

P & I Design Ltd

Process Instrumentation Consultancy & Design

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IMMINGHAM STORAGE CO LTD

WEST TERMINAL

FUELS FACILITY

TANK 103 HEATED DIESEL

DOCUMENTATION MANUAL

Rev	Date	By	Checked	Approved	Description	Client Ref.
A	18.03.15	D. Smith	MM	MM	Original Issue	
						Document No. SI404001_MNL

IF NOT SIGNED THIS DOCUMENT IS UNCONTROLLED

Contents

1. Register Control System
2. Specifications
3. Drawings and Schedules
4. Installation Scope of Work



Section 1
Register Control System



CLIENT:
Immingham Storage Co Ltd
West Terminal

REV	DATE	BY	CHKD	APPD
A	18.03.15	DS	MM	MM

CLIENT REF.

P & I REF.
SI404001_REG
SHT 1 OF 1

DRAWING NO	REVISION					DESCRIPTION	
	ISSUE 0	A	B	C	D		E
SI404001_DWG		B					Heating Control Cable Overview
SI404002_DWG		B					FT10301 – Steam Flowmeter Loop Sheet
SI404003_DWG		B					LSL10302 – Tank Low Level Loop Sheet
SI404004_DWG		B					XV10303 – Steam Control Valve Loop Sheet
SI404001_SCH		A					Cable Schedule
SI404002_SCH		A					Connection Schedule

Copies for Information Only

SI317011_DWG	K	Switchroom 3 - PLC Panel Internal Layout
SI317012_DWG	L	Switchroom 3 - Logic Drawing 1 (Power Distribution)
SI317019_DWG	J	Switchroom 3 - Logic Drawing 8 (PLC Rack 2)
SI317022_DWG	I	Switchroom 3 - Logic Drawing 9 (PLC Rack 2)
SI317023_DWG	H	Switchroom 3 - Logic Drawing 10 (PLC Rack 2)
SI317024_DWG	G	Switchroom 3 - Logic Drawing 11 (PLC Rack 2)

CLIENT:
Immingham Storage Co Ltd
West Terminal

ISSUE	DATE	BY	CHKD	APPD
A	18.03.15	DS	MM	MM

CLIENT REF.

P & I REF.
SI404002_REG
SHT 1 OF 1

REPORT NO	REVISION					DATE	DESCRIPTION
	ISSUE	0	A	B	C		
SI404001_INS		A				23.10.14	I & E Installation Scope of Work
<i>Copy for Information Only</i>							
SI169001_SCH		G				25.02.15	Fuels Facility – Gantries A & B I/O Schedule

P & I Design Ltd

Instrument Specification Register

CLIENT:
Immingham Storage Co Ltd
West Terminal

ISSUE **DATE** **BY** **CHKD** **APPD**
A 18.031.5 DS MM MM

CLIENT REF.

P & I REF.
SI404003_REG
SHT 1 OF 1

P&I REF.	REVISION						SUPPLIER	TAG No.	ITEM
	ISSUE	0	A	B	C	D			
SI404001_SPC			A				Endress & Hauser	FT10301	Vortex Flowmeter
SI404002_SPC			A				Endress & Hauser	TBA	Level Switch
SI404003_SPC			A				Endress & Hauser	JCV	Ball Valve

Register Control System

<u>Register No</u>	<u>Description</u>	<u>Issue</u>
SI404001_REG	Drawing Register	A
SI404002_REG	Report Register	A
SI404003_REG	Specification Register	A



Section 2
Specifications



CLIENT:
Simon Storage
Immingham West Terminal

REV DATE BY CHKD APPD
A 16.09.14 MM DBF MM

CLIENT REF.

P & I REF.
SI404001_SPC
SHT 1 OF 1

ITEM: Vortex
Flowmeter

GENERAL Tag Number FT10301
Service Steam to Tank 103
Area Classification Zone 1 IIB T4
Line Specification:
Material/Size/Rating Carbon Steel / 2" /ANSI 150

MEASURING ELEMENT Material: Body Stainless Steel
Shedder Bar Stainless Steel
Connections: Meter Size 2"
Rating ANSI 150
Type Flange
Meter: Casing Material Powder-coated die-cast aluminium
Enclosure Class IP67 / NEMA 4X
Sensor Seal Graphite
Power Supply 15...36 V DC (with HART 21...36V DC)
Electrical Class ATEX II 2G EExd [ia] IIC T6
Certificate Reference KEMA 02ATEX1298X
Indicator LCD display
Calibrated Range 0 to 2000 kg/hr
Instrument Range 0 to 4231 kg/hr (at 9 barg)

TRANSMISSION Output: Current 4 – 20mA HART
Pulse Pulse value and polarity can be selected
Frequency 1 pulse per kg

OPTIONS

PROCESS DATA Fluid Steam
Flow Max. 1500 kg/hr
Flow Normal 108 to 2000 kg/hr
Flow Min. 108 kg/hr (Min. linear measurable flow)
Temperature Max. 180°C (Note : Seals to be designed for 10Barg steam at 184 °C)
Temperature Oper. 180°C
Pressure Max. 9 barg
Pressure Min. 8 barg
Specific Gravity 5.15
Viscosity 4.64 cSt

MANUFACTURERS DATA Supplier Endress & Hauser
Model Number 73F50-SK4AA1CAA4AA

DOCUMENTATION See Attached Documentation Specification

Revision History
A – For Purchase

CLIENT:
Simon Storage
ISCO West

REV DATE BY CHKD APPD
A 22.09.14 MM DBF MM

CLIENT REF.

P & I REF.
SI404002_SPC
SHT 1 OF 1

ITEM: Level Switch
(Tuning Fork)

GENERAL Tag Number TBA
Service Tank 103 Low Level
Area Classification Zone 1 IIB T4

DETECTOR ELEMENT Type Vibrating Fork
Location Classification Zone 0 for wetted parts
Material: Wetted Parts 316L Stainless Steel
Seals n/a
Connections: Size 2"
Type Flanged
Rating ANSI 150
Mounting: Position Vertical
Probe Length 200mm

HOUSING Material Aluminium housing with separate connection compartment
Enclosure Class IP 66
Electrical Classification ATEX II 1/2 G EEx de IIC T6
Certificate Reference KEMA 00ATEX2035
Electrical Connection M20

TRANSMISSION Type Relay output
Supply 19-253V ac, 19-55 Vdc
Output 2 x Relay, SP Changeover
Load I max 6 Amps
Action De-energise on alarm (uncovered) & power failure
Electrical Connection Terminals
Insert FEL 54

OPTIONS 1) Temperature Spacer

PROCESS DATA Fluid Various
Temperature Max./Min. 25°C / 5°C
Temperature Normal. 20°C
Pressure Max./Min. 2 Barg / Atmospheric
Pressure Normal. Up to 1.5 Barg
Specific Gravity 0.85 to 1.33

MANUFACTURERS DATA Supplier Endress & Hauser
Model Number FTL51-IAE2JB(200mm)4G7A

DOCUMENTATION See Attached Documentation Specification

Note : This specification based on site standard template SI002102_SPC

REVISION HISTORY	
Rev	Description
A	Original Issue

P & I Design Ltd.

Valve Specification

CLIENT:
Simon Storage
ISCo West

REV **DATE** **BY** **CHKD** **APPD**
A 25.09.14 MM DSR MM

CLIENT REF.
T103
P & I REF.
SI404003_SPC
SHT 1 OF 4

ITEM Ball Valve

GENERAL Valve Tag Number TBA
Service Steam to Tank 103
Line Size /Rating/Material 2"/ANSI150/Carbon Steel

BODY Type Floating Ball, anti static & fire safe
Bore Full
Connections
Size 2"
Type Flanged
Rating ANSI B16.5 150Rf
Materials
Body A350 LF2 Carbon Steel
Ball 316 Stainless Steel
Stem 316 Stainless Steel
Seats Carbon Graphite / PTFE
Seals PTFE / Graphoil
Gland Packing Graphoil

ACTUATION Type See Sheet 2

OPTIONS

PROCESS DATA Fluid Steam
Type Dry Saturated
Flowrate Maximum 1500kg/h
Valve Pressure Drop
Inlet Pressure Max. / Min. 9.2Barg
Temperature Max. / Min. 184°C max
Viscosity Max. / Min.
Calculated C_v Max.
Valve Rated C_v Max.

MANUFACTURERS DATA Supplier John Clark Valves
Model Number : Dafram

DOCUMENTATION See Attached Documentation Specification

BV#-##A2.SPC

CLIENT: Simon Storage ISCo West	REV DATE BY CHKD APPD A 25.09.14 MM DSR MM	CLIENT REF. T103 P & I REF. SI404003_SPC SHT 2 OF 4
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ITEM Valve Actuator

GENERAL Valve Tag Number See Sheet 1
 Service See Sheet 1

BODY

Type	
Size Range	
Action	Air to Open
Failure Action	Air Fail Closed
Mounting	Direct
Movement	90°
Operating Media Connections :	
Size	NAMUR Std
Type	NAMUR Std
Material :	
Body	Aluminium Hard Anodized
Pinion	Mfr's std.
Pistons	Mfr's std.
Springs	Mfr's std.
Seals	Mfr's std.
Hazardous Area Classification	Ex II 2 GD
ATEX Certification	

SWITCH BOX

Type	Rotary
Mounting	Direct (Above Actuator)
Switches :	
Quantity	2 (1 open, 1 closed)
Type	SPDT
Rating	100mA(resistive) at 24Vdc
Connections	Screw Terminals
Cable Entry	2 x M20
Enclosure Material	Manufacturers Standard
Enclosure Class	IP67
Visual Indication	Std. Beacon (Yellow / Black)
Hazardous Area Classification	Ex II 2 GD EExd IIB T6
ATEX Certification	Epsilon 08 ATEX 2370X

OPERATING MEDIA

Media	Instrument Air
Operating Pressure	80Psi

OPTIONS

MANUFACTURERS DATA

Supplier	
Model Number :	Actuator Actreg
	Switch Box Westlock 2245

DOCUMENTATION See Attached Documentation Specification

P & I Design Ltd.

