Automation Modernization Program (AMP)

Los Angeles Refinery

LAR #1 Project

LAR1 AMP BPCS Configuration Project
BPCS Cabinet Layout Sketch (C300) - Carson

Revision and Approvals					
Rev.	**Date**	**Reason for Issue**	**Originated By**	**Checked By**	**Approved By**
D	23-Aug-22	Issued for Approval	JTJ	JTJ	HR
0	26-Sep-22	Issued for Design	JTJ	JP	HR

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Revision Description Sheet

Rev.	Revision Description	Section / Page
A	Issued for Review	All
B	Issued for Review (Internal) - IO Module Positions updated to LLMUX, AI, AO, DI, DO position convention	4.1, 4.2, 4.3
C	Issued for Review (Internal) - Updated Controller No.'s and Cabinet No.'s	4.1, 4.2, 4.3
C1	Issued for Review (Internal) - Cabinet No.'s updated	4.1, 4.2, 4.3
D	Issued for Approval - Document Number updated from 747002-LAR1-AUT-DWG-0100 to 747002-LAR1C-AUT-DWG-0100	All
0	Issued for Design - Updated for Issued for Design	All

Notes

Note#	Note Description	Section / Page

Holds

Hold #	Hold Description	Section / Page
1	Document Number and Revision Number to be updated for the MPC LP Refining LAR C300 Hardware Naming Convention (AMP Addendum)	3

1.0 Introduction

1.1 General

The Los Angeles Refinery (LAR) Refinery is undergoing an Automation Modernization Program (AMP) Project to replace obsolete automation equipment and migrate the existing functionality and operability to the Honeywell EPKS platform.

The LAR1 project scope is to migrate and/or upgrade the existing functionality and operability of identified obsolete refinery blending application and the BPCS along with operator and engineering stations to comply with current industry standards and practices.

1.2 Purpose of Document

The purpose of this document is to define the IO module allocation for the Honeywell C300 controllers.

1.3 Basis for Controller and IO Cabinet Allocation

Controller Loading:
The controller loading is as per the requirements of the specification 'BPCS and SIS Loading Guidelines' (AMP-GBL-AUT-GDL-001_A1). Section 3.3.3 The total number of I/O points for each controller shall not exceed 634 (Total Available I/O = 1056 /40% (25% Installed Spare + 15% Spare for Future Expansion). The IO count has been determined from the existing Configured IOs + an additional 40% Spare IO Count (per IO Module IO type).

IO Allocation:
All I/O will be Series C I/O Module (UIO). As per the specification 'Experion C300 Configuration Specification' (AMP-GBL-PM-SPC-0012_A0) Section 4.3.1 IO redundancy is mandatory.
1.) 20% future spare channels has been considered in the design as per section 3.2 of document "SP-70-01"
2.) An additional 5% is included as based on previous project experience

IOM Positioning:

- Column 1/A/L on C300 cabinet should follow Honeywell/MPC standard of CF9 pair first, followed by C300 pair
- Remainder of first column on cabinet containing C300s should be reserved/used for "special" modules such as EIM's and I/O Link Extenders
- From top of middle column on, typical order is LLMUX -> AI -> AO -> DI -> DO
- Where space allows, leave a minimum of 1 space before switching module types
- RO/Relay Board style DO's should be positioned in bottom right of cabinet
- MOXA modules should be treated as “special” modules and also be reserved for the first cabinet column. Where necessary for cabinet space restrictions, MOXA’s can be allocated to their own cabinet. Under no circumstances should these be mounted on the “sides” of the cabinet or outside of the standard 3 column backplane.

2.0 Acronyms and Definitions

The following table contains definitions of the Acronyms that are used within this document:

Acronym	Description
AI	Analog Input
ALM	Alarm
AMP	Automation Modernization Program
AO	Analog Output
Aux	Auxiliary
BPCS	Basic Process Control System
DI	Digital Input
DO	Digital Output
I/O	Input/Output
N/A	Not Applicable
NIS	Non-Intrinsically Safe
PLC	Programmable Logic Controller
RIO	Remote Input/Output
TBA	To Be Advised
UIO	Universal I/O

Table 2.1: Acronyms

3.0 Reference Documentation

3.1 Codes and Standards

The following table is a list of the Code and Standards applicable to this document.

