NeST Manufacturing Asset Control System

UI and Functional Specifications

October 03, 2018

Ver 2.0

Prepared For

SFO Technologies
A NeST Group Company

Prepared By

Winfy Software

Version	Description of Change	Author	Date
1.0	Maintenance and Calibration System - UI and Functional Specifications	Mohammad Rafeek	Oct 31, 2017
2.0	Maintenance and Calibration System - UI and Functional Specifications- Document Updated with new changes	Mohammad Rafeek	Oct 03, 2018

Table of Contents

1. Introduction

1.1. Purpose

This document describes the various UI and Functional specifications for the release of the NeST Manufacturing Asset Management System web portal for SFO Technologies, substituting the existing service of Microsoft software Navision. This document intends to become the rule book for the initial stage implementation of the app, which shall be used by the members of the organization to verify the correct functioning of the system.

1.2. Scope

At present the maintenance and calibration system has been implemented in Navision system in SFO. The scope of the proposed system is to replace the current functionalities implemented in Navision system for maintenance and calibration functionalities with a web portal.

1.3. Overview

An overall functionality description of the system is provided, including a product perspective, UI elements of various pages. An overall description of the system is provided including a product perspective and an easy followed user perspective.

2. System Overview

The requirements for the new features set describe how the system behaves for the proposed system users in monitoring, maintaining and calibrating system for the assets of the organization.

3. Web Portal Features

3.1. Login Page

When a user enters the URL of web portal in a browser, they will be directed to a login page for entering the identifier information into the system in order to access the system. The login page will have Username and Password. After filling these fields with relevant information, user can click on the login button to advance towards the dashboard of the respective user.

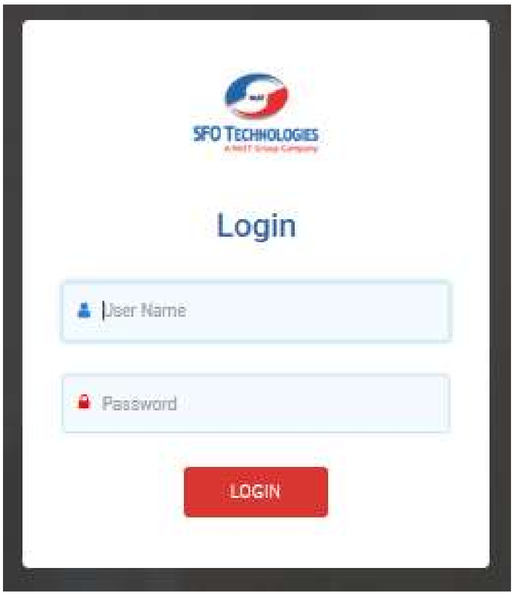


Figure: Login Page

3.2. Dashboard

After login to the system, the dashboard screen will be loaded. This screen will have menu items to select the modules in the proposed system.

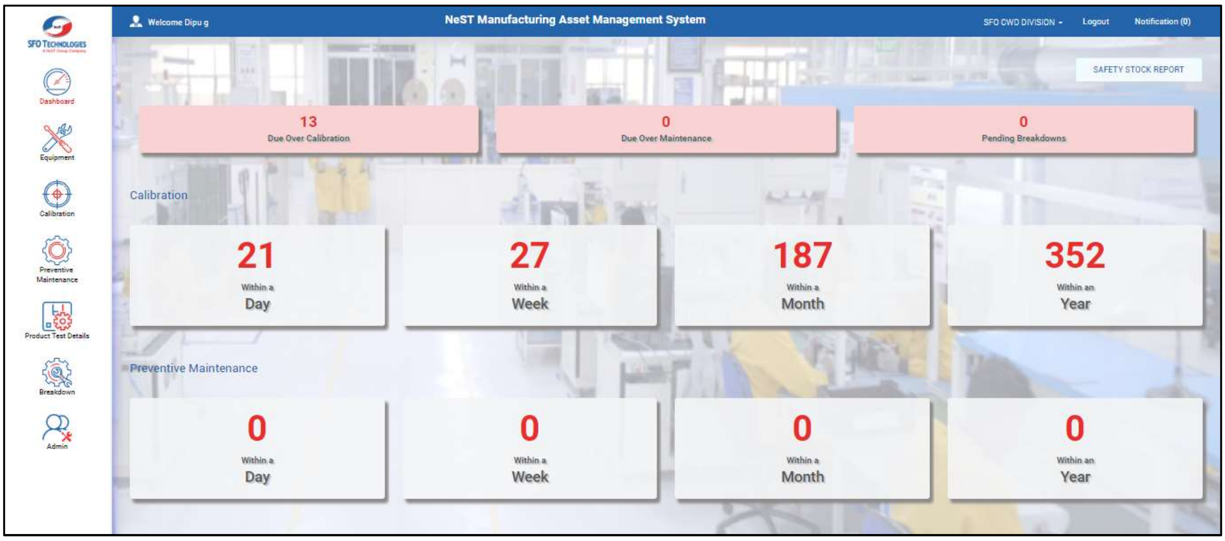


Figure: Dashboard

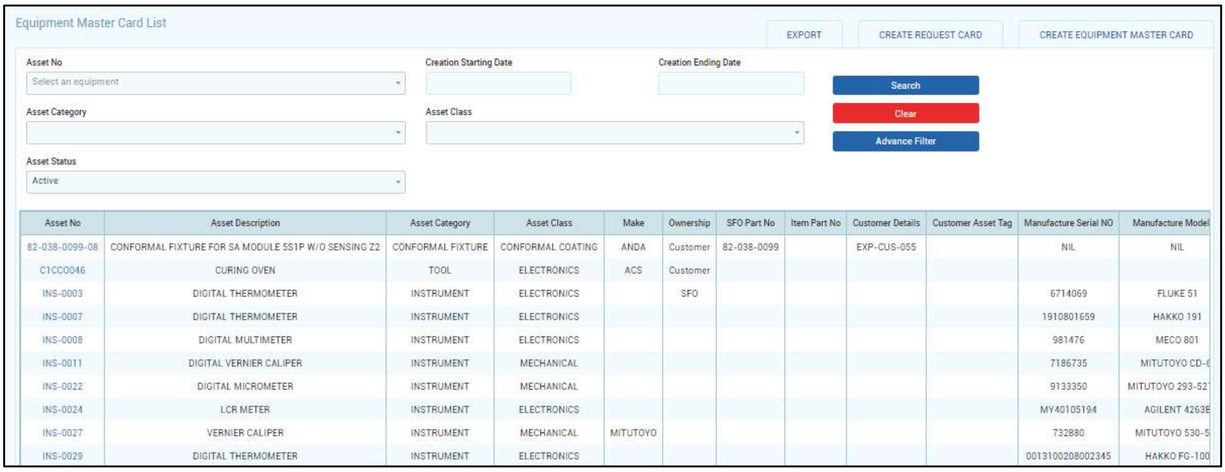
The user will have provision to switch between the companies so that the system will show the data related to the selected company. User will only get the companies where they have privilege. The dashboard will show the pending calibration, Preventive maintenance, and pending breakdown count. Also, it will show the count of equipment which are due for calibration, Preventive maintenance. When the user clicks on the count, the system will redirect user to the list of corresponding equipment.

Only the privileged users who has access to different modules can access each functionality. The user creation and assigning roles to the user can be done by the system administrator.

3.3. Equipment Master List

The Equipment Master List contains all the details of the Assets which are managed, operated, created, edited using Equipment MasterCard. There will be both Search and advanced Filter option for users to rely upon to access the specified result in the list. The delete functionality will only perform if there are no other related records of the Mastercard.

Equipment Master List will have a button called New Equipment Mastercard which will help the user to create a new equipment Mastercard. There will be an Export button in the top which will enable the user to take an excel sheet of the entire details of the equipment master list. When the user clicks on the Asset number in a row the user will be redirected to equipment master card details of that Asset, where the user will be able to edit the details of that Asset.



Asset No	Asset Description	Asset Category	Asset Class	Make	Ownership	SFO Part No	Item Part No	Customer Details	Customer Asset Tag	Manufacture Serial NO	Manufacture Model
82-038-0099-08	CONFORMAL FIXTURE FOR SA MODULE 5S1P W/O SENSING Z2	CONFORMAL FIXTURE	CONFORMAL COATING	ANDA	Customer	82-038-0099		EXP-CUS-055		NIL	NIL
C1CC0046	CURING OVEN	TOOL	ELECTRONICS	ACS	Customer						
INS-0003	DIGITAL THERMOMETER	INSTRUMENT	ELECTRONICS		SFO					6714069	FLUKE 51
INS-0007	DIGITAL THERMOMETER	INSTRUMENT	ELECTRONICS							1910801659	HAKKO 191
INS-0008	DIGITAL MULTIMETER	INSTRUMENT	ELECTRONICS							981476	MECO 801
INS-0011	DIGITAL VERNIER CALIPER	INSTRUMENT	MECHANICAL							7186735	MITUTOYO CD-(
INS-0022	DIGITAL MICROMETER	INSTRUMENT	MECHANICAL							9133350	MITUTOYO 293-52
INS-0024	LCR METER	INSTRUMENT	ELECTRONICS							MY40105194	AGILENT 4263E
INS-0027	VERNIER CALIPER	INSTRUMENT	MECHANICAL	MITUTOYO						732880	MITUTOYO 530-5
INS-0029	DIGITAL THERMOMETER	INSTRUMENT	ELECTRONICS							0013100208002345	HAKKO FG-100

Figure: Equipment Master (List)

3.4. Equipment Mastercard

Equipment Mastercard is a single master card that contains all data/information of an asset/ equipment. The equipment Mastercard page will have THREE tabs.

1. General
2. Comments
3. Documents
4. Status History

3.4.1. Equipment Mastercard (General)

Equipment Mastercard details all the information related to the assets of the organization, mainly Asset Details, calibration, preventive maintenance and break down settings details. Users can go through the details of assets and identify every asset and know the status of them. Asset identification plays an important role in an organization's ability to quickly correlate different sets of information about assets. This specification provides the necessary constructs to uniquely identify assets based on known identifiers and/or known information about the assets.

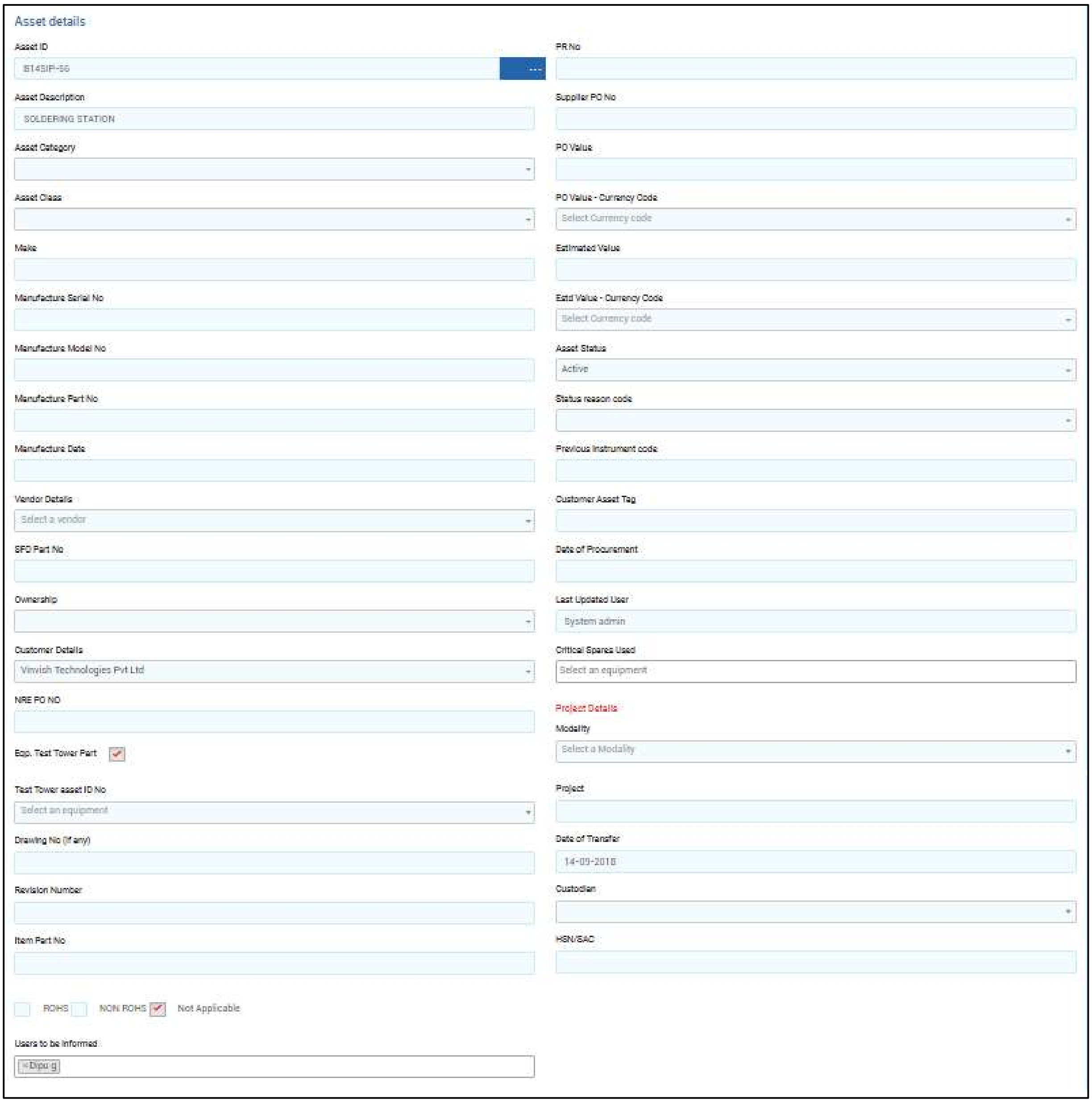


Figure: Equipment Mastercard General – Asset Details

Field like Asset ID, Asset Category, Asset Class, Vendor Details, Ownership, Customer Details, PO Value Currency Code, Estd Value Currency Code, Asset Status, Status Reason Code, Modality, Template ID, PM Frequency (list view with respective details of each frequency) and PM Responsibility will have dropdowns to select the values from user list.

- The User will be able to select the Number series set by the Admin by clicking the button near to Asset ID field. The Asset ID will be auto generated, if not allowed to enter manually from the number series.
- Number Series: In the case of manual entry of asset number is allowed in number series master, the user is free to skip the next number and he is free to enter any number. If there is a duplication in asset number, the system will alert the user regarding the same.
- Whenever the user changes the Custodian name, a mail will be generated and sent to the corresponding users to be informed.
- Any changes made by the user in the Asset Status will be recorded as Status History. Whoever is changing the status, that user information will be displayed in Asset status history. Remark and document upload are must for changing asset status of Equipment MasterCard.
- There will be fields for capturing Manufacture Date, Manufacture Part Number, Item Part Number, ROHS and Drawing Number.
- There will be provision to select the critical spares used (multiple items) from the Item Card. The item card data will be ported from Navision.
- Assets with Active status will be considered for sending the Alert for Calibration and Preventive Maintenance.
- There will be a text field for revision for Asset in Equipment master card.
- There will be provision to enter the HSN/ASN code in Equipment Master.
- There will be an Asset Transfer feature in the Equipment Master Card, through which the assets can be transferred to other companies. When the Asset is transferred to another company, the system will assign a temporary asset ID for asset in the new company and in the source company the asset status will be changed to ‘Transferred’

and the status change will be listed in asset status history. Also, a new Asset record will be created in the new company and the status of the asset will be ‘Under maintenance’.