Valve Specification

CLIENT:
Simon Storage
ISCo West

REV	DATE	BY	CHKD	APPD
A	25.09.14	MM	DSR	MM

CLIENT REF.
T103
P & I REF.
SI404003_SPC
SHT 3 OF 4

ITEM: Solenoid Valve
Direct

GENERAL Tag Number See Sheet 1
Service See Sheet 1

BODY Type Internal Pilot operated
Number of Ways 3/2
Action Spring Return
Construction Manufacturers Standard
Connections:Size/Type G 1/4"
Mounting NAMUR Interface

SOLENOID Type Encapsulated
Voltage 24Vdc
Enclosure Class IP65
Electrical Classification ATEX II 2 GD EExd IIC T6
ATEX Certificate TBA
Electrical Connection Screw Terminals via M20 x 1.5 Cable Entry

OPTIONS

PROCESS DATA Fluid Instrument Air
Pressure Max. 6 barg
Oper. Diff. Max./Min. 6 bar / 0 bar
Temperature Oper. Ambient ($\leq 50^{\circ}\text{C}$)

MANUFACTURERS DATA Supplier Pneumatrol (RGS)
Model Number TBA

DOCUMENTATION See Attached Documentation Specification

XSV-##A2.SPC

CLIENT:
Simon Storage
ISCo West

REV DATE BY CHKD APPD
A 25.09.14 MM DSR MM

CLIENT REF.
T103
P & I REF.
SI404003_SPC
SHT 4 OF 4

Documentation Requirement

<u>Item</u>	<u>Quantity</u>	<u>Description</u>
1.	n/a	APPROVAL DOCUMENTATION To be supplied before manufacture commences
2.	1	GENERAL ARRANGEMENT DRAWING Cross-sectioned to show all details necessary for repair and maintenance purposes.
3.	n/a n/a	MATERIALS TEST CERTIFICATES a. Mechanical. b. Chemical analysis.
4.	n/a	ITEMISED PARTS LIST Cross-referenced with G.A. drawing(s) and illustrating manufacturers references for all proprietary items such as bearings, oilseals, mechanical seals, etc.
5.	n/a n/a	RECOMMEND SPARES QUOTATION a. Two years service. b. Commissioning only.
6.	n/a 1	INSTALLATION, OPERATING AND MAINTENANCE MANUALS To include calibration instructions where applicable. a. Paper Copy b. Electronic copy (Preferably Adobe Acrobat)
7.	n/a n/a	SOFTWARE a. Programming manual. b. Operating manual.
8.	n/a	PRESSURE VESSELS Calculation sheets, spark test certificates (for lined vessels),hydraulic test certificates.
9.	n/a n/a n/a	ELECTRICAL a. Schematic and circuit diagrams. b. Certificates of conformity (to include EMC Directive 89/336/EEC). c. Hazardous area certification.
10.	n/a n/a 1	INSTRUMENTATION a. Certificates of conformity (to include EMC Directive 89/336/EEC). b. Calibration certificates. c. Hazardous area certification.
11.	n/a	SPECIAL REQUIREMENTS

IMPORTANT NOTICE:

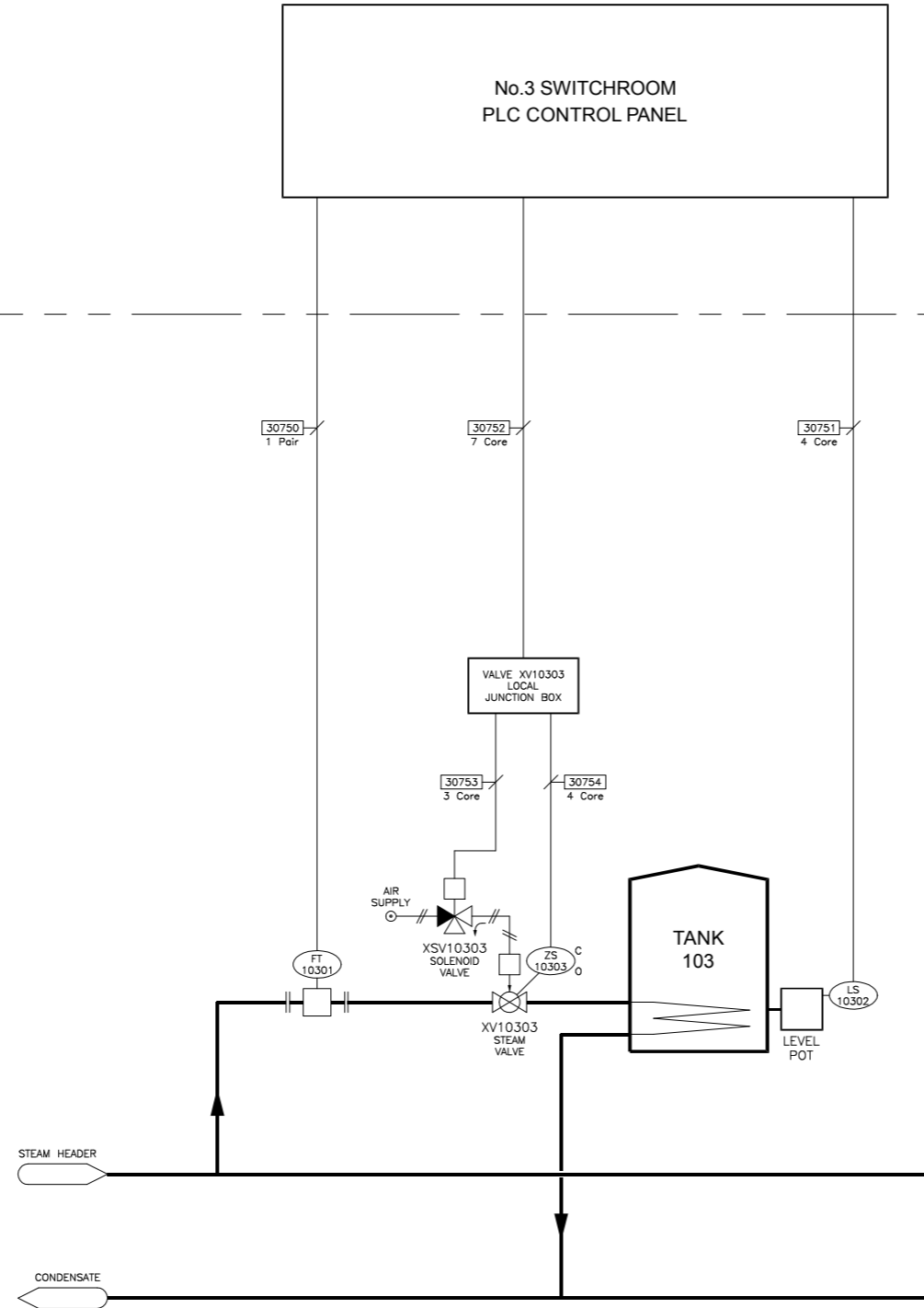
Vendors acceptance of this order is conditional on the provision of the Documentation.
Should the vendor not wish to supply the whole or part of the details herein requested, he shall state in writing any exceptions with the quotation or order acceptance.
P & I Design reserve the right to cancel any order where the documentation does not comply with P & I requirements. No item will be paid in full until documentation specified has been received.

###-FMB6.SPC

Section 3
Drawings & Schedules



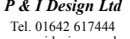


No.3 SWITCHROOM



IF NOT SIGNED THIS DOCUMENT IS UNCONTROLLED

REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION
A	23/10/14	P.P.	P.P.	M.M.	M.M.	ISSUED FOR CONSTRUCTION
B	05/11/14	D.R.P	P.P.	D.R.P	M.M.	AS BUILT

PLANT	IMMINGHAM STORAGE Co. - WEST TERMINAL
TITLE	TANK 103 HEATING CONTROL CABLE OVERVIEW
 	
CLIENT DRG. No.	P&I DRG No. SI404001_DWG

ZONE 1 II B T4 (UNLESS SPECIFIED OTHERWISE)

SAFE AREA

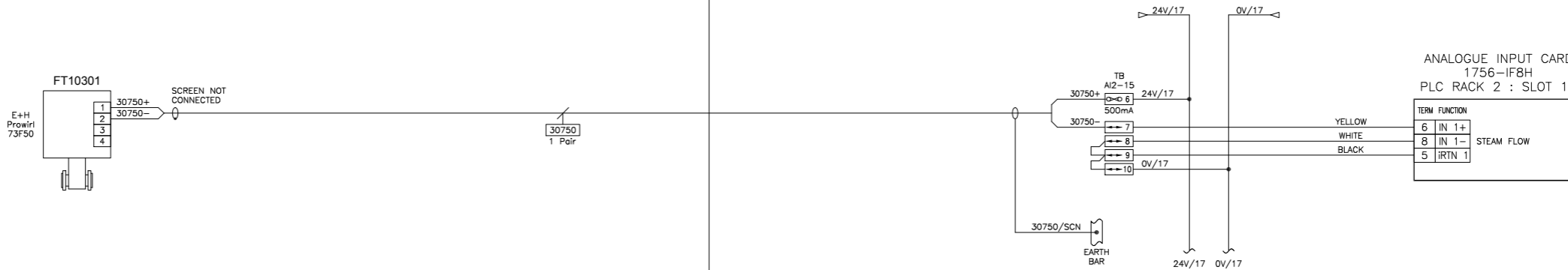
AREA 'G'

No.3 SWITCHROOM

TANK 103 HEATING COIL STEAM FLOWMETER

PLC LOGIC PANEL

REFER TO LOGIC DRAWING
SI317024_DWG
FOR FULL FUNCTIONALITY





CERTIFIED EQUIPMENT			
TAG No.	CERTIFICATE No.	ATEX CERTIFICATION	I.S. CALCULATION
FT10301	KEMA 02 ATEX 1289X	Ex II 2 G EEx d[ia] IIC T6	N/A

NOTES

1)

IF NOT SIGNED THIS DOCUMENT IS UNCONTROLLED								
REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION		
A	29/10/14	P.P.	P.P.	M.M.	M.M.	M.M.	M.M.	ISSUED FOR CONSTRUCTION
B	05/11/14	D.R.P.	P.P.	D.R.P.	M.M.	AS BUILT		

PLANT	IMMINGHAM STORAGE Co. - WEST TERMINAL
TITLE	TANK 103 HEATED DIESEL FT10301 - STEAM FLOWMETER LOOP SHEET
 	IMMINGHAM STORAGE Co. Ltd. IMMINGHAM WEST TERMINAL, WEST RIVERSIDE, IMMINGHAM DOCK, IMMINGHAM, N.E. LINCOLNSHIRE, DN40 2GU P & I Design Ltd Tel. 01642 617444 www.pidesign.co.uk
CLIENT DRG. No.	SHEET 1 OF 1 P&I DRG No. SI404002_DWG

ZONE 1 II B T4 (UNLESS SPECIFIED OTHERWISE)