Document Number	Rev	Document Title
AMP-GBL-PM-SPC-0008	A4	Universal I/O Specification
AMP-GBL-SPC-0012	A0	Experion C300 Configuration Specification
AMP-GBL-PM-GDL-0001	A1	BPCS and SIS Loading Guidelines
HOLD 1	HOLD 1	Marathon Petroleum Company LP Refining LAR C300 Hardware Naming Convention (AMP Addendum)
SP-70-01	30	Instrumentation Design and Engineering Requirements
SP-70-13	4	Instrument Wire and Cable
SP-70-15	4	Local Control Panels

Table 3.1: Codes and Standards

3.2 Project Documentation

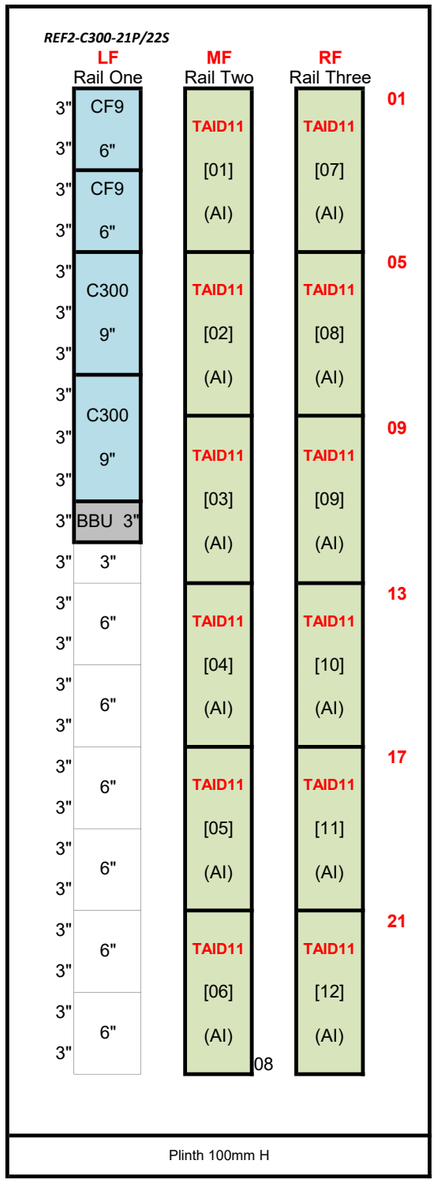
The following table is a list of the Project Specific Reference documentation applicable to this document.

Document Number	Rev	Document Title
747002-LAR1C-AUT-IOA-0100	0	LAR1 AMP BPCS Configuration Project I/O List - Carson Refinery
LAR1 - Controller NamesRUI_Rev.1.xlsx	--	Issued 21-Jul-22

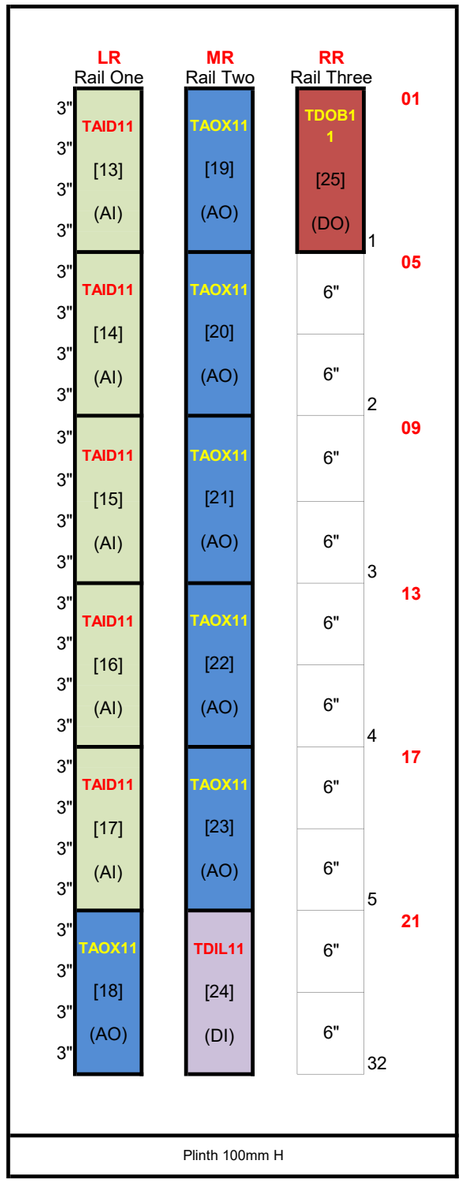
Table 3.2: Project Specific Reference Documentation