- There will be a label printing option for every asset/equipment containing details of the asset. The color change for the customer assets and the SFO assets will be managed by changing the paper in the printer while the user takes the printout. The System will show an alert message to the user for setting the correct paper in the printer.
- The ‘Master EQP Used’ Tab in existing Navision system will be removed from the Equipment Master Card.
- There will be an asset calibration section where the user will be able to configure the calibration details like Calibration Required, Frequency, External / Internal, Calibration Responsibility, Calibration Template, Department location.
- Calibration of equipment will be scheduled based on the “Next Calibration Due On” Field.
- The total Posted Calibration count and link to last posted Calibration Record will be shown here.

Figure: Equipment Mastercard General – Asset Calibration

- Asset Maintenance Details like Date of installation, PM needed, PM Doc no will ne entered.
- The total Posted PM count and link to last posted PM Record should be shown in Equipment Master Card.
- The user will be able to set multiple PM frequencies against an equipment by clicking on the PM Frequency Button. PM Frequency button will be enabled if the user ticked on PM needed option.
- Also, the last breakdown date, Breakdown responsibility can be set from here.

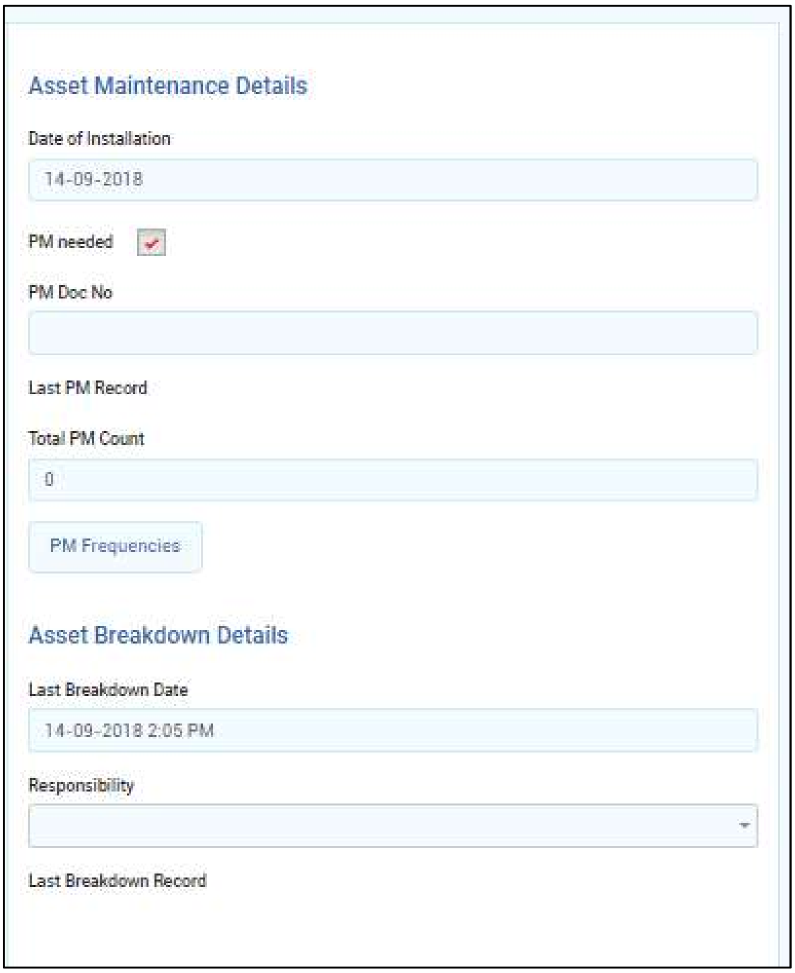


Figure: Equipment Mastercard General – Asset Maintenance and Breakdown Details

3.4.2. Equipment Mastercard (Comments)

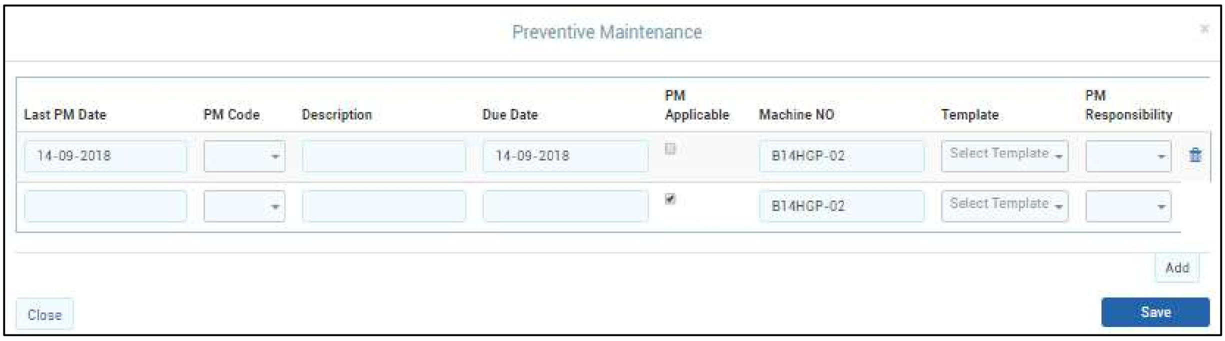


Figure: Equipment Mastercard General – Preventive Maintenance Scheduling

3.4.2. Equipment Mastercard (Comments)

The COMMENTS section can be relied by the user to comment on any of the Asset. Comments are based on respective users. All comments will be listed and showed based on the date and time. The logged in user shall be able to edit/ delete /add new comments. He/she can also view the comments of other users. The comments will be hidden to users with customer role. This is for hiding the comments from Auditors / customers.

Figure: Equipment Mastercard Comments

3.4.3. Equipment Mastercard (Documents)

The user will have options to upload the various reports in this screen in PDF, word and excel format. In the functionality where the document will be uploaded, there will be a provision to choose the document type like Bill of Entry and Delivery. These document types can be defined by the admin.

The user will be able to add SharePoint documents by giving the URL of SharePoint here. The user will be able to Open the document by clicking on the document name. The will be able to delete own documents he uploaded to the system.

Figure: Equipment Mastercard Documents

The user will be able to add the new document by clicking on the “Add document” button. The user needs to give the description, document type, file type. If document type is Sharepoint link then a URL need to be provided, else a file needs to be uploaded.

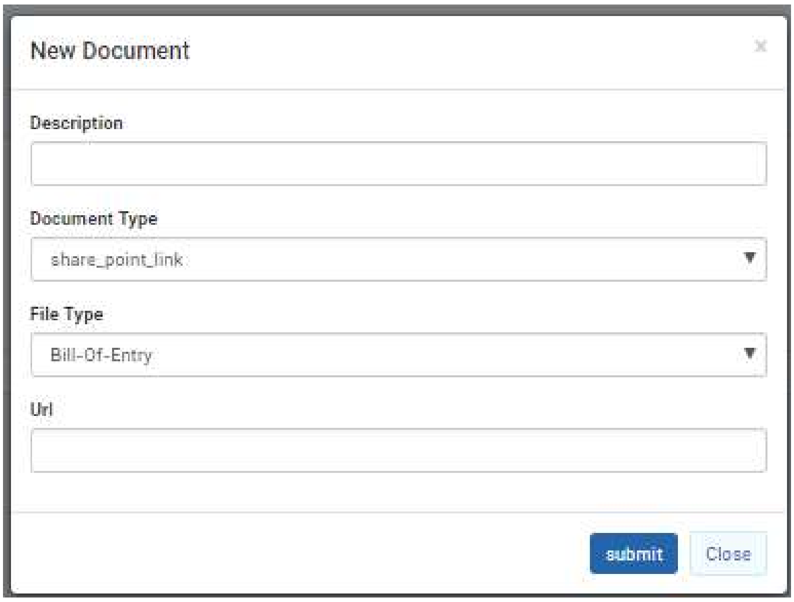


Figure: Equipment Mastercard Documents – Add document

3.4.4. Equipment Mastercard (Status History)

The status change for the Asset will be listed here

Figure: Equipment Mastercard Documents – Status History

3.5. Calibration Details

The calibration functionality will have five sub features namely Calibration List, Calibration Record, Work Instruction ID calibration, Planning Calendar Calibration and Posted calibration. Auto mail sending feature will be integrated for alerting the concerned personnel about the calibration scheduling date. There will be a notification screen for the user who logged in to the system for the Calibration schedules which are upcoming or Due for attending.

3.5.1. Calibration List

This functionality will store and maintain the list made in the Calibration Record. Users can view the total list of calibration and click on the desired calibration number to access all the details of the respective calibration. A search option will be incorporated for the users to conveniently search the data.

Figure: Calibration List - Search

Calibration No	Asset No	Asset Name	Asset Category	Document Date	Done On	Start Date	End Date	Frequency	Next Check Due On	
CAL-10576	TC-000054	Facts Power setup	TEST FIXTURE	21-07-2016	21-07-2016	20-10-2016	13-09-2018	91D	20-10-2016	
CAL-11280	TC-000041	ENERCON UTS	TEST FIXTURE	07-01-2017	07-01-2017	08-04-2017	07-01-2017	91D	08-04-2017	
CAL-11375	INS-2316	PRESSURE GAUGE		07-02-2017	07-02-2017	09-08-2017	07-02-2017	183D	09-08-2017	
CAL-11376	INS-2317	PRESSURE GAUGE	GAUGE	07-02-2017	07-02-2017	09-08-2017	07-02-2017	183D	09-08-2017	
CAL-11392	INS-0041	REFLOW OVEN	INSTRUMENT	08-02-2017	07-01-2017	06-01-2018	07-01-2017	365D	06-01-2018	
CAL-11393	INS-0055	BGA REWORK STATION	INSTRUMENT	08-02-2017	06-01-2017	06-01-2018	06-01-2017	365D	06-01-2018	
CAL-11394	M-24	REFLOW	SMT	08-02-2017	07-01-2017	06-01-2018	07-01-2017	365D	06-01-2018	
CAL-11405	INS-2761	DIGITAL VERNIER CALIPER	EQUIPMENT	09-02-2017	09-02-2017	08-08-2017	09-02-2017	180D	08-08-2017	
CAL-11410	INS-2319	PRESSURE GAUGE	GAUGE	11-02-2017	11-02-2017	13-08-2017	11-02-2017	183D	13-08-2017	
CAL-11415	INS-2466	PRESSURE GAUGE	GAUGE	11-02-2017	11-02-2017	13-08-2017	11-02-2017	183D	13-08-2017	
CAL-11417	INS-0873	HOT PLATE	EQUIPMENT	11-02-2017	17-01-2017	16-01-2018	17-01-2017	365D	16-01-2018	
CAL-11418	INS-2197	DIGITAL HOT PLATE	EQUIPMENT	11-02-2017	17-01-2017	16-01-2018	17-01-2017	365D	16-01-2018	

Figure: Calibration List

The user will be able to click on the link in calibration number to get the details of calibration for an asset. There will be a button named Create Calibration Record, which will guide the user to a page where they can create Calibration Record.

3.5.2. Calibration Record

Calibration Record tab is used for creating and posting Calibration Record. This tab stands as a documented proof that the equipment was calibrated, and if out of calibration what was done to correct it. Calibration record will have following subsections, namely:

1. General
2. Master EQP used
3. Comments
4. Documents

3.5.3. Calibration Record (General)

The general tab documents all details of calibrations and maintains all records pertaining to calibrations. In the template, a user can find calibration number, Asset number and all other pertinent information of the Asset. Adjacent to that, the user also finds certain text fields and dropdowns showing various statistics of the approving procedure and reports.

Users will have dropdowns for fields like Calibration Number, Asset number, Approved by, Sticker Affix, External Calibration Fee, Format Number and Report Number. Below it, user can find a template block which details various parameters, statistics and measurements during the calibration time, which gives users and organizations implement effective calibration process.

The Label Print button, below the report block will be able to print two types of labels (namely Limited Use, Valid Use). On clicking the List Button in the right bottom of the page (below the Report Block) users will be redirected to the list of calibration records. The Equip Master Card, adjacent to the List Button, will redirect the users to the corresponding Asset's equipment Mastercard.

There will be a field titled "To be approved" by where the user who is creating the calibration record can manually assign the name of who is going to approve the calibration record. Once the user does this, the approving authority can see the calibration record which is awaiting approval. The Approved by will show the name of the authority who will approve the calibration record along with the date and time of approval. The user can only post the calibration record when it is approved by the authority. Once the user has posted the calibration record, it will be shown in the Posted Calibration History.

The Calibration Parameters / Measurements details in the screen will show the various parameters of calibration detailed in the Work Instruction ID calibration tab. This list will be updated based on the selection of Asset number.

While updating the Master error filed in calibration record the following formulae will work;

"Corrected Reading" =("Actual Reading"-"Master Error");

IF(("Required Observation"-"Quoted Error")<="Corrected Reading") AND

("Corrected Reading"<=("Required Observation"+"Quoted Error")) THEN

Status :=OK

ELSE

Status :=NOT OK;

"Observed Error" ="Corrected Reading"-"Required Observation"

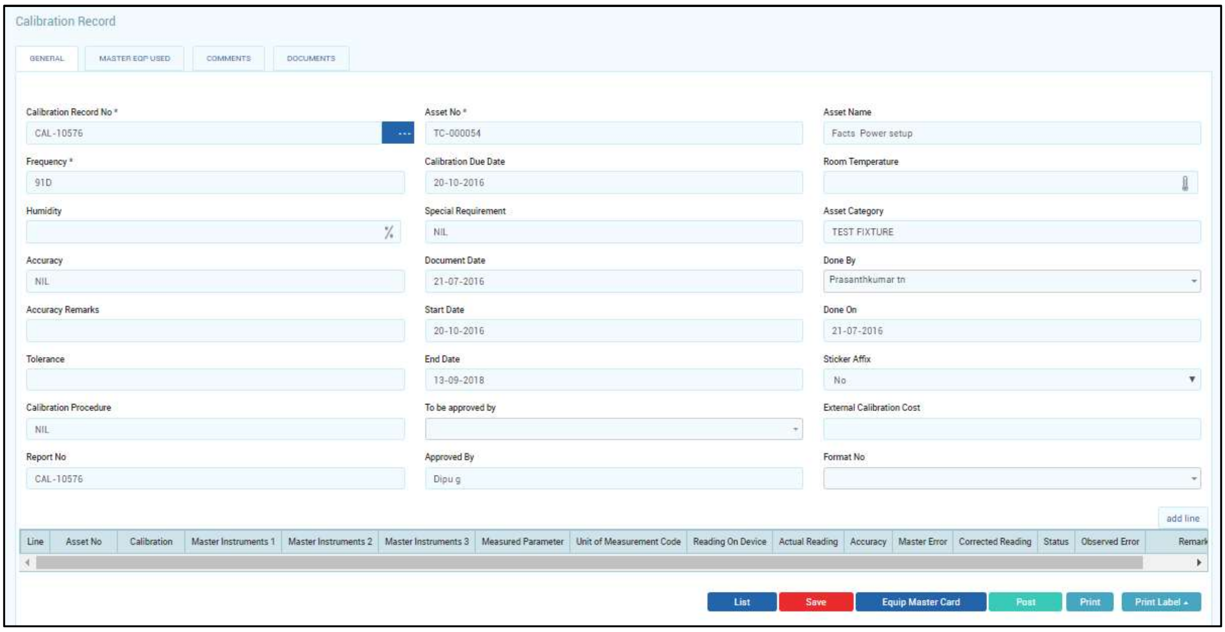


Figure: Calibration Record (General)

3.5.4. Calibration Record (Master EQP used)

The master EQP contains all the details of the equipment used for calibrating the main equipment. A maximum detail of three master equipment can be recorded and stored in this tab. Along with the name of the equipment used, each of these sections will have fields like Description, Category, Next due date, Internal/External field, External vendor, Report number EQP, Accuracy EQP and Tolerance EQP.