SAFE AREA

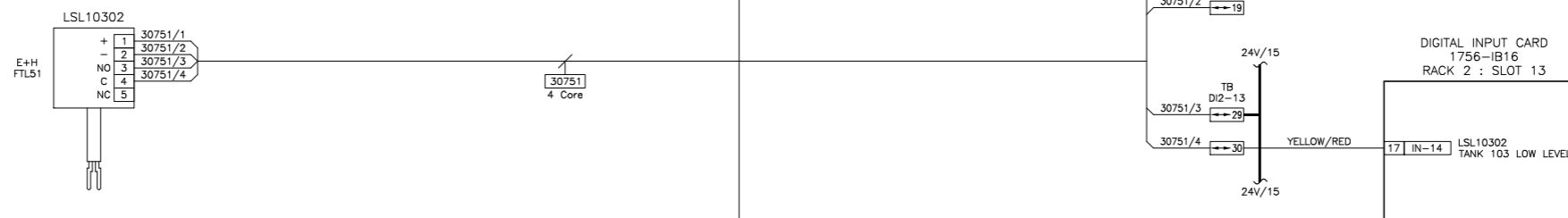
AREA 'G'

No.3 SWITCHROOM

TANK 103 LEVEL POT

PLC LOGIC PANEL

REFER TO LOGIC DRAWING
S1317023_DWG
FOR FULL FUNCTIONALITY





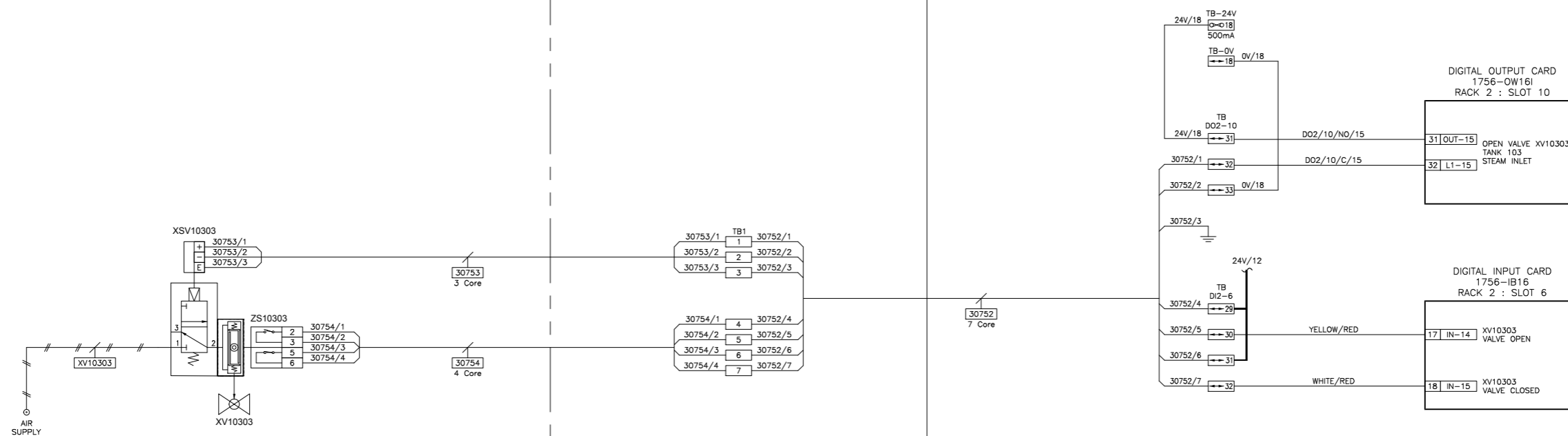
CERTIFIED EQUIPMENT			
TAG No.	CERTIFICATE No.	ATEX CERTIFICATION	I.S. CALCULATION
LSL10302	KEMA 00 ATEX 2035	Ex II 1/2 G EEx de IIC T6	N/A

NOTES							
1)							

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REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION		
A	29/10/14	P.P.	P.P.	M.M.	M.M.	M.M.	M.M.	ISSUED FOR CONSTRUCTION
B	05/11/14	D.R.P.	P.P.	D.R.P.	M.M.	AS BUILT		

PLANT	IMMINGHAM STORAGE Co. - WEST TERMINAL
TITLE	TANK 103 HEATED DIESEL LSL10302 - TANK LOW LEVEL LOOP SHEET
CLIENT DRG. No.	



P & I Design Ltd
 IMMINGHAM WEST TERMINAL,
 WEST RIVERSIDE,
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 DN40 2GU
 Tel. 01642 617444
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REFER TO LOGIC DRAWING
SI317022_DWG
FOR FULL FUNCTIONALITY

REFER TO LOGIC DRAWING
SI317019_DWG
FOR FULL FUNCTIONALITY

CERTIFIED EQUIPMENT			
TAG No.	CERTIFICATE No.	ATEX CERTIFICATION	I.S. CALCULATION
XSV10303	BASEEFA 06 ATEX 0123	Ex II 2 GD EEx d IIC T85°C	N/A
ZS10303	EPSILON 08 ATEX 2370X	Ex II 2 G EEx d IIB T6	N/A

NOTES

1)

IF NOT SIGNED THIS DOCUMENT IS UNCONTROLLED							
REV	DATE	BY	DRN	CHK'D	APP'D		DESCRIPTION
A	29/10/14	P.P.	P.P.	M.M.	M.M.	M.M.	ISSUED FOR CONSTRUCTION
B	05/11/14	D.R.P	P.P.	D.R.P	M.M.		AS BUILT

PLANT	IMMINGHAM STORAGE Co. - WEST TERMINAL
TITLE	TANK 103 HEATED DIESEL XV10303 - STEAM CONTROL VALVE LOOP SHEET
CLIENT DRG. No.	P&I DRG No. SI404004_DWG



P & I Design Ltd
Tel. 01642 617444
www.pidesign.co.uk

INSTRUMENT/ELECTRICAL CABLE SCHEDULE

CABLE		CONDUCTORS		CABLE ROUTE				APPROX. LENGTH METRES	REMARKS
REFERENCE	TYPE	AREA mm ²	No.	FROM	GLAND TYPE	TO	GLAND TYPE		
30750	E01	1.5	1 Pair	No.3 Switchroom PLC Panel	ATEX II 2 G EExed	FT10301 - Steam Flow Meter	ATEX II 2 G EExed		
30751	J04	1.5	4 Core	No.3 Switchroom PLC Panel	ATEX II 2 G EExed	LSL10302 - Tank 103 Low Level Switch	ATEX II 2 G EExed		
30752	J07	1.5	7 Core	No.3 Switchroom PLC Panel	ATEX II 2 G EExed	Valve XV10303 Local Junction Box	ATEX II 2 G EExed		
30753	J03	1.5	3 Core	Valve XV10303 Local Junction Box	ATEX II 2 G EExed	XSV10303 - Tank 103 Steam Valve Solenoid	ATEX II 2 G EExed		
30754	J04	1.5	4 Core	Valve XV10303 Local Junction Box	ATEX II 2 G EExed	ZS10303 - Tank 103 Steam Valve Limit Switches	ATEX II 2 G EExed		
30755									
30756									
30757									
30758									
30759									



ALL MODIFICATIONS TO BE MADE ON MASTER SCHEDULE SI002003_SCH AND COPIED ONTO THIS SCHEDULE

TOTAL







NOTES:
 1) Refer to P&I Design Cable Specifications for details on Cable Type.

	Denotes Cable Modified
	Denotes Cable Deleted
	Denotes Cable Added
	Future Cables

IF NOT SIGNED THIS DOCUMENT IS UNCONTROLLED							
REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION	
A	22/10/14	P.P.	P.P.	M.M.	M.M.	Issued for Construction	

PLANT	ISCo West - No.3 Switchroom
TITLE	Tank 103 Heating Control - Cable Schedule
	
CLIENT DRG No	SHEET 1 OF 1
	REF No. SI404001_SCH

FIELD							XCV10303 Valve Local JB							SWITCHROOM No.3 - PLC PANEL (MAIN PLC PANEL)										
FIELD INSTRUMENT	TERMINAL No.	CABLE DETAILS					TERMINAL No.			JUNCTION BOX DETAILS					TERMINAL No.	PANEL TERMINATION DETAILS				INST. LOOP DIAGRAM	REMARKS			
		CABLE No.	TYPE	CORE No.	FERRULE No.	LENGTH METRES				CABLE No.	TYPE	CORE No.	FERRULE No.	LENGTH METRES		CABLE No.	TERMINAL NO.	CORE No.	FERRULE No.					
FT10301	1	30750	1 Pair	Pr1+	30750+										TB AI2-15						T103 Steam Flowmeter			
	2			Pr1-	30750-										6							7		
				Pr1SCN	30741/SCN										Screen Bar									
XSV10303	+	30753	3 Core	1	30753/1										TB DO2-10	24V/18	TB24V				XCV10303 T103 Steam Control Valve			
	-			2	30753/2										31							32	33	TB0V
	E			3	30753/3										Earth Bar							0V/18	18	
ZS010303	C	30754	4 Core	1	30754/1				30752	7 Core					TB DI2-6						XCV10303 Open			
N.O.	2			30754/2	29										30									
ZSC10303	C			3	30754/3										6							30752/6	31	
N.O.	4			30754/4	7										30752/7							32		
LSL10302	1+	30751	4 Core	1	30751/1										TB24V						500mA			
	2-			2	30751/2										24V/19							0V/19		
	3			3	30751/3										TB DI2-13							29	30	
	4			4	30751/4																			

NOTES: 1) Future Level & Temperature switches to be linked out.	<i>IF NOT SIGNED THIS DOCUMENT IS UNCONTROLLED</i>								PLANT	Immingham Storage Co. - West Terminal	
	REV	DATE	BY	DRN	CHECKED		APPROVED		DESCRIPTION	TITLE	T103 Connection Schedule
	A	23/10/14	MM	MM	PP		MM		Issued for Construction		
 Denotes Item Modified  Denotes Item Deleted  Denotes Item Added  Future Use										 bulk liquid & gas network	
									CLIENT DRG No.	SHEET 1 OF 1	REF No. SH404002_SCH

