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# INTRODUCTION

This document details the Factory Acceptance Testing (FAT) migration existing System to TAS, PLC and Loading System.

## Glossary of Terms & Acronyms Used In This Manual

| **Term or Acronym** | **Context** | **Meaning** |
| --- | --- | --- |
| N/A | Not application | The test or check that not applicable to specify items |
| PLC | Control system | Programmable Logic Control |
| HMI | Control system | Human Machine Interface |
| TAS | Control system | Terminal Automation System |
| OPC | Communication protocol | Open Platform Communications |
| FAT |  | Factory Acceptance Test |

## FAT Location

The FAT Location will be at SAS Tech Solution Workshop in Rayong Province.

## Procedure for Non-Conformities

After the test and verification of each item then it shall be marked as completed. If any malfunction is detected, the test sequence shall be repeated. If the malfunction cannot be reproduced, the error shall be investigated after the completion of the FAT - with an entry to be made into the FAT Configuration query file. If the error can be reproduced, the test will be continued and the error logged on the punch-list sheets. Where possible the fault will be corrected prior to being re-tested on the next day or prior to the completion of the FAT. If this is not possible, a further entry shall be made into the FAT Configuration query file. SAS Tech will rectify and re-test these defects after the FAT has been completed.

Once the FAT has been successfully completed, the nominated customer and SAS Tech representatives shall sign the FAT Completion Certificate. At this point the FAT shall be deemed to be complete and commissioning contingent upon any defects noted in the FAT Configuration query index being rectified.

## FAT Objectives

The objectives of the FAT are to establish within reasonable time and cost that the control systems can be commissioned on site for plant operations with minimum of problems, and that they will perform as defined in the approved documents.

## FAT Test Architecture

There is limitation of prepare hardware to be the same as real design control system. So the FAT cannot prepare all hardware to be same as real use. The system overview as below is prepared for FAT.

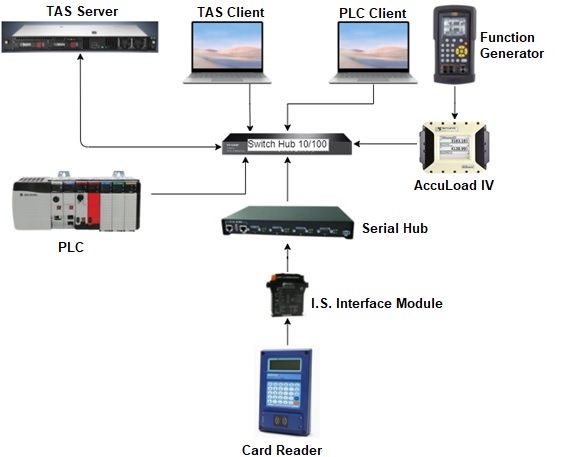


Figure System Configuration for FAT

## BOM Check List

### Hardware

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Item** | **Name** | **Description** | **Qty** | **Unit** | **Pass/Fail** | **Remark** |
| 1 | HPE ProLiant DL360 | TAS Server/Database | 1 | Set |  |  |
| 2 | Laptop | TAS Client/PLC Client | 1 | Set |  |  |
| 3 | Switch Hub | Ethernet Communication | 1 | Set |  |  |
| 4 | Mercury 2 + Terminal | Card Reader | 1 | Set |  |  |
| 5 | Smitch AccuLoad IV | AccuLoad Batch Controller | 1 | Set |  |  |
| 6 | Serial Hub | Serial Hub Communication | 1 | Set |  |  |
| 7 | Yokohama Function Generator | Function Generator | 1 | Set |  |  |
| 8 | PLC Allen Bradley | Programmable logic Control | 1 | Set |  |  |
| 9 | Card Reader & Interface Module | Card Reader & Interface Module | 1 | Set |  |  |

### IP Address List

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Item** | **Name** | **IP Address** | **Pass/Fail** | **Remark** |
| 1 | HPE ProLiant DL360/TAS Server | 1.1.21.5 |  |  |
| 2 | Laptop 1/ PLC Simulator | 1.1.21.11 |  |  |
| 3 | Laptop 2/ TAS Client | 1.1.21.12 |  |  |
| 4 | PLC | 1.1.21.41 |  |  |
| 5 | AccuLoad IV | 1.1.21.61 |  |  |

### Software

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Item** | **Name** | **Description** | **Qty** | **Unit** | **Pass/Fail** | **Remark** |
| 1 | KEPServerEx6.9 | OPC Server | 1 | License |  |  |
| 2 | Oracle 11G R2 | TAS Database Server | 1 | License |  |  |
| 3 | Visual Studio 2022 | Code Editing | 1 | License |  |  |
| 4 | Comtrol Device Management Console | Serial Hub Communication | 1 | License |  |  |
| 5 | Studio 5000 Logix designer v32 | PLC Simulator | 1 | License |  |  |