If the Master EQP of the Equipment Master Card is selected, then the same should be automatically reflected in the Master EQP used in the Calibration Record.

If the Accuracy EQP of an equipment is filled, then the respective Tolerance EQP fields must also be filled.

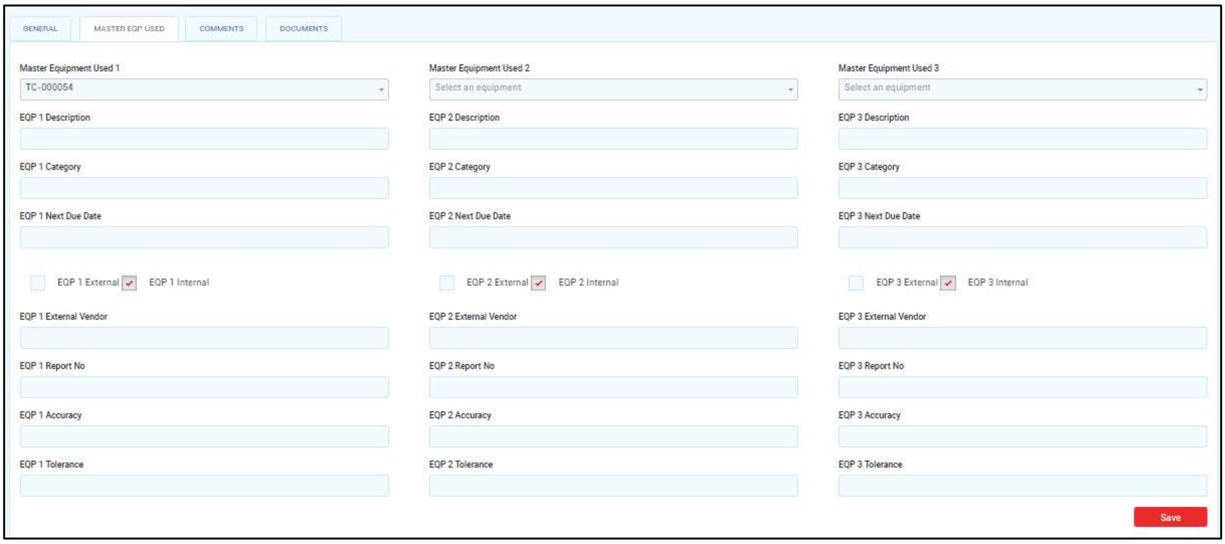


Figure: Calibration Record (Master EQP used)

3.5.5. Calibration Record (Comments)

Users can quote what they want to say in the comments section. Each comment will be shown with the name of commented user, time and date of the comment.

Figure: Calibration Record (Comments)

3.5.6. Calibration Record (Documents)

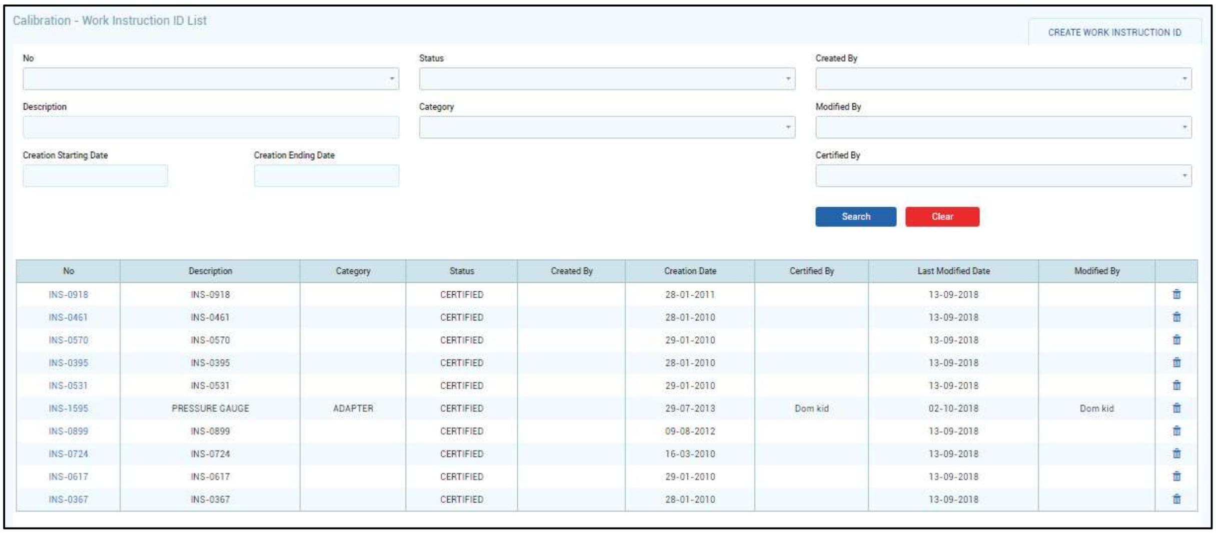
User will be able to upload the documents related to calibration.

Figure: Calibration Record (Documents)

3.6. Work Instruction ID calibration

3.6.1. Work Instruction ID Calibration (List)

This will list all the work instruction ID Templates for calibration. There be search options based on the Template ID, Description, status etc.. When user click on the "Create Work Instruction ID" button, the user will be redirected to a page for creating work instruction ID template.



No	Description	Category	Status	Created By	Creation Date	Certified By	Last Modified Date	Modified By	
INS-0918	INS-0918		CERTIFIED		28-01-2011		13-09-2018		
INS-0461	INS-0461		CERTIFIED		28-01-2010		13-09-2018		
INS-0570	INS-0570		CERTIFIED		29-01-2010		13-09-2018		
INS-0395	INS-0395		CERTIFIED		28-01-2010		13-09-2018		
INS-0531	INS-0531		CERTIFIED		29-01-2010		13-09-2018		
INS-1595	PRESSURE GAUGE	ADAPTER	CERTIFIED		29-07-2013	Dom kid	02-10-2018	Dom kid	
INS-0899	INS-0899		CERTIFIED		09-08-2012		13-09-2018		
INS-0724	INS-0724		CERTIFIED		16-03-2010		13-09-2018		
INS-0617	INS-0617		CERTIFIED		29-01-2010		13-09-2018		
INS-0367	INS-0367		CERTIFIED		28-01-2010		13-09-2018		

Figure: Work Instruction ID calibration (List)

3.6.2. Work Instruction ID Calibration

The page will have fields for Template ID, Description, Category, Status (a dropdown with values NEW, CERTIFIED and IN PROGRESS), , Creation Date, Modified By, Last Modified Date and Certified By.

In the status tab, user can edit the NEW value when he/she enters the section for the first time. User can edit the required fields and save the entered details and get it certified. Once it is certified, thereafter, a user can only edit the values when the status is put as IN PROGRESS. In the template is in CERTIFIED status, the user cannot edit the Work Instruction ID calibration page. Only the CERTIFIED Templates will be available for template selection in equipment master.

A Calibration Parameters / Measurements details will be showed below the page with fields Line No, Template ID, Measured Parameter, Required Ops, Quoted Error and Unit of Measurement, which will summarize the calibration process with its findings to implement the right solution. User will be able to Add or delete

Below the Calibration Parameters / Measurements details, there will be two fields, with namely SAVE and LIST buttons, where the former will help the users to submit the instructions to calibrate respective Assets and the latter directs users to the whole List of Work Instruction ID calibration.

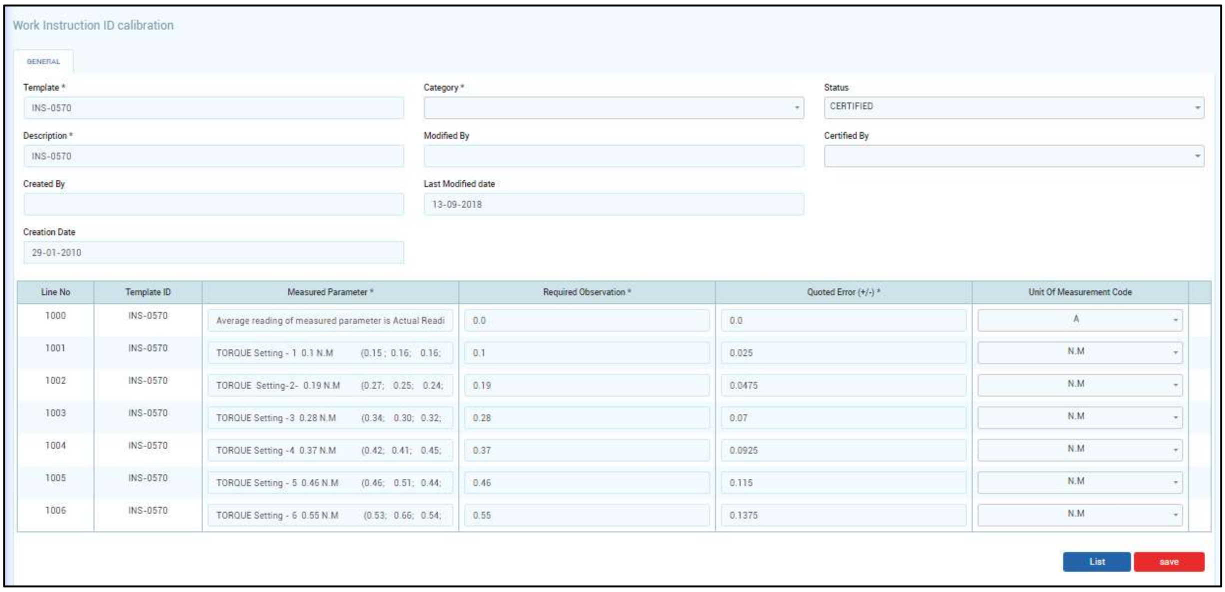


Figure: Work Instruction ID calibration (General)

3.7. Planning Calendar Calibration

For identifying the calibration or preventive maintenance due date through a calendar mechanism. Planning calendar will assist in recording the schedule of calibration to organize the administrative activities. The General tab of Planning Calendar Calibration will have Asset Filter and Date Filter fields on the top. Asset filter helps the user to filter the details of the Assets. It will be appearing as a dropdown. The Date Filter will help users to filter out the calibration details according to the entered date range. There will be a Filter in dropdown with value "with in a day , With in a Week, With in a Month, With in a Year". This will help users to view the calibration details based on the respective filter chosen.

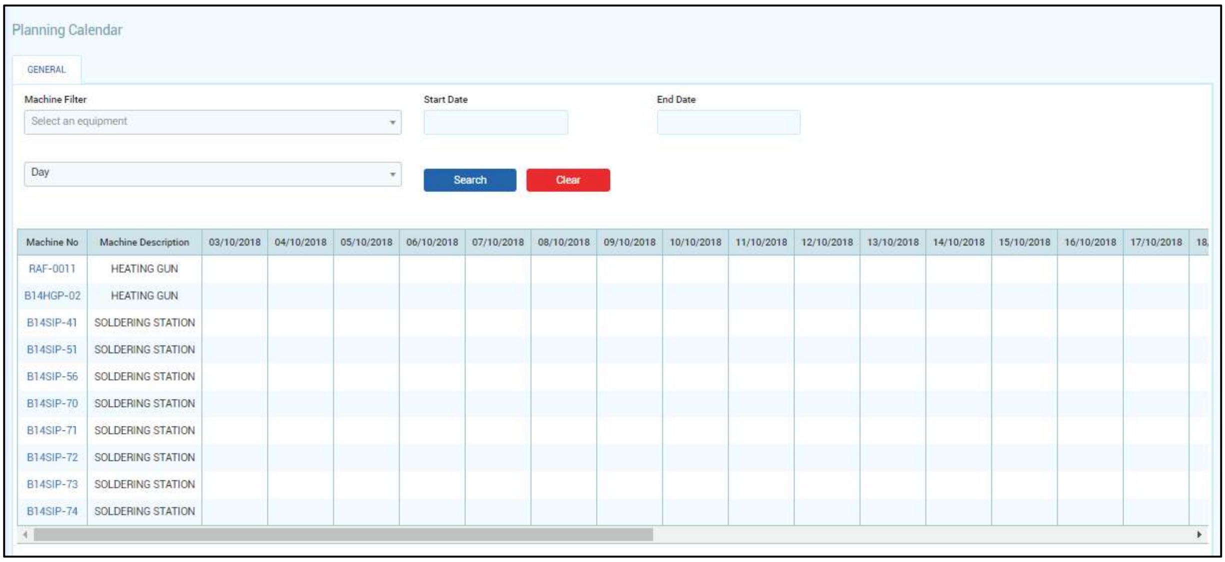


Figure: Planning Calendar Calibration

3.8. Posted Calibration

A posted calibration record contains all the records of the conducted accuracy checks of calibration for each equipment.

3.8.1. Posted Calibration Record List

This functionality will list all the posted Calibration Record. Users can view the total list of posted calibration and click on the desired calibration number to access all the details of the respective calibration. A searching option will be incorporated for the users to conveniently search the data.

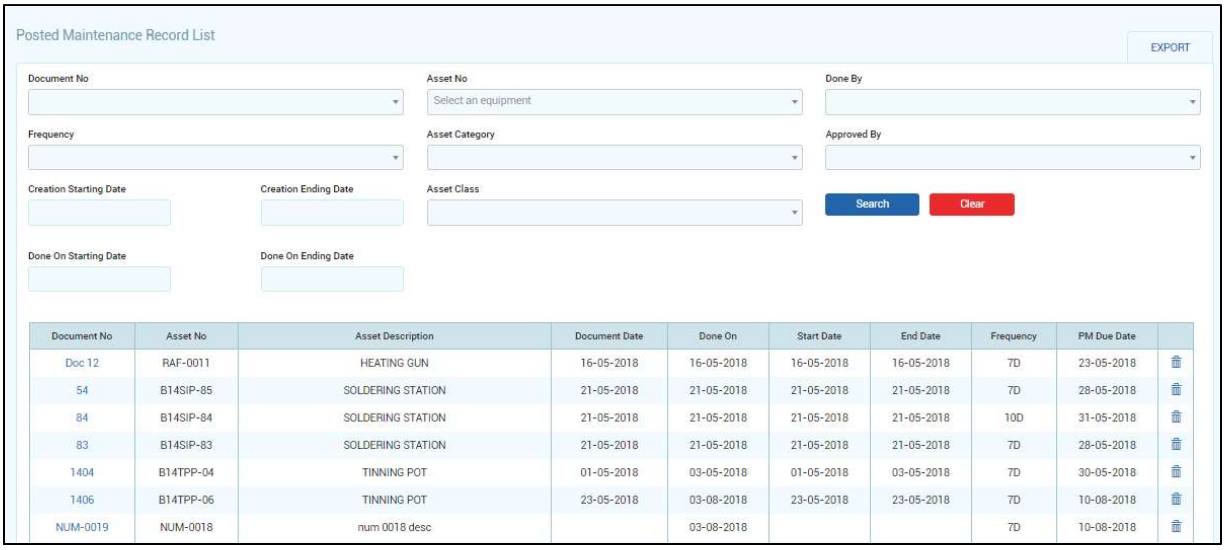


Figure: Posted Calibration Record List

3.8.2. Posted Calibration Record

On clicking the calibration number from the posted calibration record list, the Posted Calibration Record page will be loaded, where they can view all the results of calibrations for each asset.