NOTES

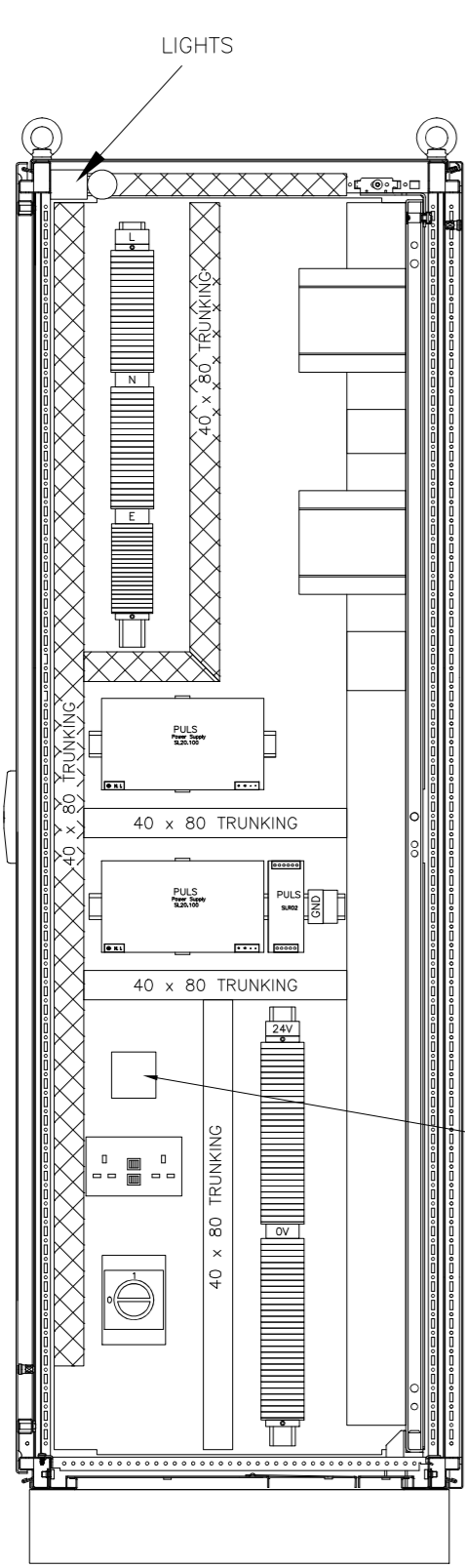
TERMINAL BLOCKS

TB	QTY	DESCRIPTION
TB-L	20	ASK1
TB-N	20	ASK1
TB-E	20	EK2.5/35
24V	30	ASK1
0V	30	ASK1
GND	3	SAK 2.5
RACK 1 - SLOT 4	32	SAKR
RACK 1 - SLOT 5	32	SAKR
RACK 1 - SLOT 6	32	SAKR
RACK 1 - SLOT 7	32	SAKR
RACK 1 - SLOT 8	32	SAKR
RACK 1 - SLOT 9	32	SAKR
RACK 1 - SLOT 10	32	SAKR
RACK 1 - SLOT 11	32	SAKR
RACK 1 - SLOT 12	8	ASK1
	32	SAKR
RACK 2 - SLOT 2	32	WTR 2.5
RACK 2 - SLOT 3	32	WTR 2.5
RACK 2 - SLOT 4	32	WTR 2.5
RACK 2 - SLOT 5	32	WTR 2.5
RACK 2 - SLOT 6	32	WS16
RACK 2 - SLOT 7	32	WTR 2.5
RACK 2 - SLOT 8	32	WTR 2.5
RACK 2 - SLOT 9	32	WTR 2.5
RACK 2 - SLOT 10	32	WTR 2.5
RACK 2 - SLOT 11	32	WTR 2.5
RACK 2 - SLOT 12	32	WTR 2.5
RACK 2 - SLOT 13	32	WTR 2.5
RACK 2 - SLOT 15	8	WS16
	32	WTR 2.5
RACK 2 - SLOT 16	8	WS16
	4	WTR 2.5
TB-SIS	12	WDU 2.5
RACK 2 - SLOT 14	10	WTR 2.5

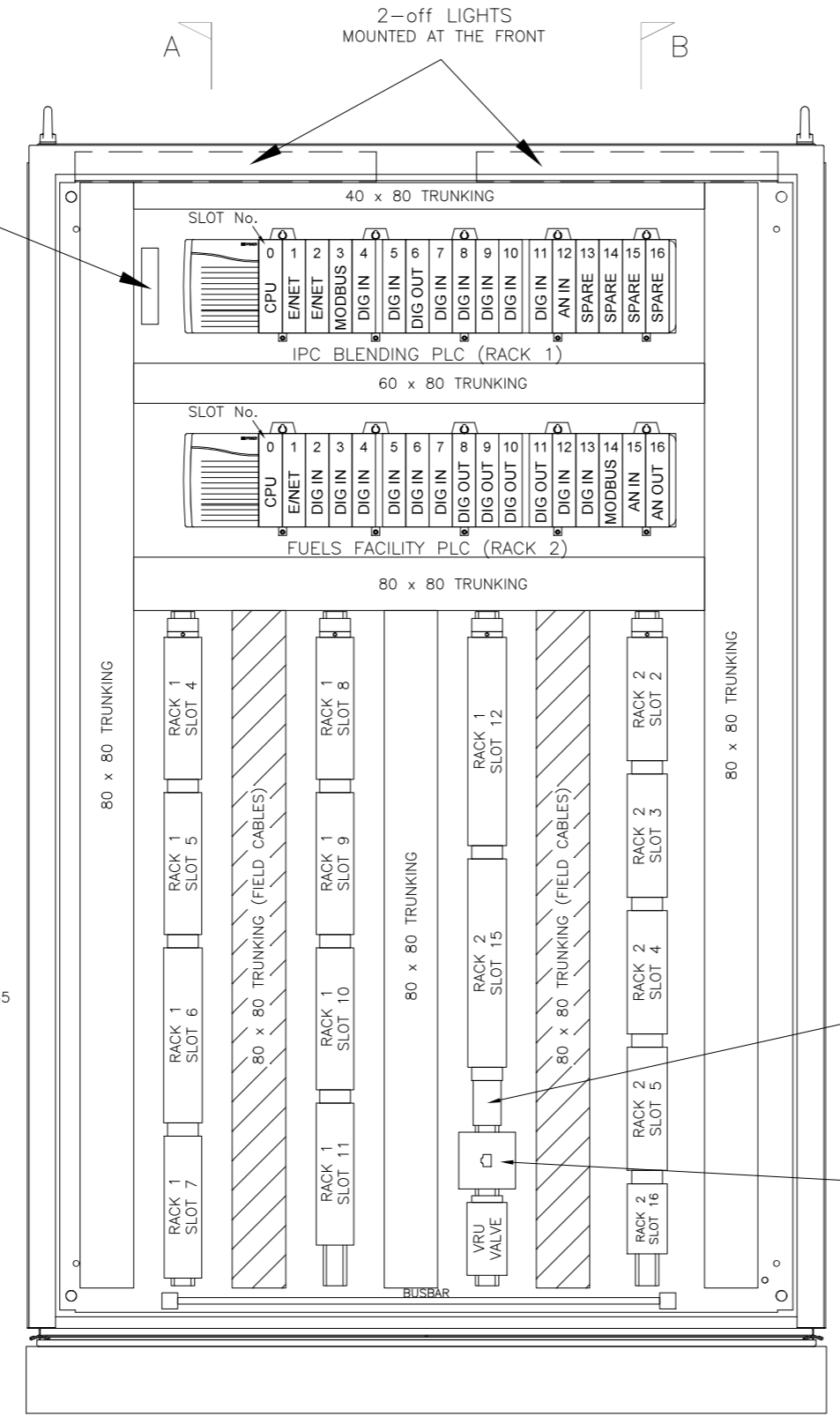
WIRING DETAILS

DESCRIPTION

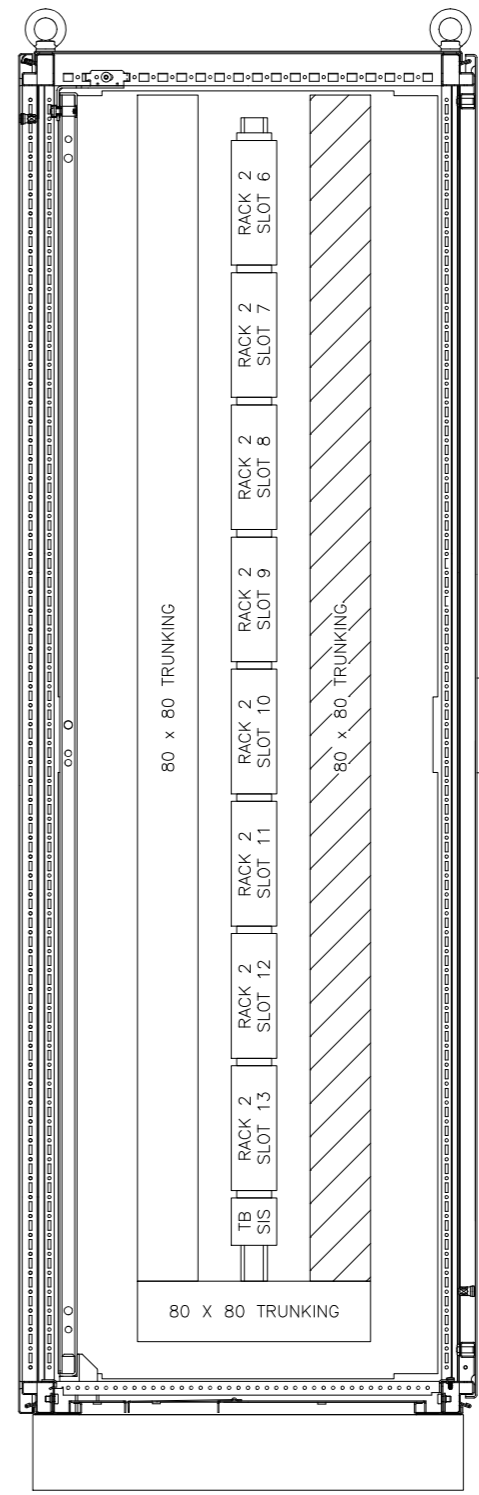
ELECTRICAL 440V / 230V AC:	
SIZE:	n/a
COLOUR:	n/a
INSTRUMENT 230Vac SUPPLIES:	
SIZE:	Suitably Rated with Minimum 0.5mm ²
COLOUR:	Live (Brown) / Neutral (Blue) / Earth (Green/Yellow)
INSTRUMENT 110Vdc SUPPLIES:	
SIZE:	n/a
COLOUR:	n/a
24V DC SUPPLIES:	
SIZE:	Suitably Rated with Minimum 0.5mm ²
COLOUR:	Positive (Red) / 0V (Black)
DIGITAL SWITCHED AC:	
SIZE:	n/a
COLOUR:	n/a
DIGITAL SWITCHED DC:	
SIZE:	0.5mm ²
COLOUR:	White
ANALOGUE:	
SIZE:	0.5mm ²
COLOUR:	Grey
CRIMPS:	
TYPE:	Bootlace or Twin Grip Insulated
FERRULES:	
TYPE:	Pre-Printed Wrap Around