4.0 Carson Refinery
4.1 NARIE-C300-21/22 - 2REFORMER System Cabinet
Located in the B-1139 North Area RIE

Cabinet: NARIE-C300-21/22 (FRONT)



Cabinet: NARIE-C300-21/22 (REAR)



LEGEND	
Color	**Description**
	CF9 Firewall and C300 Controller (Controller 1 Black / Controller 2 Yellow)
	Battery Backup Unit
	C300 Analog Input (redundant)
	C300 Analog Output (redundant)
	C300 Discrete Input (redundant)
	C300 Discrete Output (redundant)
	C300 LLMUX
	Series-C Pulse Input

ABCXX	IOTA Type
[CC]	Corresponding Module Number
(AI)	IOTA Signal Type

NOTES	
Sr.	**Description**
1	Bottom row is left empty for future use.
2	Location 1 & 2 kept empty for proximity of the cabinet power supplies.
3	Hardware is provided to accommodate a nominal allowance of 25% spare capacity
4	"SP-70-01" , Section 3.2 states 30% future spare space shall be provided.
5	

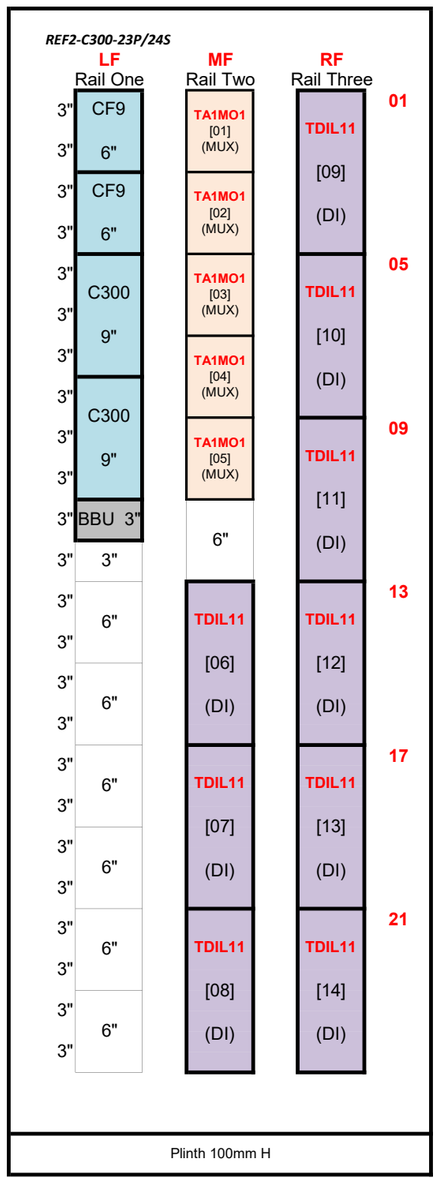
PANEL SPARE SPACE				
Sr.	**Total Space**	**Space Consumed**	**% Space Consumed**	**% Spare Space**
1	32 Slots	24 Slots	75%	25%

IO MODULE DETAILS							
Sr	**Type**	**IOTA**	**Module**	**Sr**	**Type**	**IOTA**	**Module**
1	**AI**	**TAID11**	**CC-PAIH02**	**3**	**AO**	**TAOX11**	**CC-PAOH01**
2	**DI**	**TDIL11**	**CC-PDIL01**	**4**	**DO**	**TDOB11**	**CC-PDOB01**