Posted Calibration Record will have three sub tabs, namely,

1. General
2. Master EQP Used
3. Comments
4. Documents

3.8.2.1. Posted Calibration Record (General)

GENERAL tab will contain information like Calibration Number, Asset Number, Asset Name, Frequency, Calibration Due Date, Room Temperature, Humidity, Special Requirement, Accuracy, Accuracy Regards, Tolerance and Asset Category.

Adjacent to it in the right side, the GENERAL tab will have fields like Approved By, Document Date, Done On, Done By, End Date, Sticker Affix, Calibration Procedure, External Calibration File, Format Number and Report Number.

Towards the bottom of the tab, there will be a Report Block containing all the information regarding the calibration process. Users can analyze the information for knowing the outcome of the calibration process. Towards the right bottom of the GENERAL tab, there will be three fields namely;

1. **Label Print:** The Label Print button, below the report block will be able to print two types of labels (namely Limited Use, Valid Use).
2. **Print:** Users can click on the print field to obtain a printed copy of the calibration record.
3. **List:** On clicking the List Button in the right bottom of the page (below the Report Block) users will be redirected to the list of posted calibration records.

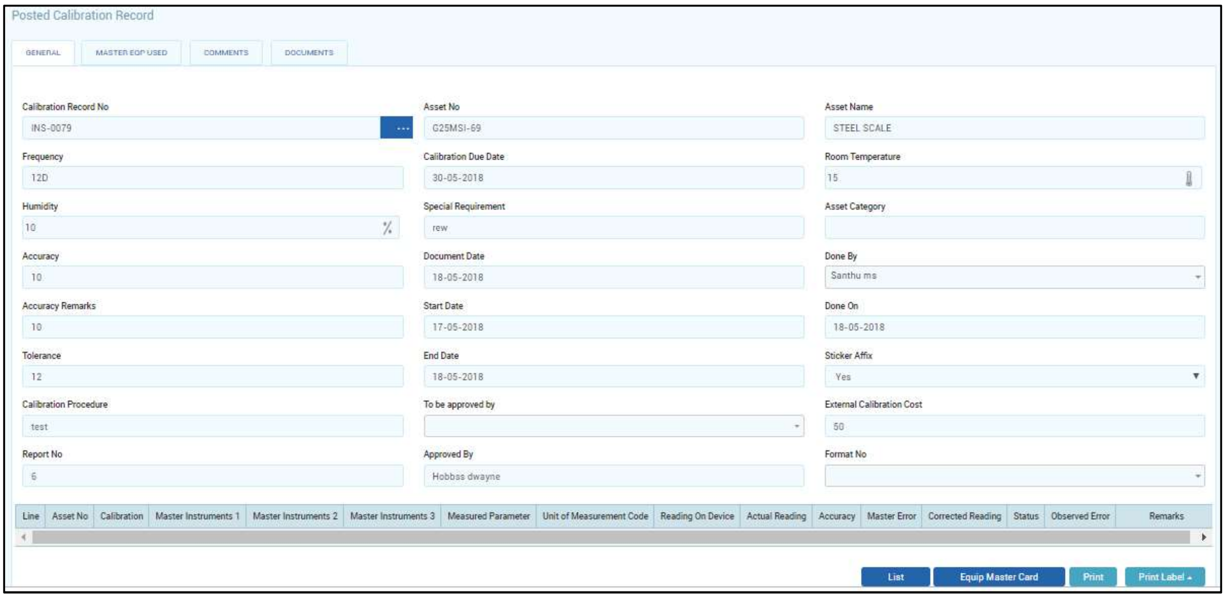


Figure : Posted Calibration Record (General)

3.8.2.2. Posted Calibration Record (Master EQP Used)

The master EQP contains all the details of the equipment used for calibrating the main equipment. A maximum detail of three master equipment can be recorded and stored in this tab. Along with the name of the equipment used, each of these sections will have fields like Description, Category, Next due date, Internal/External field, External vendor, Report number EQP, Accuracy EQP and Tolerance EQP.

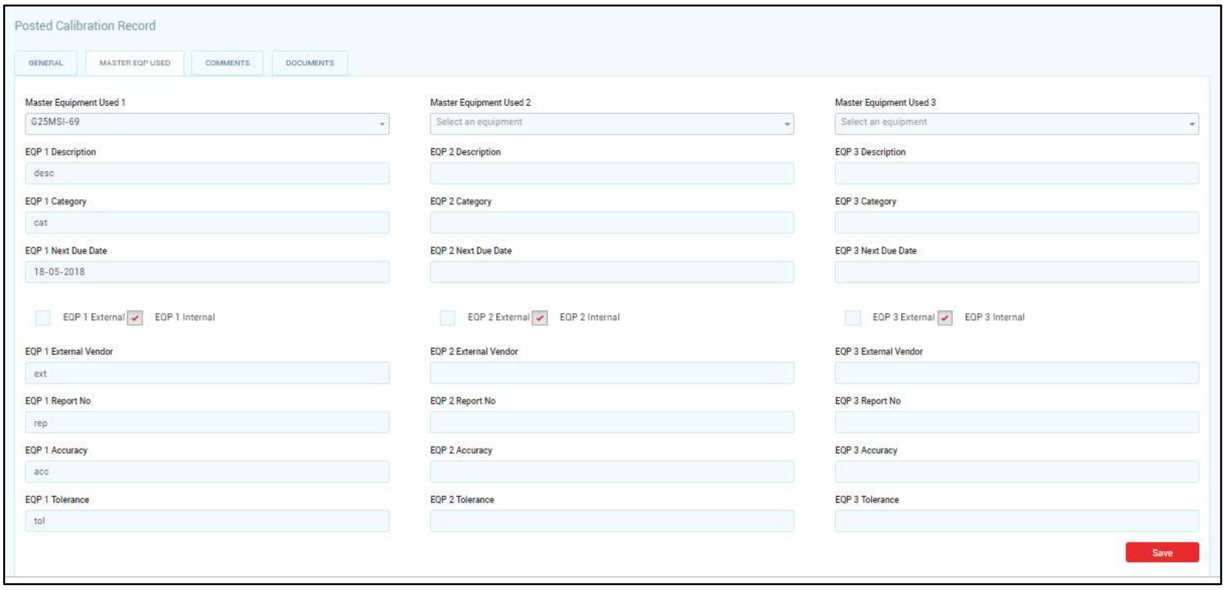


Figure: Posted Calibration Record (Master EQP Used)

3.8.2.3. Posted Calibration Record (Comments)

Comments related to posted calibration records can be filed in the comments tab.

Figure: Posted Calibration Record (Comments)

3.8.2.4. Posted Calibration Record (Documents)

User will be able to upload the documents related to calibration.

Figure: Posted Calibration Record (Documents)

3.9. Preventive Maintenance Details

The module will record and keep all the details of preventive maintenance of the equipment. Auto mail sending feature will be integrated for alerting the concerned personnel about the PM scheduling date. There will be a notification for the user who logged in to the system for the Preventive Maintenance schedules which are upcoming.

3.9.1. Preventive Maintenance Record List

This page will list all the Maintenance Record. User can view the total list of Maintenance record and click on the desired document number to access all the details of the respective Maintenance Record. There will be two buttons namely, Export and Create Preventive Maintenance Record. There will be search options based on Document Number, Asset ID / Name.

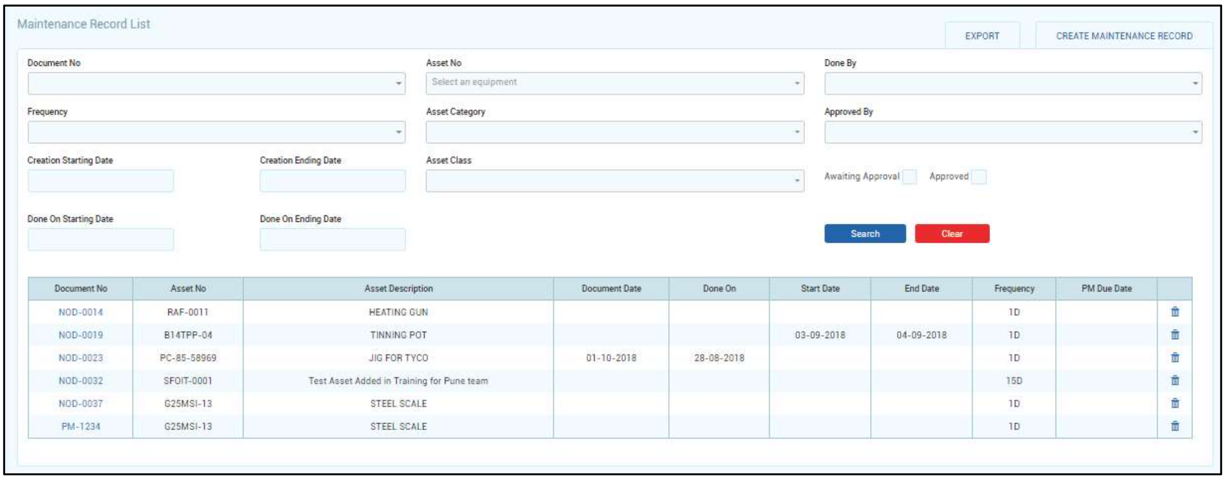


Figure: Preventive Maintenance Record List

3.9.2. Preventive Maintenance Details

3.9.2.1. Maintenance Record (General)

The tab will provision to enter all the details related to the preventive maintenance of equipment or assets. It includes various fields like Document No, Asset ID, Asset Name, Document Date, Frequency, Modality, Posting Date, PM Due Date, PM Done On and PM Done By. The PM Due Date is determined based on the given frequency of the equipment. The frequency field will be enabled to choose from the PM frequencies of the equipment. The PM Parameters / Measurements details in the screen will show the various parameters of preventive maintenance detailed in the Work Instruction ID - PM tab.

There will be a field titled To be approved by where the user who is creating the Maintenance Record can manually assign the name of who is going to approve the Maintenance record. Once the user does this, the approving authority can see the maintenance record which is awaiting approval. The Approved by button will show the name of the authority who will approve the maintenance record along with the date and time of approval. The user can only post the maintenance record when it is approved by the authority. Once the user has posted the maintenance record, it will be shown in the Posted Preventive Maintenance List.

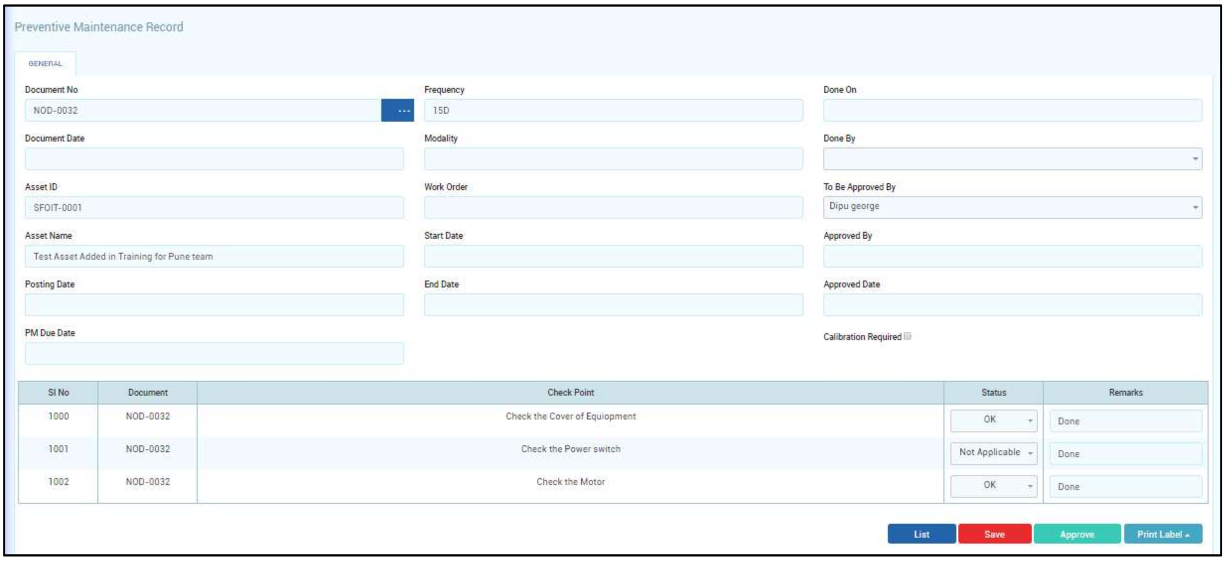


Figure: Maintenance Record (General)

3.9.3. Work Instruction ID PM – List

This will list all the work instruction ID Templates for Preventive Maintenance. There be search options based on the Template ID, Description, status etc. When user click on the “Create Work Instruction ID” button, the user will be redirected to a page for creating work instruction ID template.

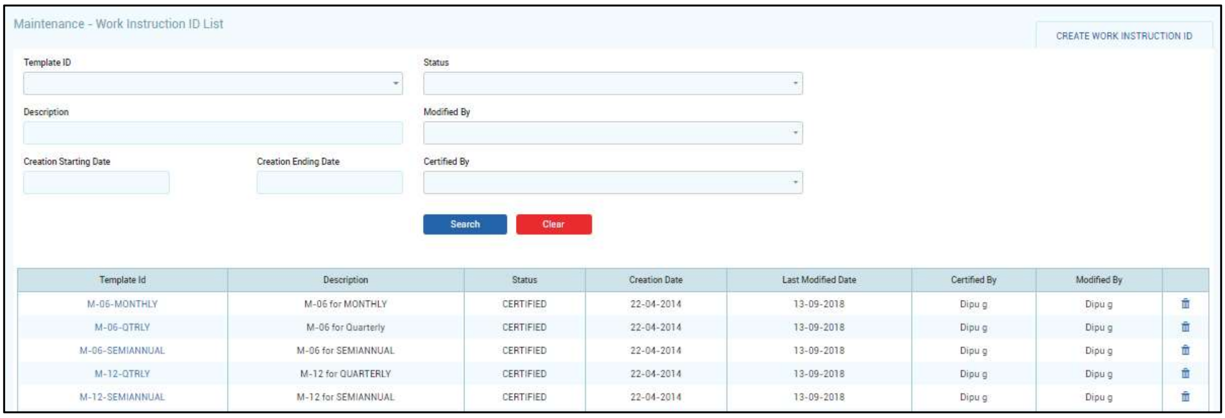


Figure: Work Instruction ID PM - List

3.9.4. Work Instruction ID PM

This module will contain fields for Number, Description, Status (a dropdown with values NEW, CERTIFIED and IN-PROGRESS), Creation Date, Last Modified Date, Modified By and Certified By.

In the status tab, user can edit the NEW value when he/she enters the section for the first time. User can edit the required fields and save the entered details and get it certified. Once it is certified, thereafter, a user can only edit the values when the status is put as IN PROGRESS. In the template is in CERTIFIED status, the user cannot edit the Work Instruction ID calibration page. Only the CERTIFIED Templates will be available for template selection in equipment master.