VIEW ON A-A



FRONT ELEVATION
(FRONT DOOR REMOVED)



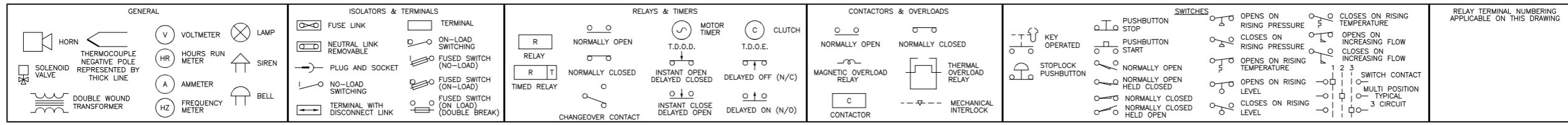
VIEW ON B-B

	TRUNKING - FIELD CABLES (24Vdc)
	TRUNKING - 230Vac
	TRUNKING - PANEL WIRING (24Vdc)

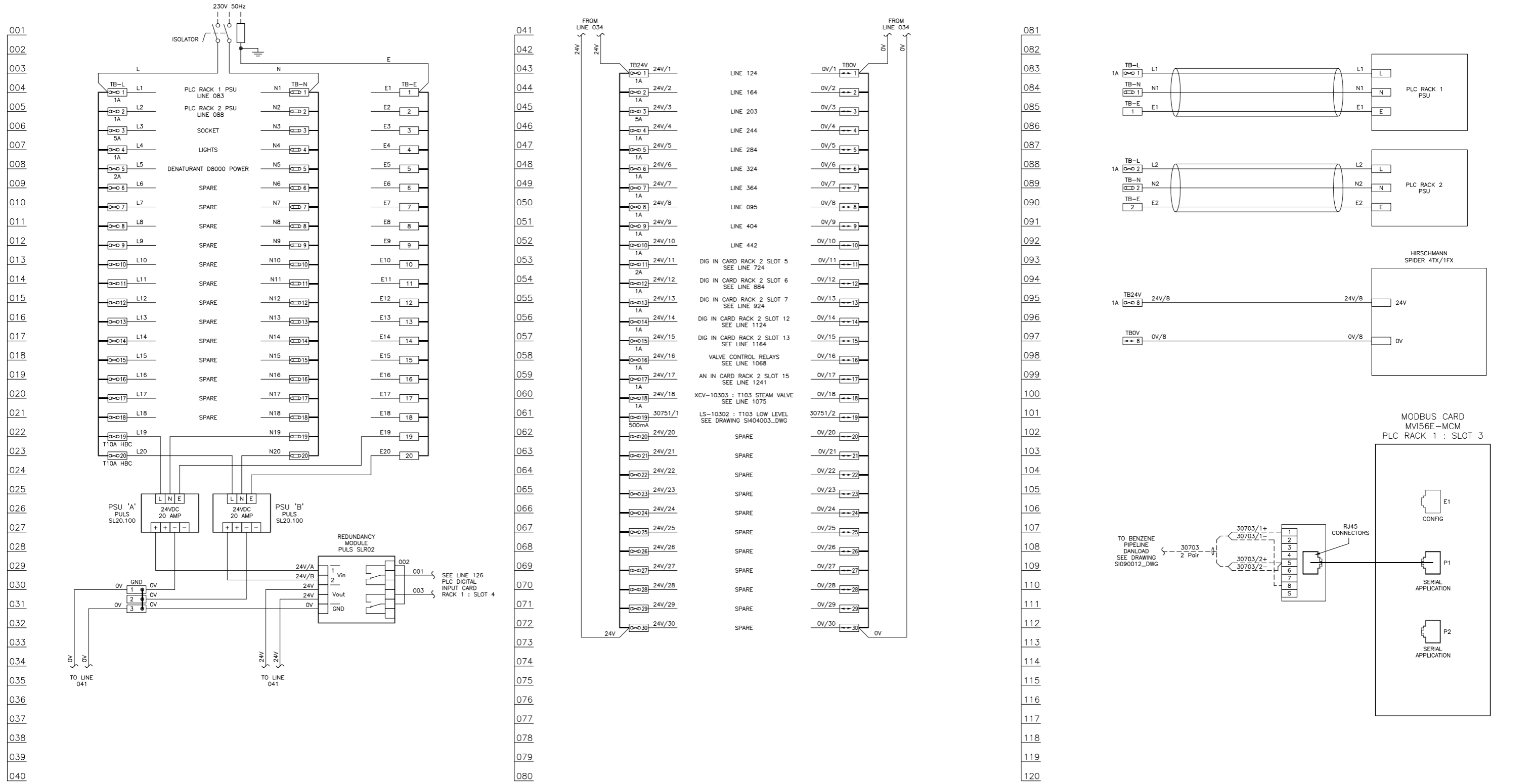
IF NOT SIGNED THIS DOCUMENT IS UNCONTROLLED																	
REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION	REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION				
H	25/01/11	P.P.	P.P.	M.M.	M.M.	M.M.	M.M.	ETHANOL DENATURANT ADDED	A	03/01/08	P.P.	P.P.	M.M.	M.M.	M.M.	M.M.	ISSUED FOR TENDER
I	30/08/12	P.P.	P.P.	M.M.	M.M.	M.M.	M.M.	MODBUS CARD ADDED BENZENE DANKLOAD	B	23/01/08	P.P.	P.P.	M.M.	M.M.	M.M.	M.M.	ISSUED FOR CONSTRUCTION
J	7/05/13	P.P.	P.P.	M.M.	M.M.	M.M.	M.M.	AS BUILT POST BENZENE PROJECT	C	07/02/08	P.P.	P.P.	M.M.	M.M.	M.M.	M.M.	SLOT 11 & 12 TERMINALS ADDED
K	03/02/15	P.P.	P.P.	M.M.	M.M.	M.M.	M.M.	AS BUILT - S1404 PROJECT	D	09/03/09	P.P.	P.P.	M.M.	M.M.	M.M.	M.M.	AS BUILT
									E	28/05/09	P.P.	P.P.	M.M.	M.M.	M.M.	M.M.	PLC RACK 2 & TERMINALS ADDED
									F	08/06/09	P.P.	C.F.	M.M.	M.M.	M.M.	M.M.	AS BUILT-FUELS PLC UPGRADE
									G	23/09/10	P.P.	P.P.	M.M.	M.M.	M.M.	M.M.	ETHANOL BLENDING ADDED

PLANT	IMMINGHAM WEST STORAGE DEPOT - SWITCHROOM 3
TITLE	PLC PANEL INTERNAL LAYOUT
Immingham Storage Co Ltd Immingham West Terminal West Riverside Immingham Dock Immingham N.E. Lincolnshire DN40 2QU	
Tel. 01642 617444 www.pidesign.co.uk	
SHEET 1 OF 1	
CLIENT DRG. No.	P&I DRG No. SI317011_DWG

LEGEND OF GRAPHICAL SYMBOLS (ALL CONTACTS SHOWN IN THE DE-ENERGISED STATE)



POWER DISTRIBUTION



LAST NUMBER USED : 003
SPARE TO : 029

LAST NUMBER USED : 030
SPARE TO : 059

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REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION	REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION
H	02/02/11	P.P.	P.P.	M.M.	M.M.	DENATURANT D8000 POWER ALLOCATED	A	03/01/08	P.P.	P.P.	M.M.	M.M.	ISSUED FOR TENDER
I	17/03/11	P.P.	P.P.	M.M.	M.M.	24Vdc FUSE 18 ALLOCATED	B	30/01/08	P.P.	P.P.	M.M.	M.M.	ISSUED FOR CONSTRUCTION
J	19/04/11	D.B.F	P.P.	M.M.	M.M.	FUSE 18 NOT USED	C	07/02/08	P.P.	P.P.	M.M.	M.M.	FUSE'S 9 & 10 USED
K	30/08/12	P.P.	P.P.	M.M.	M.M.	MODBUS CARD ADDED	D	09/03/09	P.P.	P.P.	M.M.	M.M.	AS BUILT
L	03/02/15	P.P.	P.P.	M.M.	M.M.	AS BUILT - SI404 PROJECT	E	27/05/09	P.P.	P.P.	M.M.	M.M.	FUSE ALLOCATED FOR RACK 2
							F	08/06/09	P.P.	C.F	M.M.	M.M.	AS BUILT-FUELS PLC UPGRADE
							G	23/09/10	P.P.	P.P.	M.M.	M.M.	ETHANOL BLENDING ADDED

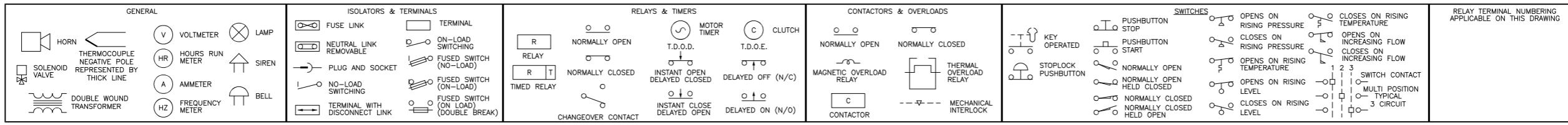
PLANT: IMMINGHAM WEST STORAGE DEPOT - SWITCHROOM 3
 TITLE: PLC PANEL - LOGIC DRAWING 1

inter terminals
 Immingham Storage Co Ltd
 Immingham West Terminal
 West Riverside
 Immingham Dock
 Immingham
 N.E. Lincolnshire DN40 2QU