## PLC Function Design

### DI Mapping - Routine name: \_01\_DI\_Mapping

New tags for input modification defined as table and picture below.

|  |  |  |  |
| --- | --- | --- | --- |
| **Tag** | **Service** | **I/O assignment** | **R/W format** |
| f\_360L\_HZA………… | ESD (Bay 6) | Local3I.Data……. | R/W |
| f\_360L\_GZS….…….. | Block Valve Bay 6 | Local3I.Data……. | R/W |
| f\_360L\_GZS………… | Earth Bay 6 | Local3I.Data……. | R/W |
| f\_GZS..….\_M…..A | Arm Side A Bay 6 | Local3I.Data……. | R/W |
| f\_Earth\_BAY6 | Earth (Bay 6) | Local3I.Data……. | R/W |
| f\_ACL31\_Permissive | Permissive(to ACL31) | Local3I.Data……. | R/W |

Figure 1.7.1 DI Mapping

**Remark**:

* Request owner to give 1 point DO and define tag name to command Relay change communication Card Reader Bay5.
* No modification for DO until received DO point and tag name from owner.

## TAS Interface Test with Devices

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Description :** Connect Device | | | | |
| **Item** | **Function** | **Result** | | **Remark** |
| **Pass** | **Fail** |  |
| 1. | TAS PLC Interface Connect Kepware OPC (127.0.0.1:49320) | □ | □ |  |
| 2. | Kepware OPC Connect to PLC | □ | □ |  |
| 3. | TAS PCRBay Interface Connect to Card Reader Bay 6 | □ | □ |  |
| 4. | TAS Interface PAccuload Connect to AccuLoad IV | □ | □ |  |
| 5. | TAS Client Connect to Database Server | □ | □ |  |
| **Note :** | | | | |

## PLC IO Module Test

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Description :** PLC Module Test | | | | | |
| **Item** | **Function** | | **Result** | | **Remark** |
| **IO Address** | **PLC Tag** | **Pass** | **Fail** |
| 1 | Local:3:I.DATA…………. | f\_360L\_HZA………… | □ | □ |  |
| 2 | Local:3:I.DATA…………. | f\_360L\_GZS….……… | □ | □ |  |
| 3 | Local:3:I.DATA…………. | f\_360L\_GZS…………. | □ | □ |  |
| 4 | Local:3:I.DATA…………. | f\_GZS..….\_M…..A | □ | □ |  |
| 5 | Local:3:I.DATA…………. | f\_Earth\_BAY6 | □ | □ |  |
| 6 | Local:3:I.DATA…………. | f\_ACL31\_Permissive | □ | □ |  |
| **Note :** | | | | | |

## Kepware OPC Data Test

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Title:** PLC Module Test | | | | | |
| **Item** | **Function** | | **Result** | | **Remark** |
| **OPC TAG** | **Description** | **Pass** | **Fail** |
| 1 | f\_360L\_HZA………… | ESD (Bay 6) | □ | □ |  |
| 2 | f\_360L\_GZS….……… | Block Valve Bay 6 | □ | □ |  |
| 3 | f\_360L\_GZS…………. | Earth Bay 6 | □ | □ |  |
| 4 | f\_GZS..….\_M…..A | Arm Side A Bay 6 | □ | □ |  |
| 5 | f\_Earth\_BAY6 | Earth (Bay 6) | □ | □ |  |
| 6 | f\_ACL31\_Permissive | Permissive(to ACL31) | □ | □ |  |
| **Note :** | | | | | |

|  |  |
| --- | --- |
| **Check-list sign-off** | |
| Tester (Name) | Signature and Date |
|  |  |
| Customer Approver (Name) | Signature and Date |
|  |  |

# TAS Functional Test

## Create a Ticket Delivery Order (Create DO)

Creation product ticket from the TAS system is used as the default information to create order.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Description :** Create DO Sulphuric Acid Product | | | | |
| **Item** | **Function** | **Result** | | **Remark** |
| **Pass** | **Fail** |
| 1. | Create DO Sulphuric Acid Product | □ | □ |  |
| Note: Create DO | | | | |

## Create Load

The product and quantity obtained from the tickets creation. The system will (DO) arrange the compartment for the truck and check the vehicle information and permission for driver and card (Black List, Expiration Date) before creating a settlement and printing a filly guide. Then after the payment is created successfully, Driver can use the fill rate to create a filling invoice and payout.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Description :** Create Load | | | | |
| **Item** | **Function** | **Result** | | **Remark** |
| **Pass** | **Fail** |
| 1. | TAS Create Load | □ | □ |  |
| Note :Create Load | | | | |