A PM Parameters / Measurements details will be showed below the page with fields Sl No, Template ID and Check Points which will summarize the preventive maintenance process with its finding to implement the right solution.

Below the Report Block, there will be TWO buttons, namely SAVE and LIST, where the former one will save the form for Work Instruction ID PM and the latter will show the list of all saved work instruction ID PM.

Figure: Work Instruction ID PM

3.9.5. Planning Calendar PM

For identifying the preventive maintenance due date through a calendar mechanism. Planning calendar will assist in recording the history of preventive maintenance to organise the administrative activity. This tab will have Asset Filter and Date Filter fields on the top. Asset Filter helps the user to filter the details of the Assets, it will be appearing as a dropdown. The Date Filter will help users to filter out the calibration details according to the entered date range. There will be a Filter in dropdown with value "with in a day , With in a Week, With in a Month, With in a Year". Delayed items will be marked in red.

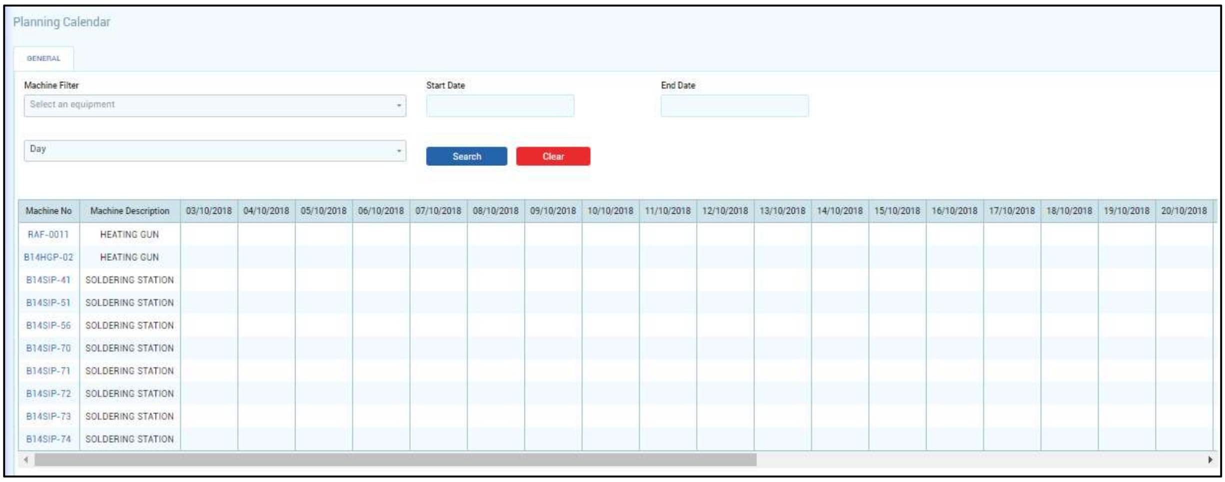
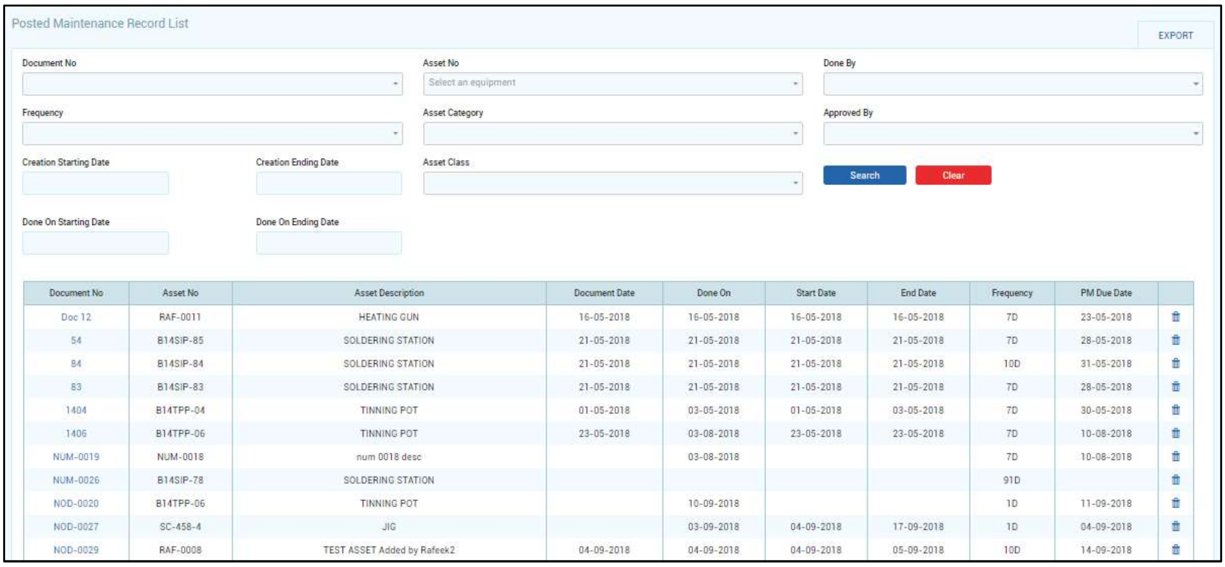


Figure: Planning Calendar PM

3.9.6. Posted Maintenance Record List

On clicking on the Posted Preventive maintenance list, users will be directed to Posted Maintenance Record list page, on clicking the document number from the list, the Posted Maintenance Record page will be loaded, where they can view all the results of maintenance for each asset. A searching option will be incorporated for the users to conveniently search the data.



Document No	Asset No	Asset Description	Document Date	Done On	Start Date	End Date	Frequency	PM Due Date	
Doc 12	RAF-0011	HEATING GUN	16-05-2018	16-05-2018	16-05-2018	16-05-2018	7D	23-05-2018	
54	B14SIP-85	SOLDERING STATION	21-05-2018	21-05-2018	21-05-2018	21-05-2018	7D	28-05-2018	
84	B14SIP-84	SOLDERING STATION	21-05-2018	21-05-2018	21-05-2018	21-05-2018	10D	31-05-2018	
83	B14SIP-83	SOLDERING STATION	21-05-2018	21-05-2018	21-05-2018	21-05-2018	7D	28-05-2018	
1404	B14TPP-04	TINNING POT	01-05-2018	03-05-2018	01-05-2018	03-05-2018	7D	30-05-2018	
1406	B14TPP-06	TINNING POT	23-05-2018	03-08-2018	23-05-2018	23-05-2018	7D	10-08-2018	
NUM-0019	NUM-0018	num 0018 desc		03-08-2018			7D	10-08-2018	
NUM-0026	B14SIP-78	SOLDERING STATION					91D		
NOD-0020	B14TPP-06	TINNING POT		10-09-2018			1D	11-09-2018	
NOD-0027	SC-458-4	JIG		03-09-2018	04-09-2018	17-09-2018	1D	04-09-2018	
NOD-0029	RAF-0008	TEST ASSET Added by Rafeek2	04-09-2018	04-09-2018	04-09-2018	05-09-2018	10D	14-09-2018	

Figure: Posted Maintenance Record List

3.9.7. Posted Maintenance Record

Users can access all the details of posted maintenance record in this page. There will be a report print button to take the print of the posted maintenance record report. The Print Label functionality will be enabled to print two types of labels and can be chosen with two separate size and content. When user click on the Print Report, the report will also contain the modality value. Report Heading will be changed with respect to the number series of the record. Validation & Re-validation: PM Report for jig/fixture/stencil category assets will be generated with separate heading “Validation and Re-validation report”. The PM report will have Done By and Approved By information

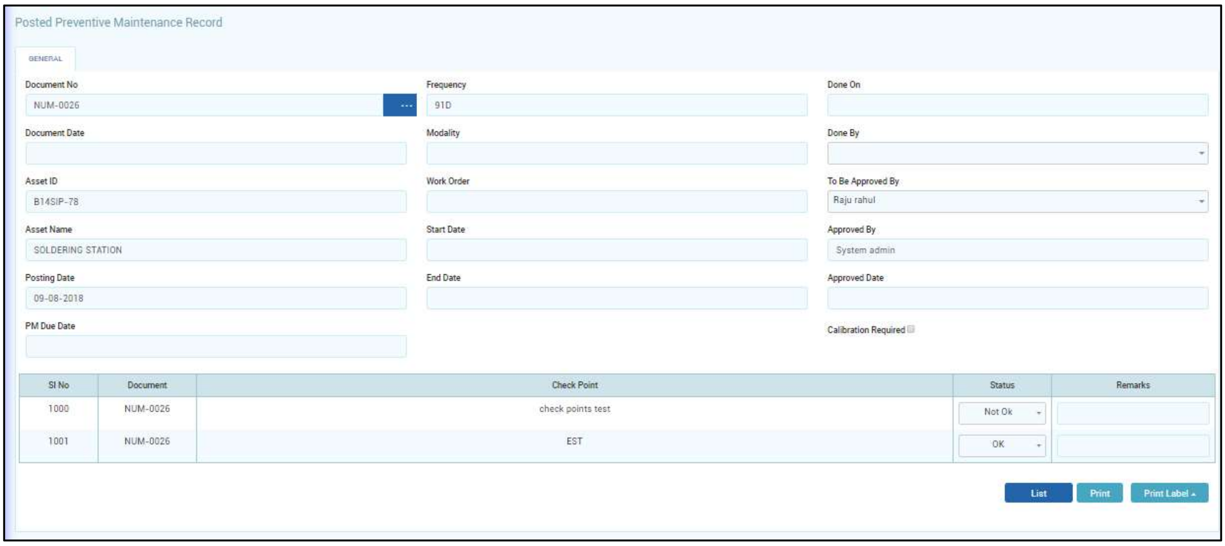


Figure: Posted Maintenance Record

3.10. Breakdown Details

Breakdown record tab is used to create and post breakdown record. If any Asset is breaking down or any asset is malfunctioning, breakdown record page is used to inform, review and later approve the breakdown process. Breakdown records are created for Product Test Item or Assets.

3.10.1. Breakdown Records List

This functionality will list all the Breakdown Record. User can view the total list of breakdowns and click on the desired breakdown number to access all the details of the respective breakdown. There will be two buttons namely, Export and Create Breakdown Record. Also, there is a search option for searching the breakdown records.

Figure: Breakdown Record List

3.10.2. Breakdown Record (General)

The general tab will have fields for entering Asset details, date of occurrence, person who has informed the breakdown, person who has tested the breakdown and approval. The Production Lead will inform about breakdown, Test Engineer will initiate the breakdown work and QA Department will approve the breakdown record. There will respective fields for these departments to fill.

When Breakdown is created have an option to add from where it is created: for Equipment Master Card or Product Test Item. If it is created for Product Test Item, added an option to select Test Part.

3.10.2.1. Create Breakdown Record

The users will be able to create breakdown record. If the user has privilege to inform the breakdown can create a breakdown record by clicking on the "Create Break Down Record" in the breakdown record list. The user will be able to select "Breakdown No ", Resource Type, Informed By, Document Date, Asset / Product Test Item, Informed Date Time, Breakdown Date Time, Section (Modality), and need to enter the Problem Description.

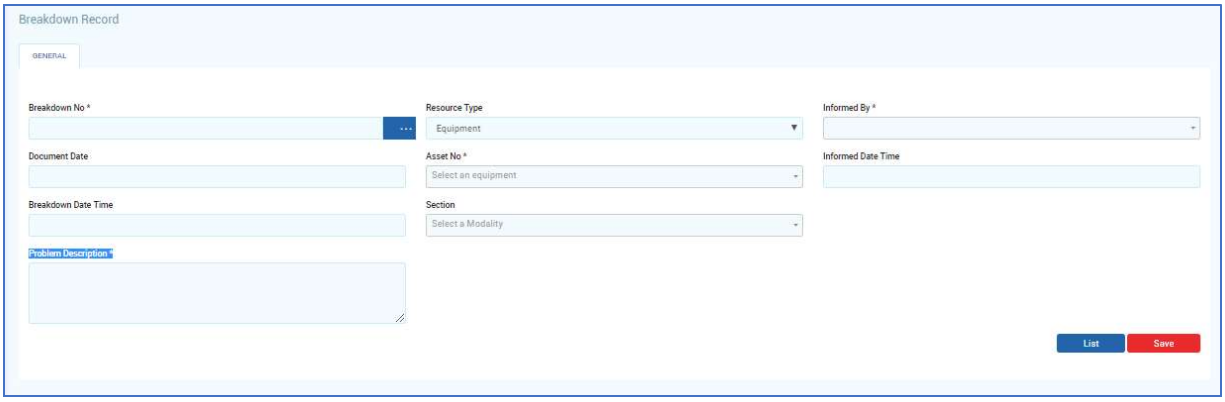


Figure: Create Breakdown Record

There will be a Save button to save the breakdown record. Adjacent to the save button, there will be a LIST button which will guide users to the Breakdown List.

When the user click on "Save", a mail will be sent to the responsible person mentioned in the equipment master copied to other stakeholders.

3.10.2.2. Test Engineer Review on Breakdown Record

When a Test Engineer with necessary privilege on the system clicks on the breakdown record number from the breakdown record list he will ge the following screen.

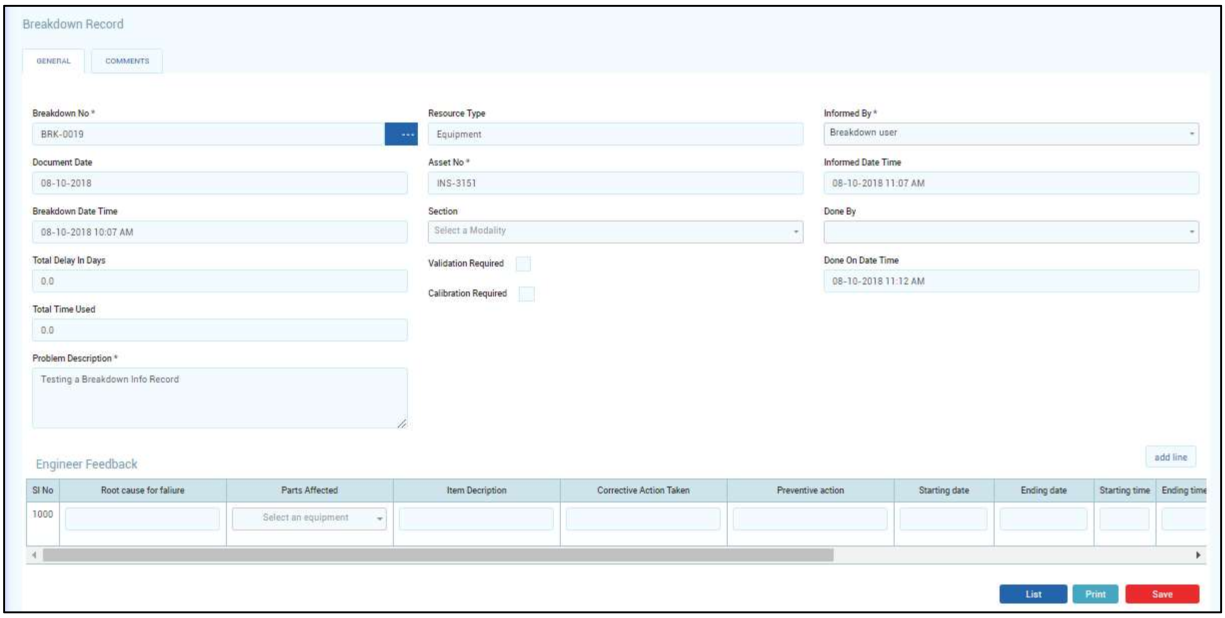


Figure: Breakdown Record (Test Engineer Review)

The test engineer will be able to fill the fields like Done by, Done on Date, Engineer Feedback etc. The Breakdown Parameters / Measurements details will show various statistics of the breakdown process in respect to corresponding Assets. Total time used in Breakdown Record is the value getting by calculating Breakdown Date time and Done on Date time. After filling the Done by, Done on Date and engineer feedback, the test engineer will be able to save the record.