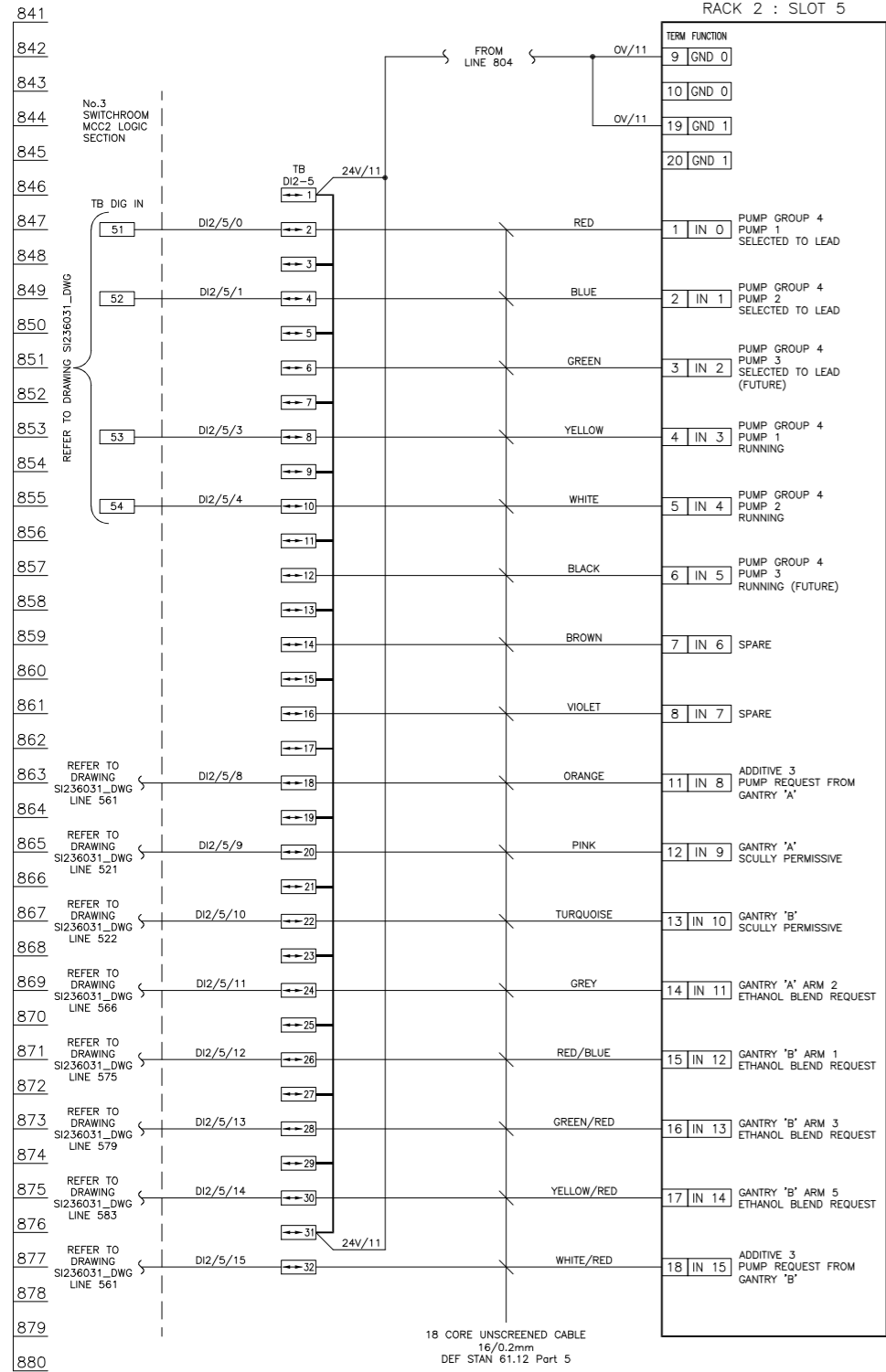
P & I Design Ltd
 Tel: 01642 617444
 www.pidesign.co.uk

SHEET 1 OF 1
 CLIENT DRG. No. P&I DRG No. SI317012_DWG

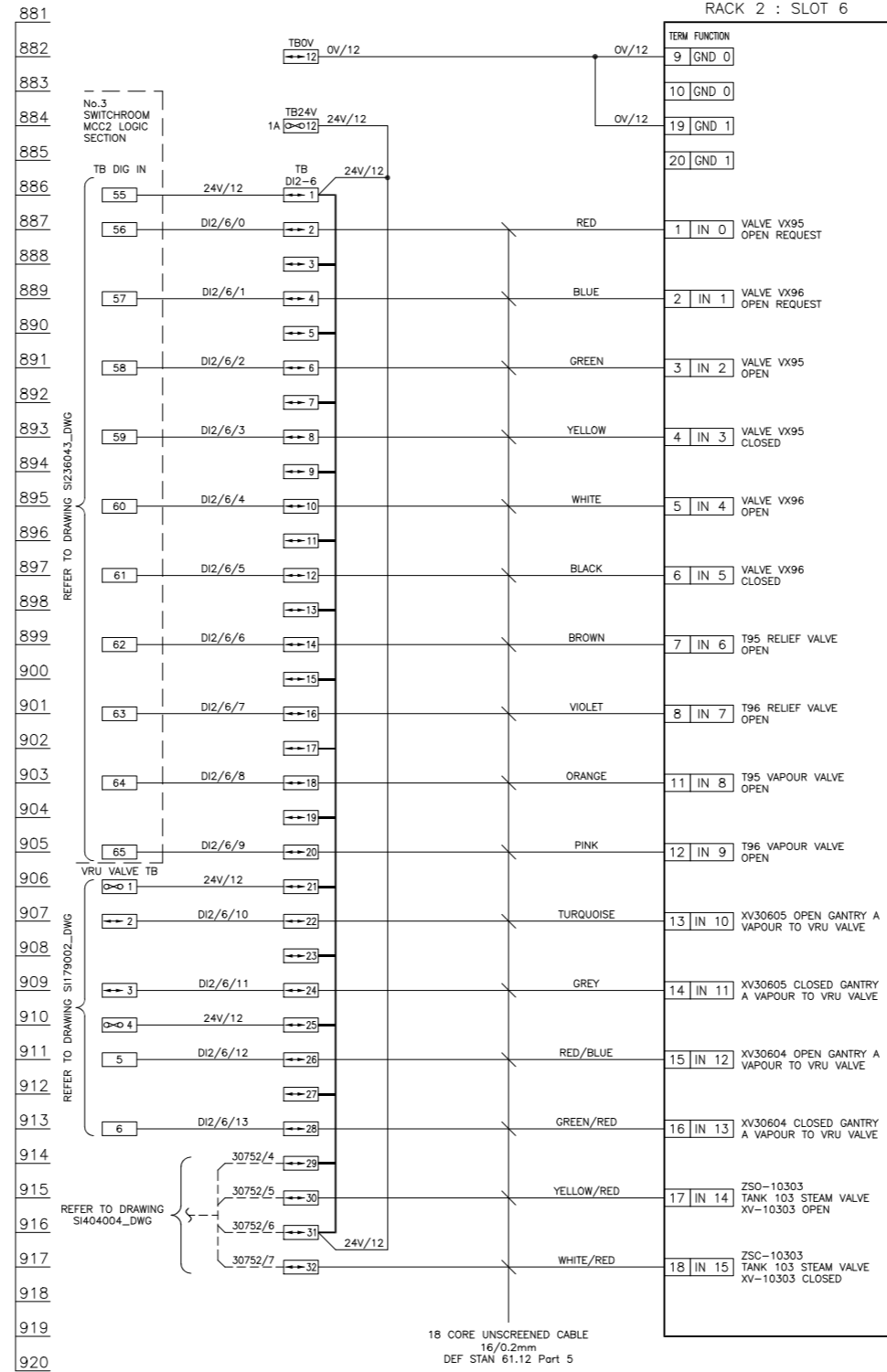
LEGEND OF GRAPHICAL SYMBOLS (ALL CONTACTS SHOWN IN THE DE-ENERGISED STATE)



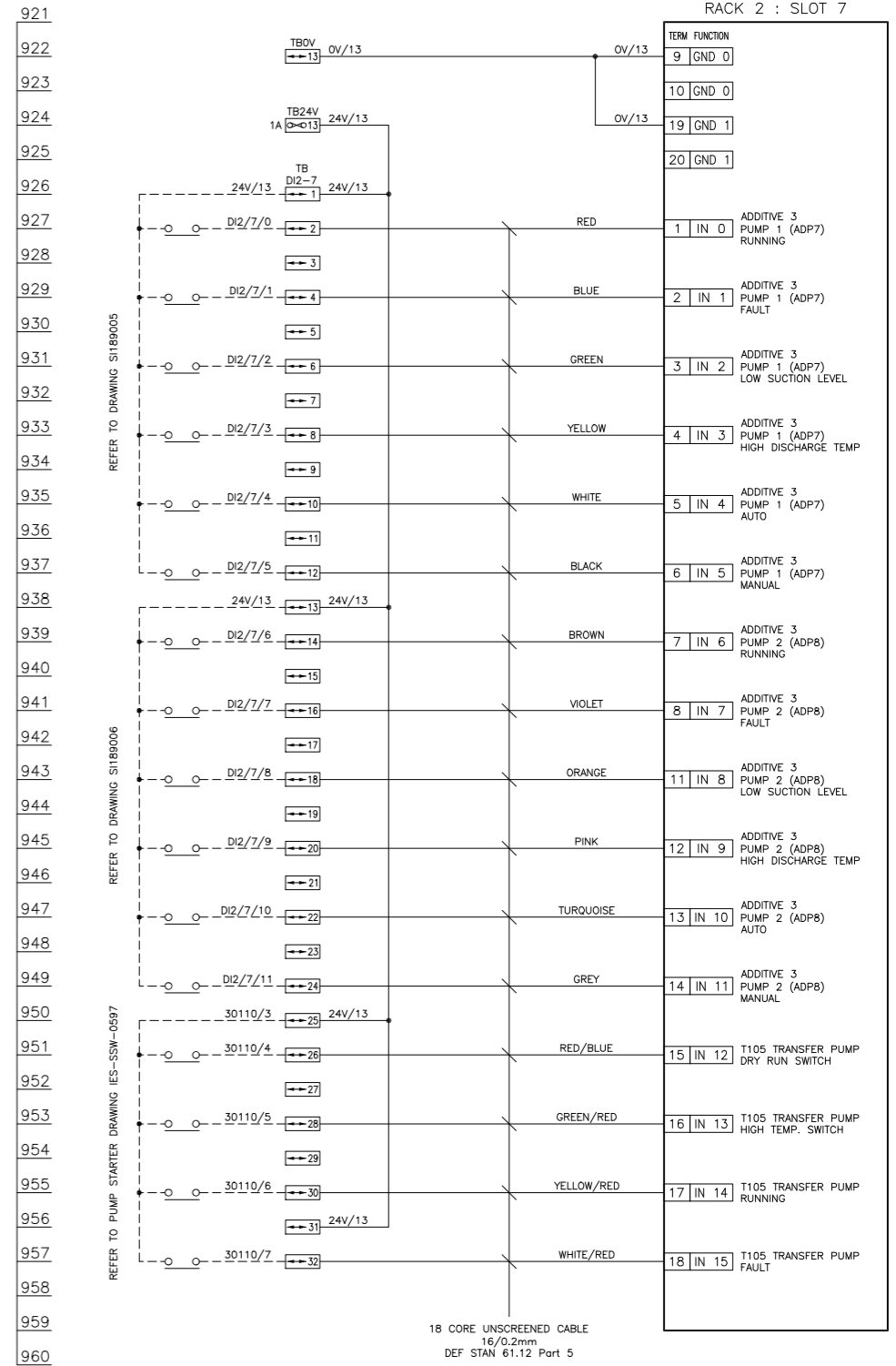
DIGITAL INPUT CARD
1756-IB16
RACK 2 : SLOT 5