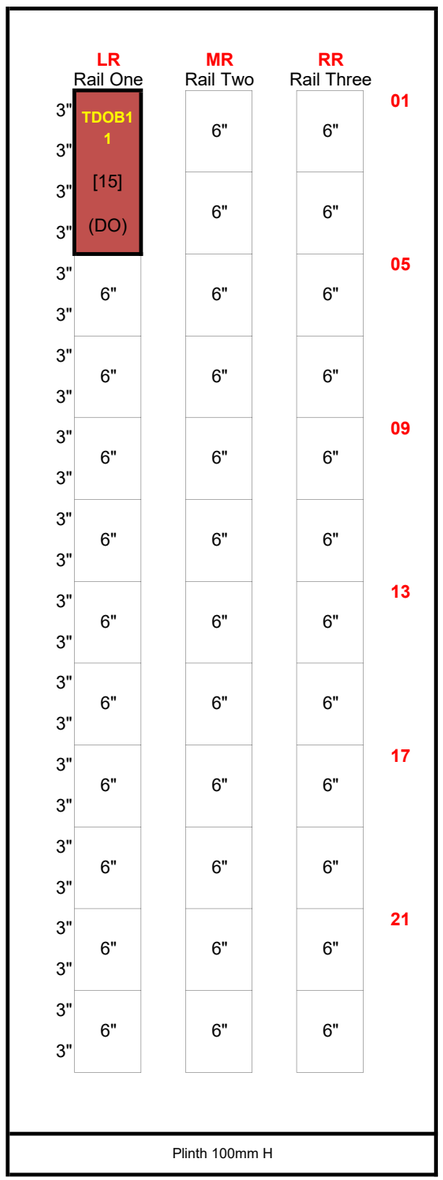
4.2 NARIE-C300-23/24 - 2REFORMER System Cabinet

Located in the B-1139 North Area RIE

Cabinet: NARIE-C300-23/24 (FRONT)



Cabinet: NARIE-C300-23/24 (REAR)



LEGEND	
Color	**Description**
	CF9 Firewall and C300 Controller (Controller 1 Black / Controller 2 Yellow)
	Battery Backup Unit
	C300 Analog Input (redundant)
	C300 Analog Output (redundant)
	C300 Discrete Input (redundant)
	C300 Discrete Output (redundant)
	C300 LLMUX
	Series-C Pulse Input

ABCXX	IOTA Type
[CC]	Corresponding Module Number
(AI)	IOTA Signal Type

NOTES	
Sr.	**Description**
1	Bottom row is left empty for future use.
2	Location 1 & 2 kept empty for proximity of the cabinet power supplies.
3	Hardware is provided to accommodate a nominal allowance of 25% spare capacity
4	"SP-70-01" , Section 3.2 states 30% future spare space shall be provided.
5	

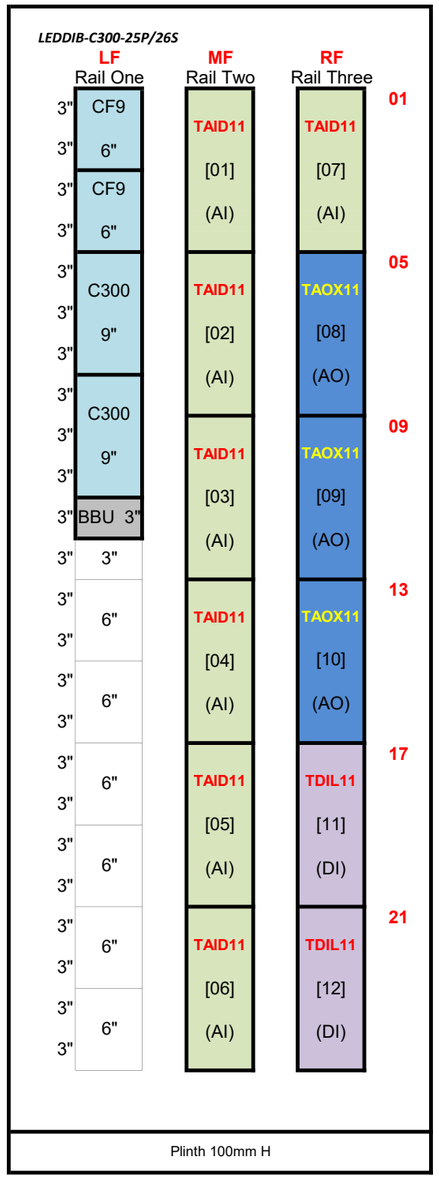
PANEL SPARE SPACE				
Sr.	**Total Space**	**Space Consumed**	**% Space Consumed**	**% Spare Space**
1	32 Slots	12 Slots	38%	63%