The Test engineer will be able to request "QA Approval Required" by click on check box "QA required?" field after saving this the system will send a mail for QA Approval for stakeholders. Otherwise no QA action is initiated and no Alert Mail is required. If no QA approval is required, the test engineer will be able to post the breakdown record.

If QA Approval is required, then the user has to fill the Approved by field, and Update the QA Report SharePoint URL filed and will be able to post the breakdown record. The system will send the QA Approval Completion Mail after the same.

While posting the breakdown record, if the calibration required field is selected, then it should automatically send a mail to the calibration department. , if the validation required field is selected, then it should automatically send a mail to the validation department.

The System will send email with three set of mail sending in Breakdown module. The three levels of Emails are Breakdown Alert Mail, Test Engg Review Mail, QA Approval Completion Mail.

1. **Breakdown Alert Send Mail** - Mail sent when the breakdown is informed.
2. **Test Engineer Review Over Mail -** Mail sent after the review of engineer.
3. **QA Approval Completion Mail -** Mail sent by QA to approve the breakdown record.

There will a provision to print the Breakdown Report, which will have all the details in the breakdown record with the fields Raised By, Done By and Approved by information at the bottom of the report.

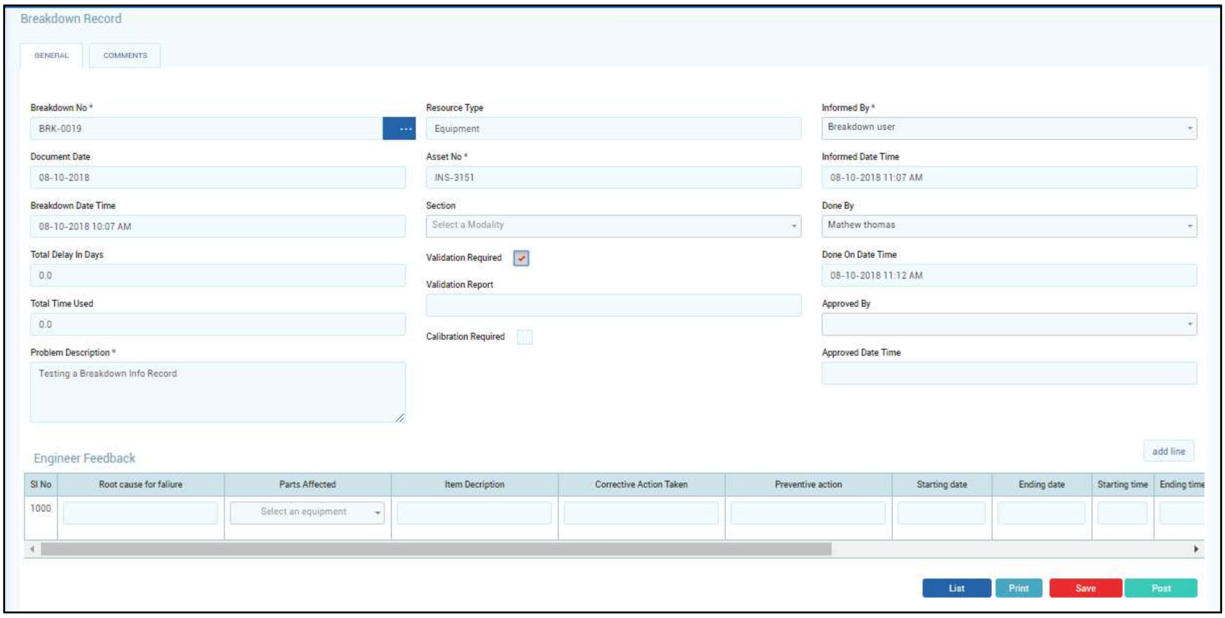


Figure: Breakdown Record (QA Approval Required)

3.10.3. **Breakdown Record (Comments)**

User comments related to Breakdown Record.

Figure: Breakdown Record (Comments)

3.10.4. Posted Breakdown List

This will have all the list of posted breakdown records. When the user clicks on the Breakdown number this will redirect to the posted breakdown record.

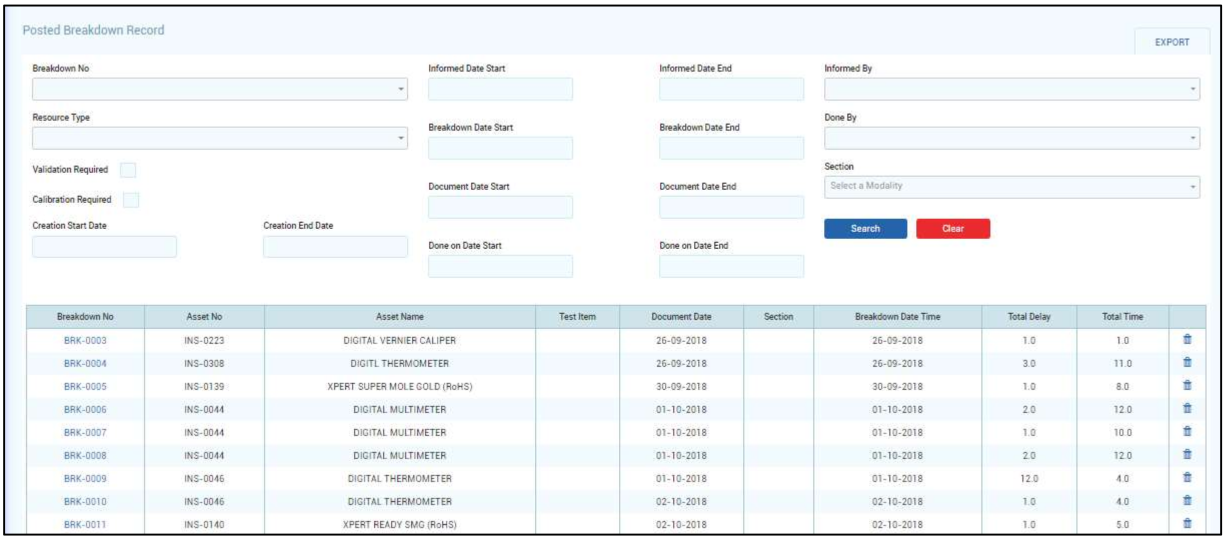


Figure: Posted Breakdown Record List

3.10.5. Posted Breakdown Record

This will contain all the details of the posted breakdown record. Towards the bottom right of the tab, there will be TWO buttons, namely PRINT REPORT and LIST. In the former button, user can print the breakdown report and the latter will lead the user to list of posted breakdown records.

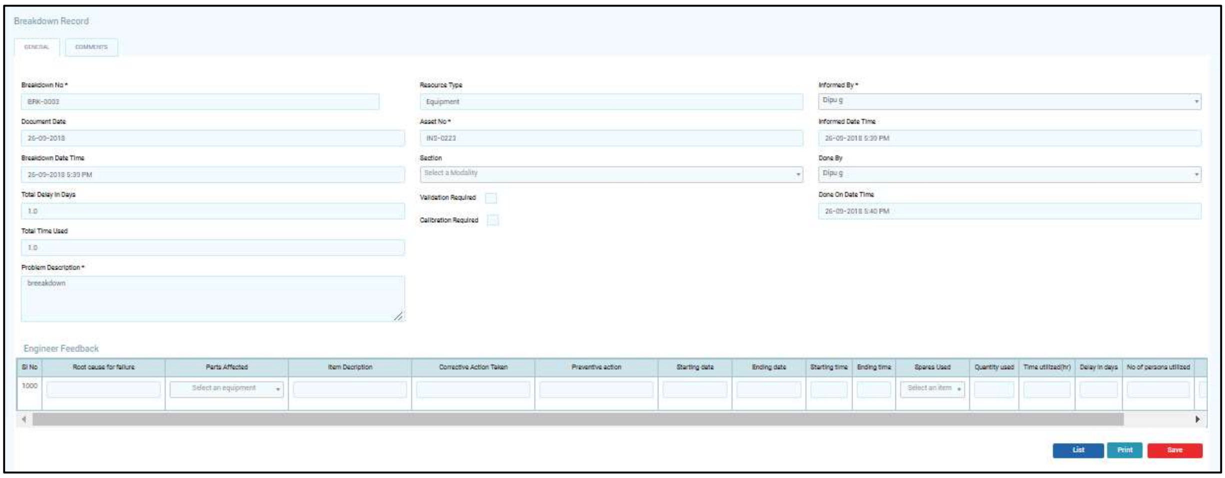


Figure: Posted Breakdown Record

3.11. Product Test Item

In Product Test Item, the user will be able to create and manage details of a complete product test system. Breakdown Records can be created for a Product Test Item. The user will be able to create the product test item details against an Item Part number (The Item part number and other related information like description, modality and manufacturing part number will be downloaded from Navision). The Item part number will be linked with HLA and sub assembly part numbers. If PCB Assembly Only HLA Need to be Filled / If HLA then Sub Assembly need to be filled.

There will be 12 sections (tabs) with below headings. The user will have option to select the section which is applicable for the part number and only the selected section's tab will be generated for the data entry.

1. Offline PROGRAMMING
2. Online PROGRAMMING
3. IN CIRCUIT TESTING
4. FLYING PROBE TESTING
5. Boundary Scan Test
6. FCT
7. Temp. Cycling (RELIABILITY TESTING)
8. Burn-in Test (RELIABILITY TESTING)
9. Thermal Shock (RELIABILITY TESTING)
10. Vibration Test(RELIABILITY TESTING)
11. Electrical Safety Tests
    a. Hipot Test(Electrical Safety Tests)
    b. Ground bond test(Electrical Safety Tests)

3.11.1. Create Product Test Item

The user will have option to create product test item. For that the user has to select the Item number and the description, modality and customer data will be loaded for that item from the item card. Click on create button, the product test item will be created. The user will be redirected to Product Test Item page.

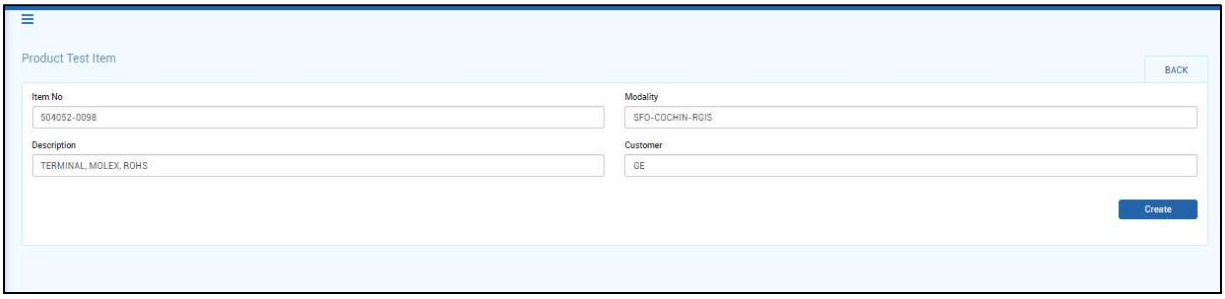


Figure: Create Product Test Item

The user will be able to create a Subassembly item by clicking on the ‘Sub-assemblies. Button. The user will be able to create a new product test item by clicking on “Create New”. Also, the user will be able to delete a product test item by clicking on “Destroy” button. By clicking on the test details link, the user will be able to select the test details associated with that product test item. By clicking on the Update Test Item button, the page will be populated with the relevant filed associated with the selected test items.

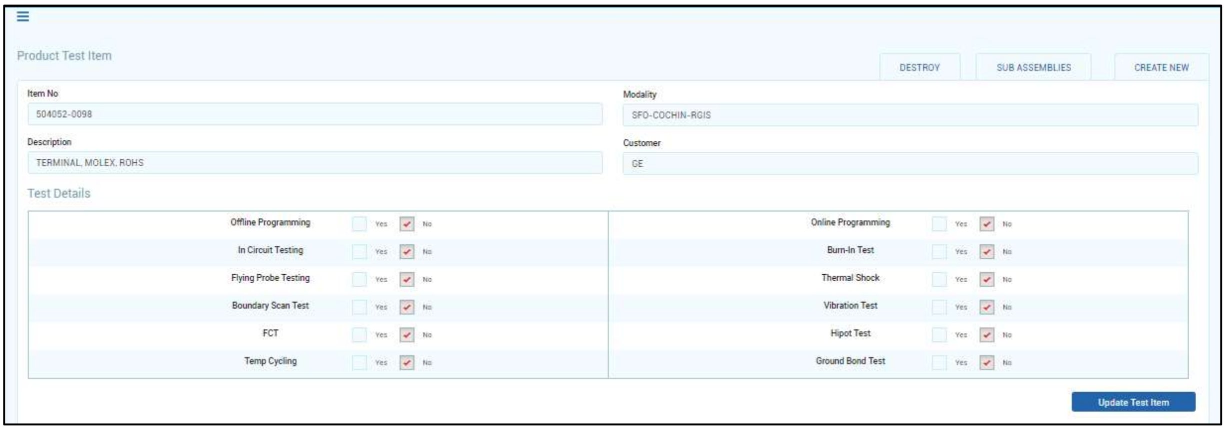


Figure: Product Test Item Page.

The user will be able to search or select the existing product test item from the menu icon on top left of the screen.

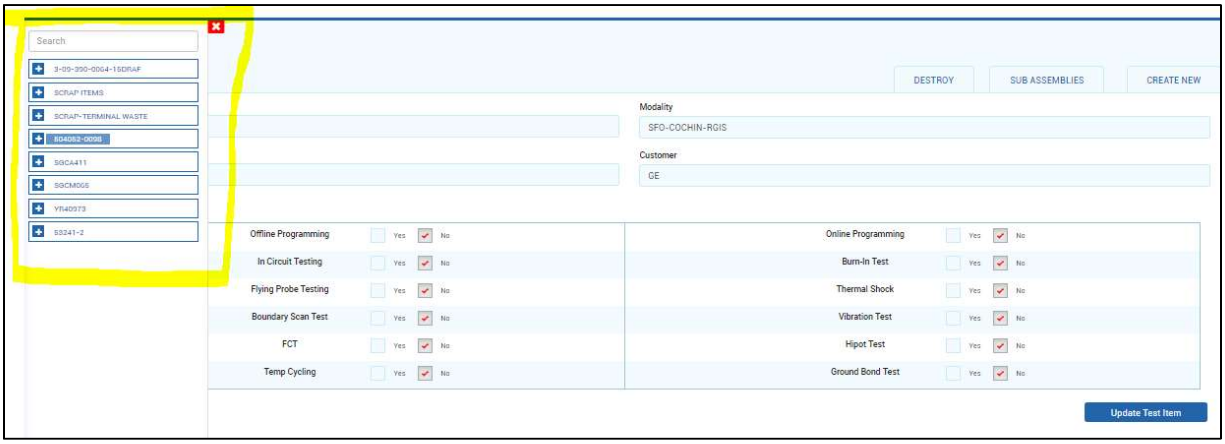


Figure: Product Test Item Search Page.