DIGITAL INPUT CARD
1756-IB16
RACK 2 : SLOT 6



DIGITAL INPUT CARD
1756-IB16
RACK 2 : SLOT 7



IF NOT SIGNED THIS DOCUMENT IS UNCONTROLLED

REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION
H	19/04/11	D.B.F	P.P.	M.M.	M.M.	AS BUILT - DENATURANT
I	06/01/12	P.P.	P.P.	M.M.	M.M.	ADDITIVE 3 MODIFICATIONS
J	03/02/15	P.P.	P.P.	M.M.	M.M.	AS BUILT - SI404 PROJECT
A	21/05/09	P.P.	P.P.	M.M.	M.M.	ISSUED FOR CONSTRUCTION
B	05/06/09	P.P.	C.F	M.M.	M.M.	AS BUILT
C	10/06/09	P.P.	C.F	M.M.	M.M.	AS BUILT-FUELS PLC UPGRADE
D	07/07/09	P.P.	D.A.Y	M.M.	M.M.	GANTRY A VAPOUR VALVES
E	08/07/09	P.P.	D.A.Y	M.M.	M.M.	ADDITIVE 3
F	14/01/11	P.P.	P.P.	M.M.	M.M.	SCULLY PERMISSIVES ADDED
G	25/02/11	P.P.	P.P.	M.M.	M.M.	BLEND & PUMP INPUTS ADDED

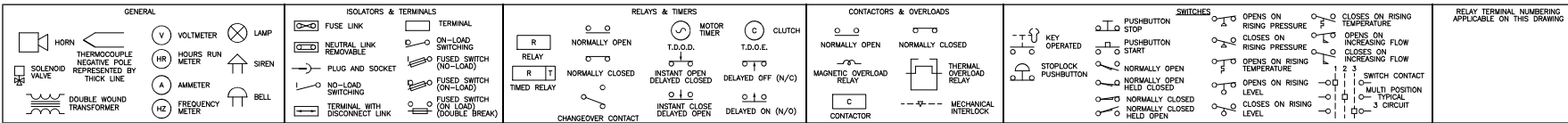
PLANT: IMMINGHAM WEST STORAGE DEPOT - SWITCHROOM 3
 TITLE: PLC PANEL - LOGIC DRAWING 8

inter terminals
 Immingham Storage Co Ltd
 Immingham West Terminal
 West Riverside
 Immingham Dock
 Immingham
 N.E. Lincolnshire DN40 2QU

P & I Design Ltd
 Tel. 01642 617444
 www.pidesign.co.uk

SHEET 1 OF 1
 CLIENT DRG. No. P&I DRG No. SI317019_DWG

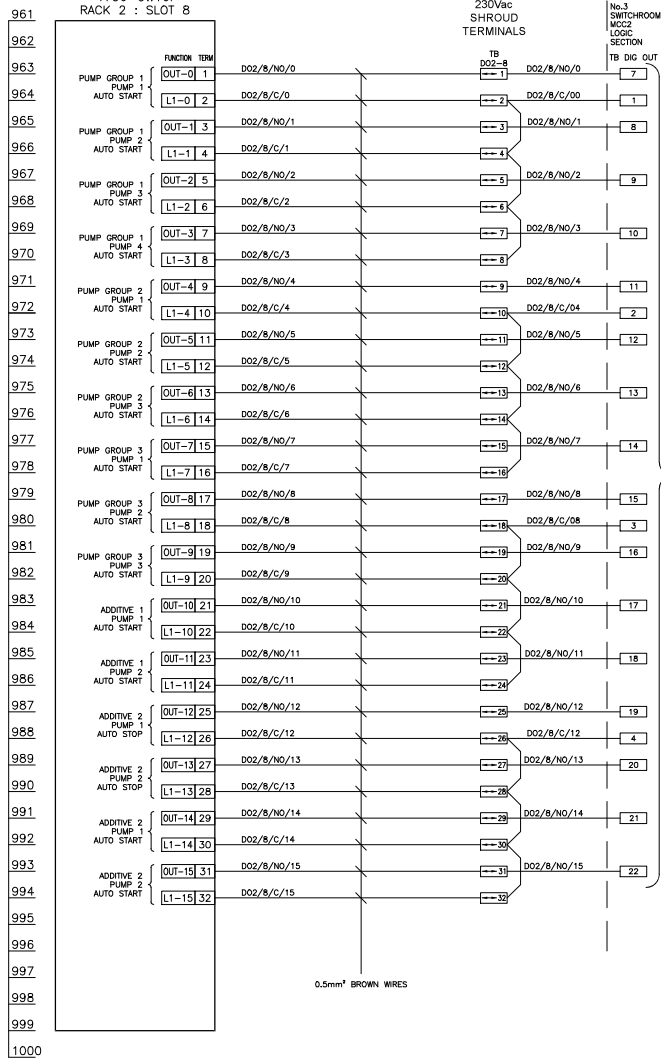
LEGEND OF GRAPHICAL SYMBOLS (ALL CONTACTS SHOWN IN THE DE-ENERGISED STATE)