## Tap The Entrance Gate

The driver must tap the card on card reader (Entrance Gate) before truck through to loading area for receive the product, The system will check the load status. In case the entrance card is not reached when touching the card, the Gate Barrier will not open. Tapping the card at the entrance is as follows:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Description :** Tap The Entrance Gate | | | | |
| **Item** | **Function** | **Result** | | **Remark** |
| **Pass** | **Fail** |
| 1. | Tap The Entrance Gate Success : | □ | □ |  |
| Note: Tap The Entrance Gate | | | | |

## Tap the Card at Bay

the driver must tap the card at the payer card reader to begin the process of receiving the product according to the refill instructions. Tapping a card at the bay is as follows:

1. The driver takes the truck to the pay plant as specified in the refill instructions.
2. The driver connects the ground line and puts the proboscis into the vehicle's inlet.
3. The driver taps the card at the payer card reader. Interlock Inspection System

• EARTH A Bay 6

• BALL VALVE A Bay 6

• ESD CCR

• ESD BAY 6

• ESD FIRE ALARM

• ESD GATE HOUSE

• PERMISSIVE A Bay 6

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Description :** **Interlock Bay** | | | | |
| **Item** | **Function** | **Result** | | **Remark** |
| **Pass** | **Fail** |
| **Interlock** **Bay** | | | | |
| 1 | EARTH A Bay 6 | □ | □ |  |
| 2 | BALL VALVE A Bay 6 | □ | □ |  |
| 3 | ESD CCR | □ | □ |  |
| 4 | ESD BAY 6 | □ | □ |  |
| 5 | ESD FIRE ALARM | □ | □ |  |
| 6 | ESD GATE HOUSE | □ | □ |  |
| 7 | PERMISSIVE A Bay 7 | □ | □ |  |
| Note: | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Description :** **Loading Process** | | | | |
| **Item** | **Function** | **Result** | | **Remark** |
| **Pass** | **Fail** |
| 1 | Start Load By Card Reader (F1-F5) | □ | □ |  |
| 2 | Stop Load By Card Reader (F7) | □ | □ |  |
| 3 | Stop Load (By Permissive) | □ | □ |  |
| 4 | Display Loading Card Reader and Screen Bay Detail | □ | □ |  |
| 5 | Finish Loading | □ | □ |  |
| Note: | | | | |

## Tap The Exit Gate

The driver must tap the card on the balance card reader to record the weight out before taking the vehicle to the exit to finish receiving the product. Tapping a heavy weight card is as follows:

1. The driver puts the car on the scale in the correct position according to the type of vehicle.
2. The driver taps the car card at the card reader.
3. Monitoring System

* If you tap Pass Time Recording, Heavy Weight and Print Delivery Report
* In case of failing to touch the card The system displays a warning message, the driver contacts the staff for further examination and correction.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Description :** Tap The Exit Gate | | | | |
| **Item** | **Function** | **Result** | | **Remark** |
| **Pass** | **Fail** |
| 1. | Tap The Exit Gate Success : | □ | □ |  |
| Note: | | | | |

## Show invoice report

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Description :** Show invoice report | | | | |
| **Item** | **Function** | **Result** | | **Remark** |
| **Pass** | **Fail** |
| 1. | Show invoice report: | □ | □ |  |
| Note: | | | | |

|  |  |
| --- | --- |
| **Check-list sign-off** | |
| Tester (Name) | Signature and Date |
|  |  |
| Customer Approver (Name) | Signature and Date |
|  |  |

# PUNCH LIST

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Log No** | **Description** | **Date** | **Signed** | **Retested and OK Signed** | **Comments** |
| 1 |  |  |  |  |  |
| 2 |  |  |  |  |  |
| 3 |  |  |  |  |  |
| 4 |  |  |  |  |  |
| 5 |  |  |  |  |  |
| 6 |  |  |  |  |  |
| 7 |  |  |  |  |  |
| 8 |  |  |  |  |  |
| 9 |  |  |  |  |  |
| 10 |  |  |  |  |  |
| 11 |  |  |  |  |  |
| 12 |  |  |  |  |  |
| 13 |  |  |  |  |  |
| 14 |  |  |  |  |  |
| 15 |  |  |  |  |  |
| 16 |  |  |  |  |  |
| 17 |  |  |  |  |  |
| 18 |  |  |  |  |  |
| 19 |  |  |  |  |  |
| 20 |  |  |  |  |  |