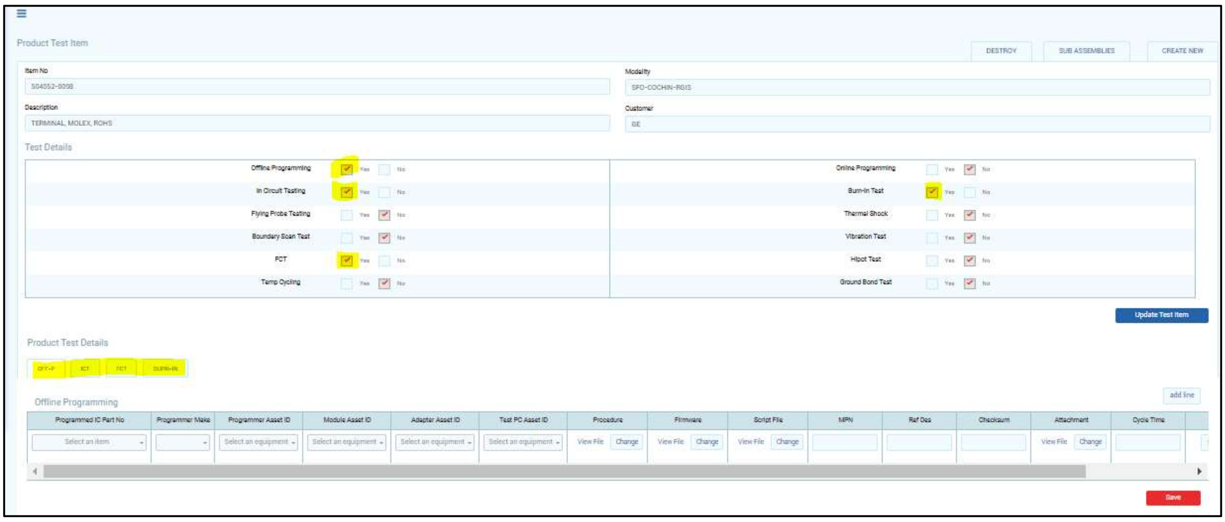


Figure: Product Test Item with test details.

The user will be able to Add sub-assemblies to existing product test item by clicking on the Add sub assembly button. To add a sub-assembly item, select the sub assembly item from the list, click on the "Plus" button and click on the "Update" button. This will add the sub assembly item.

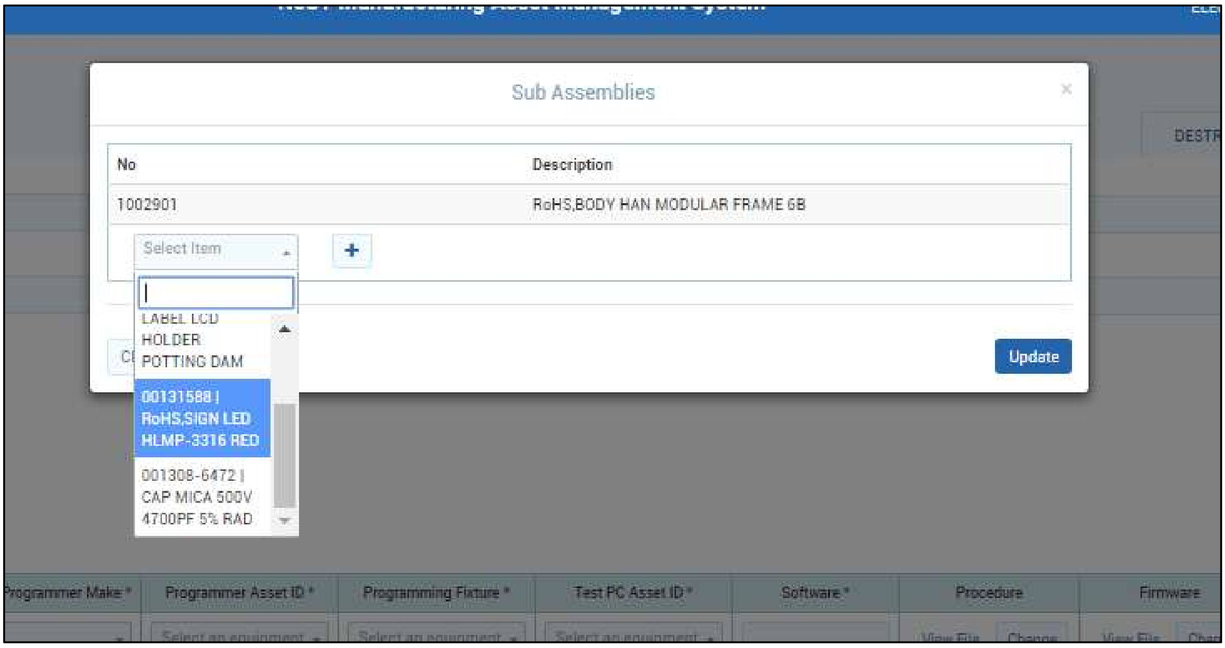


Figure: Add Sub assembly to Product Test Item.

3.11.2. Field Description – Product Test Item

Field	Location from where data to be fetched	Remarks	
General Information			
Item Number	*Nav*		
Description	*Nav*		
Modality	*Nav*		
Customer	*Nav*		
Type of assembly	*HLA/ PCBA*	If PCB Assembly Only HLA Need to be Filled / If HLA then Sub Assembly need to be filled	
HLA Part NO	Nav		
Sub assy 1 part No	Nav	*link to Subassemblytest page*	
Sub assy 2 part No	Nav		
Sub assy 3 part No	Nav	Autopopulate	

Offline PROGRAMMING			
Offline Programming	Yes/ No		
Programmed IC part no	Nav	SFO programmed part number	
Programmer Make	BPM/ALL-100/ALL-11/XELTEK	select from Programmer make master	
Programmer Asset ID	*Equipment Master*		
Module Asset ID	*Equioment Master*		
Adapter Asset ID	*Equipment Master*		
Programming Procedure	*Share point Link*	*Document upload*	
Programming Firmware	*Share point Link*	*Document upload*	
Programming File	*Share point Link*	*Document upload*	
MPN		*From ItemCard*	
Ref Des	*Manual entry*		
Checksum	*Manual entry*		Optional Entry
Line In Charge	*Domain username pick*		

Online PROGRAMMING			
Online Programming	Yes/ No		
Programmed IC part#	Nav		
Programmer Make		select from Programmer make master	
Programmer Asset ID	*Equipment Master*		
Programming fixture	*Equipment Master*		
Programming software	*Equipment Master*		Mandatory
Programming Procedure	*Share point Link*	*Document upload*	
Programing firmware	*Share point Link*		
MPN			
Ref Des	*Manual entry*		
Checksum	*Manual entry*		
Line In Charge	*Domain username pick*		

IN CIRCUIT TESTING	Yes/ No		
ICT Machine	Agilent/Teradyne/ Aerorflex/ Jet	select from Master	
ICT Machine Asset ID	*Equipment Master*		
ICT Fixture Asset ID	*Equipment Master*		
ICT Software Validation Report	*Share point Link*		
ICT Fixture Validation Report	*Share point Link*	*Document upload*	
ICT Coverage Report	*Share point Link*		
ICT IQOQPQ	*Share point Link*	*Document upload*	
ICT Cycle Time	H:M: S (*Manual entry)*		
Fixture Spare list	*NAV part number Pick list*	*Refer list Details Page (autopopulate) Table: Spare List*	
Line In Charge	*Domain username pick*		

FLYING PROBE TESTING	Yes/ No		
FPT Stage	Top/Bottom/Top & Bottom	3 options to select from	
FPT Machine	Takaya	select from Master	
FPT Machine Asset ID	Equipment master		
FPT Fixture Asset ID	Equipment master	Optional	
FPT Procedure Documents	*Share point Link*	*Document upload*	
FPT Program .SWX Files	*Share point Link*	*Document upload*	
FPT Coverage report	*Share point Link*	*Document upload*	
FPT validation Report	*Share point Link*	*Document upload*	
FPT IQOQPQ	*Share point Link*	*Document upload*	
Spare list	*NAV part number Pick list*	*Refer Table: Spare List*	
FPT Validation Date			
FPT Cycle Time	Hour:Minute: Seconds		
Line In Charge	*Domain username pick*		

Boundary Scan Test	Yes/ No		
Boundary Scan Software Make	Corelis/JTAG/XJTAG	Select from Master	

Boundary Scan software Asset ID	Equipment Master		
Boundary Scan fixture Asset ID	Equipment Master	Multiple	
No of Hardware Tools Used	Manual entry	Autopopulate	
H/W Tool Description	Equipment Master	line	
H/w Tool Asset ID	Equipment Master	line	
Boundary Scan program	Sharepoint link	Document Upload	
Boundary Scan test cycle time	Manual entry(H:MM:SS)		
Line In Charge	*username pick*		

FCT	Yes/ No		
FCT procedure	Share point Link	Document upload	
FCT - IQOQPQ	*Share point Link*	*Document upload*	
Master card Avaialable	Yes/No		
FCT Spare Details	*Yes/No*		
FCT Cycle Time	*Manual entry (H:MM:SS)*		
Spare list	*List Open (NAV part list)*	*Refer list Details Page (autopopulate) Table: Spare List*	
Line In Charge	*Domain username pick*		
Conformal Coating Applicable	*Yes/No*		
Number of FCT stages	*Manual entry (name as FCT, FCT-2 etc)*	Autopopulate	
FCT Stage Name	*Select from a List*	Select from Master	analog/RF/Source/FVT/post conformal, post burn in
FCT report format #	*Sharepoint Link*		
No of FCT	*Manual Entry*	Autopopulate	

Stations			
FCT Fixture Asset ID	*Equipment Master*	Need to add multiple Equipments	
FCT Fixture Asset ID	*Equipment Master*	Need to add multiple Equipments	Repeated for each item above.

RELIABILITY TESTING

Temp. Cycling	Yes/ No		
Third Party Lab	Yes/ No		
Lab Details	Select from List(NAV)	NAV Supplier list	Need to Show a Short description of Navision
Temperature Cycling Equipment Make		Select from Master	
Equipment Asset ID	Equipment Master		
Temp. Cycling fixture Asset ID	*Equipment Master*		
Temp. Cycling procedure	*Share point Link*	*Document upload*	
Temp Cycling Test time	*Manual entry*		
Batch Qty	*Manual entry*		
Temperature Max	*Manual entry*		
Temperature Min	*Manual entry*		
Chamber Program File	*Share point Link*	Document upload	
Spare List	*List Open (NAV part list)*	*Refer list Details Page. Table: Spare List*	
Cycle Time	*Manual entry (H:MM:SS)*		
Line in charge	*Domain username pick*		

Burn-in Test	Yes/ No		
Heat Room Required	Yes/ No		
Heat Room Asset ID	Equipment Master		
Burn-in procedure	*Share point Link*	*Document upload*	
Burn-in fixture Asset ID	*Equipment Master*		

Burn-in temp	*Manual entry*		
Burn-in Duration	*Manual entry*		
Batch Qty	*Manual entry*		
Temperature	*Manual entry*		
Spare List	*List Open (NAV part list)*	*Refer list Details Page. Table: Spare List*	
Cycle Time	*Manual entry (H:MM:SS)*		
Line in charge	*Domain username pick*		

Thermal Shock	Yes/ No		
Third Party Lab	Yes/ No		
Lab Details	Manual entry	NAV Supplier list	
Thermal Shock Equipment Make		Select from Master	
Equipment Asset ID	Equipment Master		
Thermal Shock fixture Asset ID	*Equipment Master*		
Thermal Shock procedure	*Share point Link*	*Document upload*	
Thermal Shock Test time	*Manual entry*		
Batch Qty	*Manual entry*		
Temperature Max	*Manual entry*		
Temperature Min	*Manual entry*		
Chamber Program File	*Share point Link*	Document upload	
Spare List	*List Open (NAV part list)*	*Refer list Details Page. Table: Spare List*	
Cycle Time	*Manual entry (H:MM:SS)*		
Line in charge	*Domain username pick*		

Vibration test	Yes/ No		
Third Party Lab	Yes/ No		
Lab Details	Manual entry	NAV Supplier list	
Vibration test procedure	Sharepoint Link		
Vibration test fixture	Equipment Master Card		
Test time			
Batch qty			

Vibration parameters	String		
Spare List	*List Open (NAV part list)*	*Refer list Details Page. Table: Spare List*	
Cycle Time	*Manual entry (H:MM:SS)*		
Line in charge	User		

Electrical Safety Tests

Hipot test	Yes/ No		
Hipot test procedure	*Share point Link*	*Document upload*	
Hipot test fixture	*Equipment Master*		
Validated Hipot Tester	*Equipment Master*		
Hipot test time	*time*		
Hipot test voltage	*string*		
Spare List	*List Open (NAV part list)*	*Refer list Details Page. Table: Spare List*	
Cycle Time	*Manual entry (H:MM:SS)*		
Line in charge	*username pick*		

Ground bond test	Yes/ No		
Ground bond test procedure	*Share point Link*	*Document upload*	
Ground bond fixture	*Equipment Master*		
Validated ground bond Tester	*Equipment Master*		
Ground bond test time	*Manual entry*		
Ground Bond test current	*Manual entry*		
Spare List	*List Open (NAV part list)*	*Refer list Details Page. Table: Spare List*	
Cycle Time	*Manual entry (H:MM:SS)*		
Line in charge	*Domain username pick*		

3.12. Safety Stock Report

This functionality allows the company to list all the items with inventory less than safety stock mentioned in Navison. This page will include fields like item, modality, item part number, Manufacturing part number, inventory, safety stock and inventory posting group. There will be provision to search item based on Item number and Modality. When the inventory goes beyond the safety stock level, that row will be highlighted as RED.

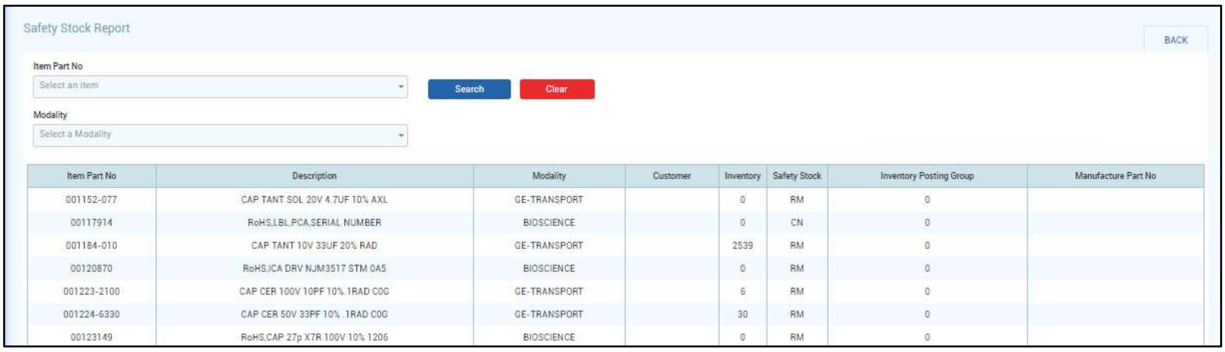


Figure: Safety Stock Report.