IO MODULE DETAILS							
Sr	**Type**	**IOTA**	**Module**	**Sr**	**Type**	**IOTA**	**Module**
1	**AI**	**TAID11**	**CC-PAIH02**	**3**	**AO**	**TAOX11**	**CC-PAOH01**
2	**DI**	**TDIL11**	**CC-PDIL01**	**4**	**DO**	**TDOB11**	**CC-PDOB01**

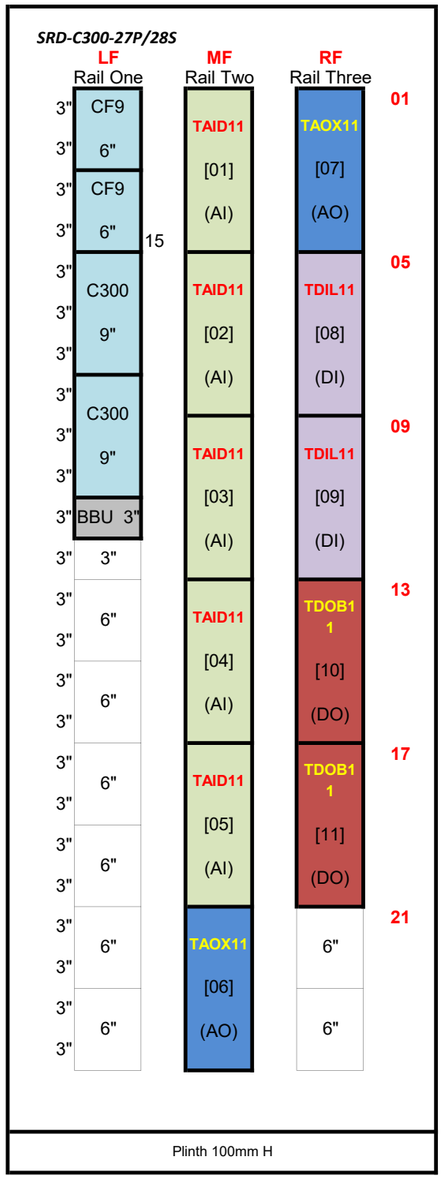
4.3 HCU-C300-25/26 & HCU-C300-27/28 - Alphabet Units System Cabinet

Located in the B-1139 North Area RIE

Cabinet: HCU-C300-25/26



Cabinet: HCU-C300-27/28



LEGEND	
Color	**Description**
	CF9 Firewall and C300 Controller (Controller 1 Black / Controller 2 Yellow)
	Battery Backup Unit
	C300 Analog Input (redundant)
	C300 Analog Output (redundant)
	C300 Discrete Input (redundant)
	C300 Discrete Output (redundant)
	C300 LLMUX
	Series-C Pulse Input

ABCXX	IOTA Type
[CC]	Corresponding Module Number
(AI)	IOTA Signal Type

NOTES	
Sr.	**Description**
1	Bottom row is left empty for future use.
2	Location 1 & 2 kept empty for proximity of the cabinet power supplies.
3	Hardware is provided to accommodate a nominal allowance of 25% spare capacity
4	"SP-70-01" , Section 3.2 states 30% future spare space shall be provided.
5	

HCU-C300-25/26 PANEL SPARE SPACE				
Sr.	**Total Space**	**Space Consumed**	**% Space Consumed**	**% Spare Space**
1	14 Slots	12 Slots	86%	14%

HCU-C300-27/28 PANEL SPARE SPACE				
Sr.	**Total Space**	**Space Consumed**	**% Space Consumed**	**% Spare Space**
1	14 Slots	11 Slots	79%	21%

IO MODULE DETAILS							
Sr	**Type**	**IOTA**	**Module**	**Sr**	**Type**	**IOTA**	**Module**
1	AI	TAID11	CC-PAIH02	3	AO	TAOX11	CC-PAOH01
2	DI	TDIL11	CC-PDIL01	4	DO	TDOB11	CC-PDOB01