of a maintenance prediction is limited by the period length which is recorded by the reference item.

Example

> After selling a car, the first maintenance activity is due one month (or 1,000 km) after the sale.

Preventive Maintenance (PM)

The maintenance activities that are carried out on a regular basis to prevent malfunctions or failures.

reference activity

The smallest unit of work that is required to carry out maintenance.

reference activity

A group activity or a single activity (directive) that is planned for a serialized item or cluster. A list of reference activities for an item forms a maintenance concept.

repair report

A report that informs the business partner about the findings of the service orders, in case repairs have been carried out on specific items. A template of the letter can be defined in the SOC parameters. For each activity an appendix (standard layout) will be printed. This appendix is printed in the language of the business partner.

Repair Warranty

The service provider's guarantee that the product is repaired free of charge, if the repair done earlier on the product is not satisfactory or not proper.

requirement lines

The lines that specify the resources required to carry out an activity. Requirement lines can comprise material, tool, and other requirements.

requirements

The material, labor and other requirements can be defined for a reference/planned activity.

return material authorization

Expected return of material from the customer to the service provider. Acronym: RMA

serialized item

An item that is uniquely identified by the item code (manufacturer part number) in combination with the serial number.

serial number

> A number that, together with the item code or manufacturer part number, uniquely identifies a component, an item, a machine, or an installation.

> This serial number is usually shown together with the manufacturer part number and other identification data on an identification plate that is attached to the item.

service contract

> A sales agreement between a service organization and a customer for a specific period, that states the configurations (clusters or serialized items) to be maintained, the coverage terms, and the agreed price.

service department

> The department that is responsible for the execution of a work order.

service department

> A department that consists of one or more persons and/or machines with identical capabilities, that can be considered as one unit for the purposes of service and maintenance planning.

service engineer

> A trained technician who carries out the service activities within his/her own organization or on the customer's site.

service order

> Orders that are used to plan, carry out, and control all repair and maintenance on configurations as present on customer sites or as present with the company.

service-order activity line

> The smallest unit of activity that can be carried out for a service order. Multiple activities can be defined per service order. This can be useful, for example, to combine calls with planned maintenance activities.

service order header

> The service order header contains all the data that is entered in the Service Orders (tssoc2100m000) session.

service-order quotation

A service-order quotation is a statement of price, terms of sale, and description of services and materials, that can be sent to a prospective business partner. The business partner data, terms of payment and terms of delivery are listed in the header. The data about the activities and materials are entered on the quotation lines.

service order sheet

A sheet that informs the service engineer about the work that must be carried out.

service type

The service classification that service providers offer. The service type determines which availability type applies to a service order header, and provides a default order procedure and coverage type.

slack time

The time between the earliest start time and the planned start time of an activity, and between the latest finish time and the planned finish time of an activity. Slack time is deliberately introduced by the planner to reduce the risk that a delay in a single activity is passed on to subsequent activities and, as a result, disturbs the overall planning.

subcontractor

A business partner that is hired to perform certain services, such as the execution of a part of a project or production order. The services are delivered via a purchase order.

surcharge/discount

A *surcharge* can be made, if, for example, a special response time is requested. A *discount* can be given, if, for example, a quantity of a given item is requested as opposed to a single item.

Note
- If a surcharge is applied to an item or order, it is added to the original costs.
- If a discount is applied to an item or order, the original costs are lowered.

tool maintenance

The maintenance activities that are carried out on tooling.

usage class

Usage classes categorize the use of a cluster, configuration, or (serialized) item, based on environmental factors or frequency of use.

You can use usage classes to:

- Predict the maintenance required for a cluster, configuration, or (serialized) item, based on its usage.
- Define more than one maintenance concept for a cluster's configurations, and generate a maintenance plan based on the concept.

Example

The usage class of a truck can be national or international. The required maintenance for national use is different than that for international use, for example:

- Difference in number of kilometers
- Difference in climate

warranty

A guarantee that a component is repaired free of charge or at reduced costs if it does not work according to the agreed specifications within a warranty period.

work center

The subdepartment of the service department that is responsible for the execution of a work order.

work order

Orders that are used to plan, carry out, and control all maintenance on items in a maintenance shop or in a repair shop. A work order consists of at least one work order header, and can have a number of activities that must be carried out on a repairable service item.

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