3.13. Admin Functionalities

3.13.1. User Creation

Admin will be authorized to handle the functions related to user creation and management. Admin shall be authorized to assign various roles to the user. The login will be based on Windows Authentication.

3.13.1.1. User list

There will be a user list where admin user will be able to view the list of users in the system. The Admin user will be able to create new users by clicking on the “New User” button. Also, the users can be searched using their user name, e-mail. There will be option to edit and delete an existing user.

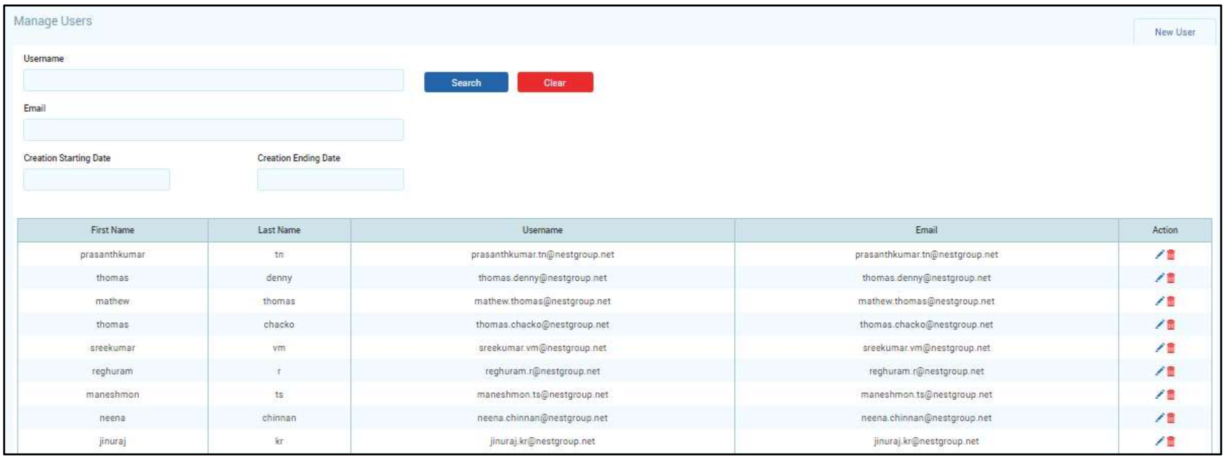


Figure: User List.

3.13.1.2. User Details / Assigning Roles to users

When the user clicks on edit button the user will be redirected to the user details page. He will be able to Add Roles for the selected companies. The user needs to be assigned to respective roles for performing activities in the system. Also the user will be able to set a user as admin by ticking on the "Is admin" check box.

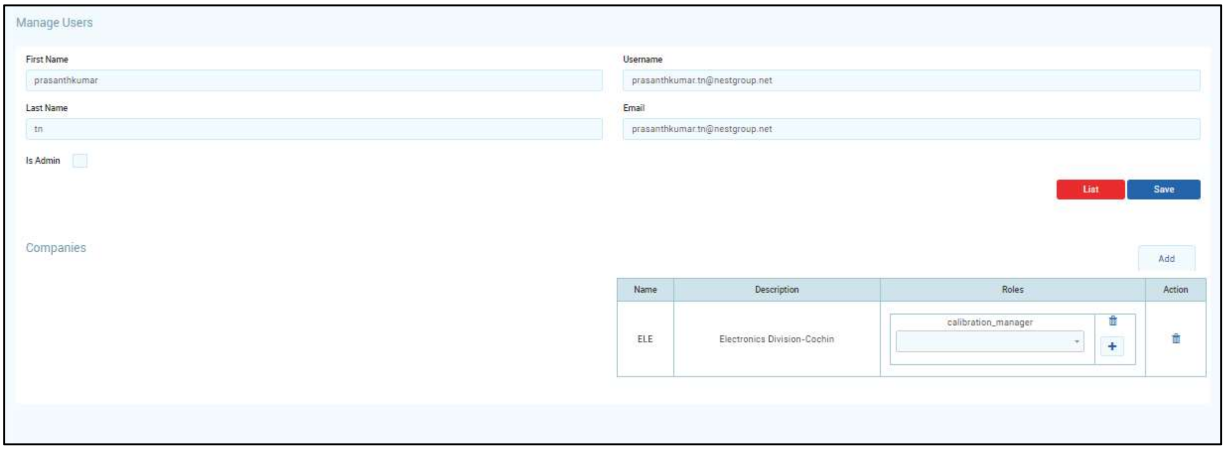


Figure: User Details.

3.13.1.3. Add New User

The new user can be added by clicking on the "New User" button from the user list. Provide the User Full name, username (SFO windows login name) and SFO Email ID and click on submit. This will create the user.

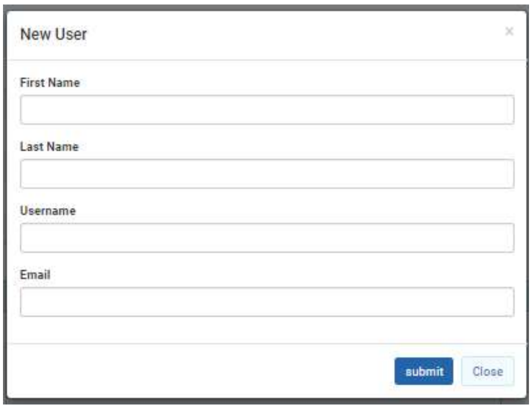


Figure: Create User.

3.13.1.4. Manage Roles

For restricting the access to data for the users, effective role management is important. So, we have introduced Role – Privilege mechanism in the system. The users will be assigned to roles inside companies and every role will have privileges. The data and the functionality will be controlled by privileges. Some of the roles are default role and that cannot be deleted.

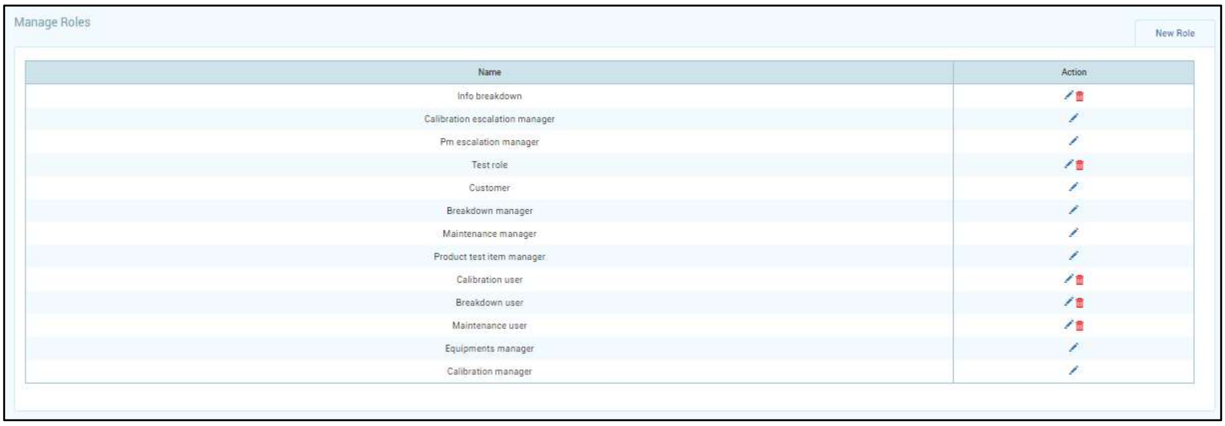
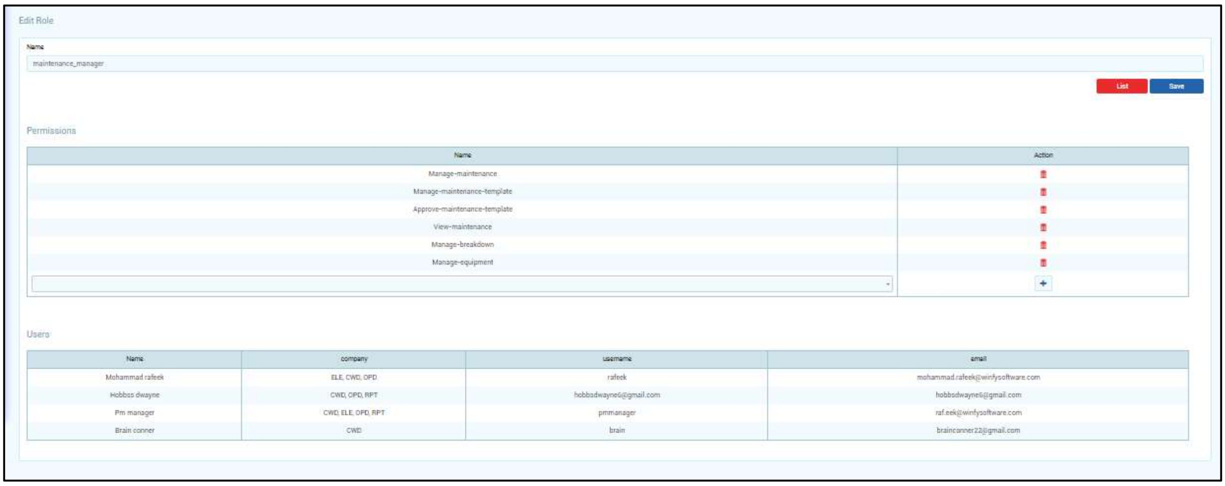


Figure: Role List.

For creating the new role, click on new role button from the list, the user will be redirected to the following page.

Figure: New Role.

Enter the name of the role and click on submit. The user will be redirected to the Role list and the new role will be listed there. Click on edit. The Following screen will come.



Edit Role

Name

maintenance_manager

List | Save

Permissions

Name	Action
Manage-maintenance	
Manage-maintenance-template	
Approve-maintenance-template	
View-maintenance	
Manage-breakdown	
Manage-equipment	

Users

Name	company	username	email
Mohammad rafeek	ELE, CWD, OPD	rafeek	mohammad.rafeek@winfysoftware.com
Hobbss dwayne	CWD, OPD, RPT	hobbsdwayne6@gmail.com	hobbsdwayne6@gmail.com
Pm manager	CWD, ELE, OPD, RPT	pmmanager	raf.eek@winfysoftware.com
Brain conner	CWD	brain	brainconner22@gmail.com

Figure: Role Details.

The user will be able to assign privileges to the role. Also, the users assigned to that role will be listed there.

3.13.2. Number Series (Prefix Definition for Record ID's) :

Admin shall be entitled to define the number series of all the records in the system.

Number Series

New

Code	Type	Default	Manual	Description	Starting NO	Ending NO	Starting Date	Ending Date	Status	Last Date Used	Last No Used	
INS	Equipment	✓		Machine number	INS-000		16-11-2017	01-08-2018	Inactive	07-08-2018	INS-0096	
CWDD	Calibration record	✓	✓	CWD num series	CWD-0000		24-05-2018		Active	07-09-2018	CWDD-0043	
NOD	Maintenance record	✓		NOD	NOD-0001		01-08-2018		Active	07-09-2018	NOD-0037	
NUM	Breakdown record	✓		NUM	NUM-0001		02-08-2018		Active	06-09-2018	NUM-0064	
RAF		✓	✓	TEST Series2	RAF-0000	RAF-0002	02-08-2018		Active	02-08-2018	RAF-0009	
TST		✓		TEST Series1	TST-000	TST-0006	03-08-2018		Active	07-08-2018	TST-0009	
AST	Equipment	✓	✓	Number Series for Asset	AST-001		07-08-2018		Active	01-10-2018	AST-0019	
Test		✓		Test desc	Test-0000	Test-0002	07-08-2018		Active	07-08-2018	Test-0000	
TS	Equipment	✓		TEST Series	TS-0001		08-08-2018		Active	01-10-2018	TS-0013	
EQT	Equipment	✓		EQT	EQT-0001	EQT-0002	15-08-2018	15-08-2018	Inactive	15-08-2018	EQT-0002	
EQPCWD	Equipment	✓		EQPCWD	EQPCWD-0001	EQPCWD-0100	16-08-2018		Active	05-09-2018	EQPCWD-0010	
INS	Calibration record	✓	✓	INS	INS-0001		04-09-2018		Active	07-09-2018	INS-0010	
SFOIT	Equipment	✓	✓	SFOIT	SFOIT-0001		04-09-2018		Active	07-09-2018	SFOIT-0001	
EQPMNT	Equipment	✓		equipment	EQPMNT-0000	EQPMNT-1000	06-09-2018		Active	06-09-2018	EQPMNT-0000	

Figure: Number Series List

Admin will be able to create new number series for equipment/ Calibration / PM / Breakdown. Admin will be able to provide a Code, staring number, ending number, if any and can set a number series to its default. So, while creating a new record for asset the default asst code will be selected by default. Admin will be able to activate / deactivate a number series.

Figure: Number Series Details

3.13.3. Master entries

There will a single page for create and managing master values like Asset Category, Asset Class and Departmental Location etc. There will be single form for creating these records and there will be also a dropdown for specifying the type of these records. By changing the type, the corresponding master values will be loaded. There will be option to delete the mater values.

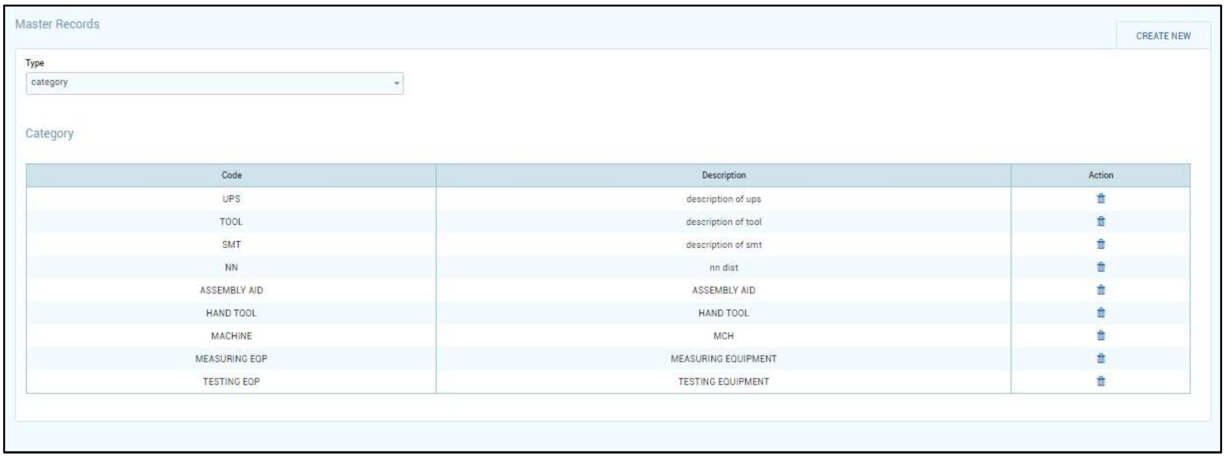


Figure: Master Table List

For Create a new master record, click on the “Create New” button, Provide code and Description along with the Type. The new record will be created.

Figure: Master Table Details

3.14. Navision Integration.

The system will be integrated with Navision for fetching data from Navision. The data from the following tables will be fetched on a daily basis.

1. Customer Table
2. Modality Table
3. Currency Table
4. Vendor Table
5. Item Table.