DIGITAL OUTPUT CARD
1756-OW161
RACK 2 : SLOT 8

WARNING-
230Vac
SHROUD
TERMINALS

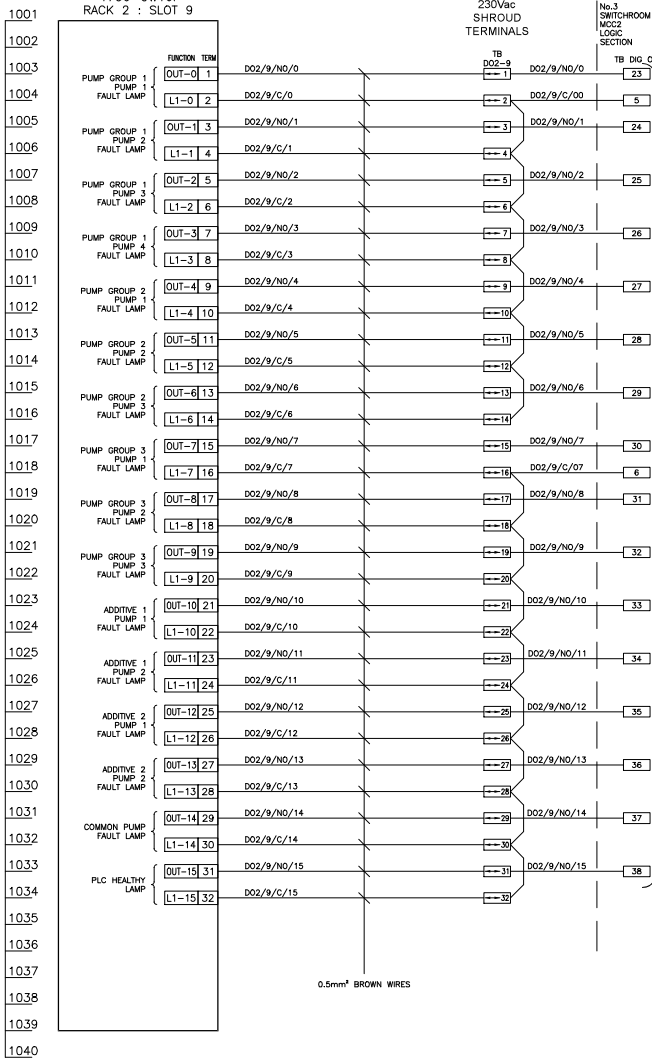
No.3 SWITCHROOM
MCC2
LOGIC
SECTION



DIGITAL OUTPUT CARD
1756-OW161
RACK 2 : SLOT 9

WARNING-
230Vac
SHROUD
TERMINALS

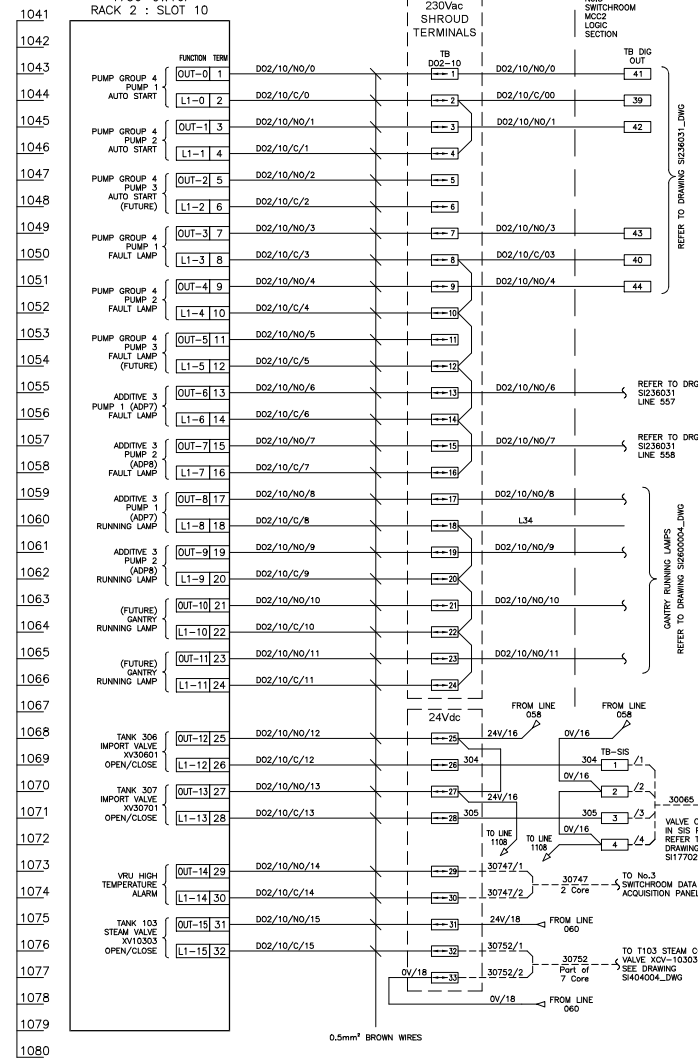
No.3 SWITCHROOM
MCC2
LOGIC
SECTION



DIGITAL OUTPUT CARD
1756-OW161
RACK 2 : SLOT 10

WARNING-
230Vac
SHROUD
TERMINALS

No.3 SWITCHROOM
MCC2
LOGIC
SECTION



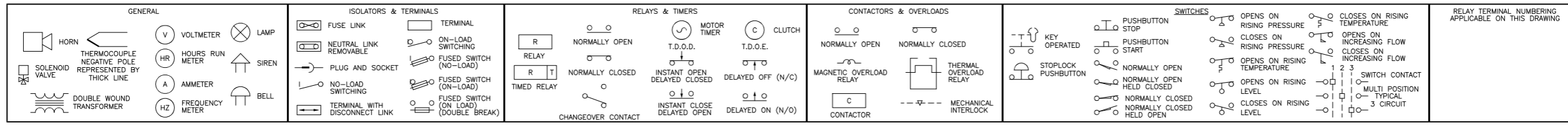
LAST NUMBER USED : 305
SPARE TO : 309

IF NOT SIGNED THIS DOCUMENT IS UNCONTROLLED										PLANT				
REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION	REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION	TITLE
H	27/10/14	D.B.F.	P.P.	M.M.	M.M.	AS BUILT - S1224 PROJECT	A	21/05/09	P.P.	M.M.	M.M.	M.M.	ISSUED FOR CONSTRUCTION	IMMINGHAM WEST STORAGE DEPOT - SWITCHROOM 3
I	03/02/15	P.P.	P.P.	M.M.	M.M.	AS BUILT - S1404 PROJECT	B	05/06/09	P.P.	C.F.	M.M.	M.M.	AS BUILT	PLC PANEL - LOGIC DRAWING 9
C	10/06/09	P.P.	C.F.	M.M.	M.M.	AS BUILT-FUELS PLC UPGRADE	C	08/07/09	P.P.	D.A.Y.	M.M.	M.M.	ADDITIVE 3	
E	25/11/10	P.P.	P.P.	M.M.	M.M.	ETHANOL BLENDING ADDED	E	25/02/11	P.P.	P.P.	M.M.	M.M.	ETHANOL DENATURANT	
F	25/02/11	P.P.	P.P.	M.M.	M.M.	ETHANOL DENATURANT	F	19/04/11	D.B.F.	P.P.	M.M.	M.M.	AS BUILT - DENATURANT	

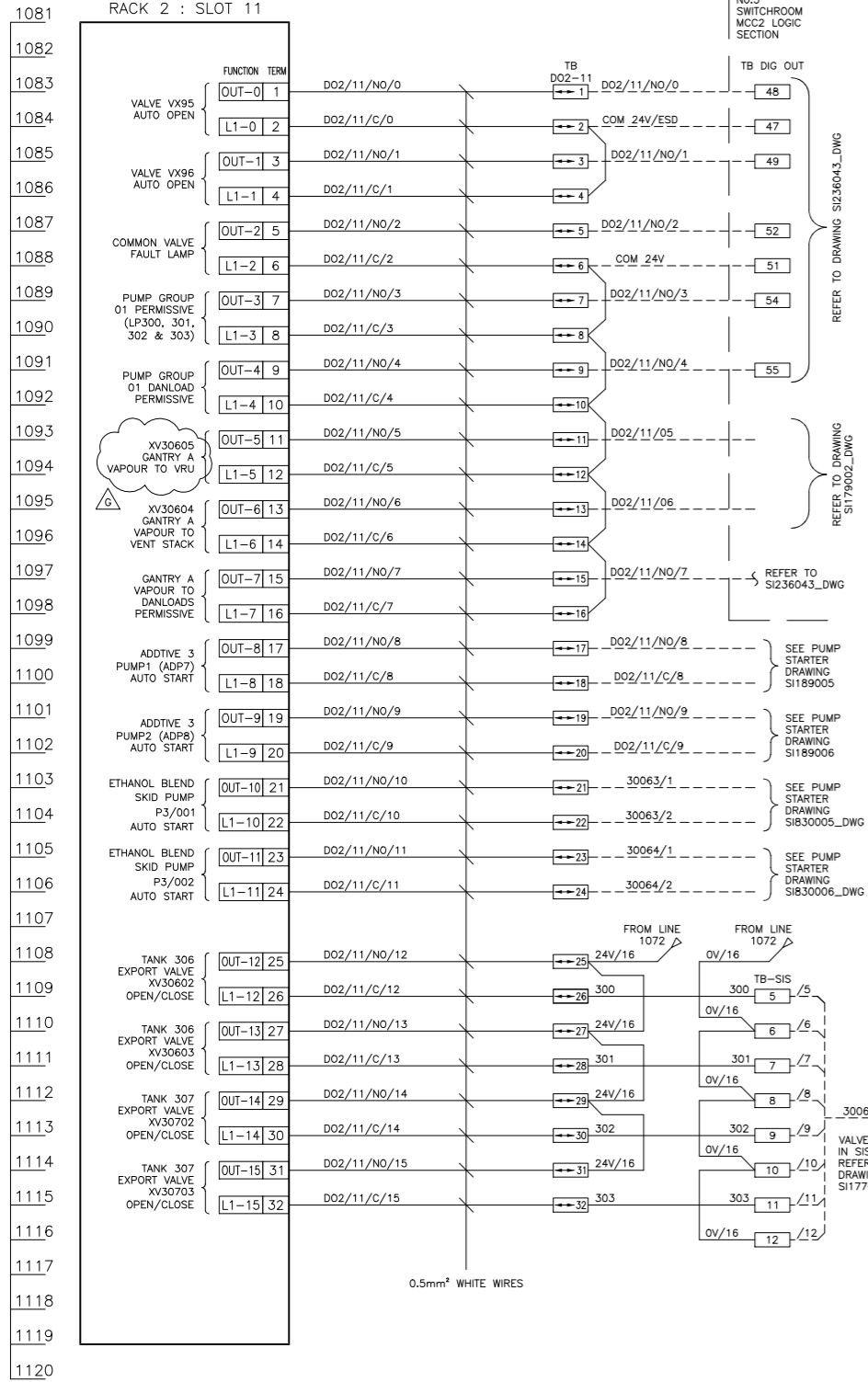
inter terminals
 Immingham Storage Co Ltd
 Immingham West Terminal
 West Riverside
 Immingham
 N.E. Immingham DN40 2DU

P & I Design Ltd
 P & I DESIGN
 Tel: 01642 617444
 www.pidsign.co.uk

SHEET 1 OF 1

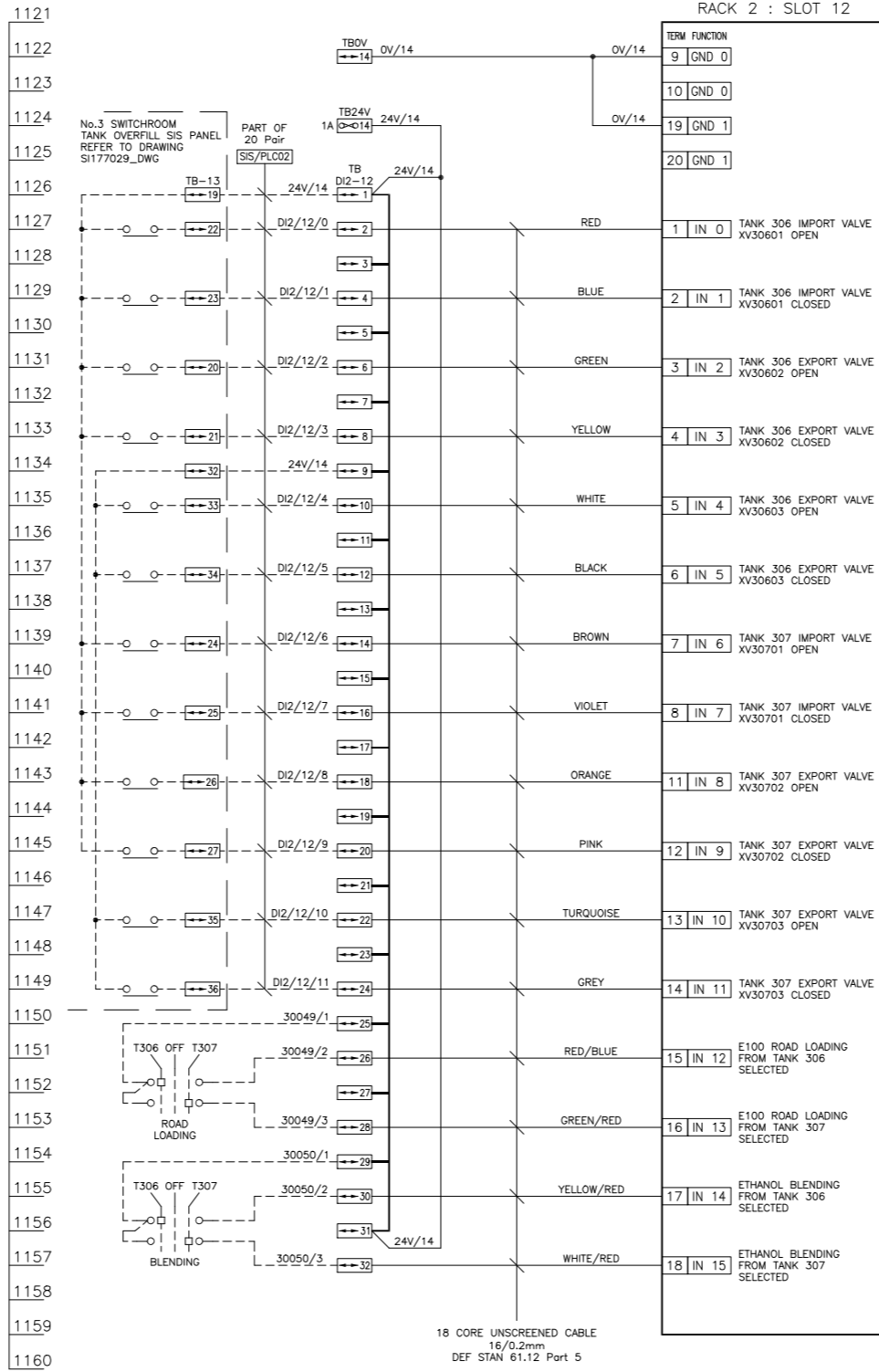


RELAY OUTPUT CARD
1756-OW161
RACK 2 : SLOT 11



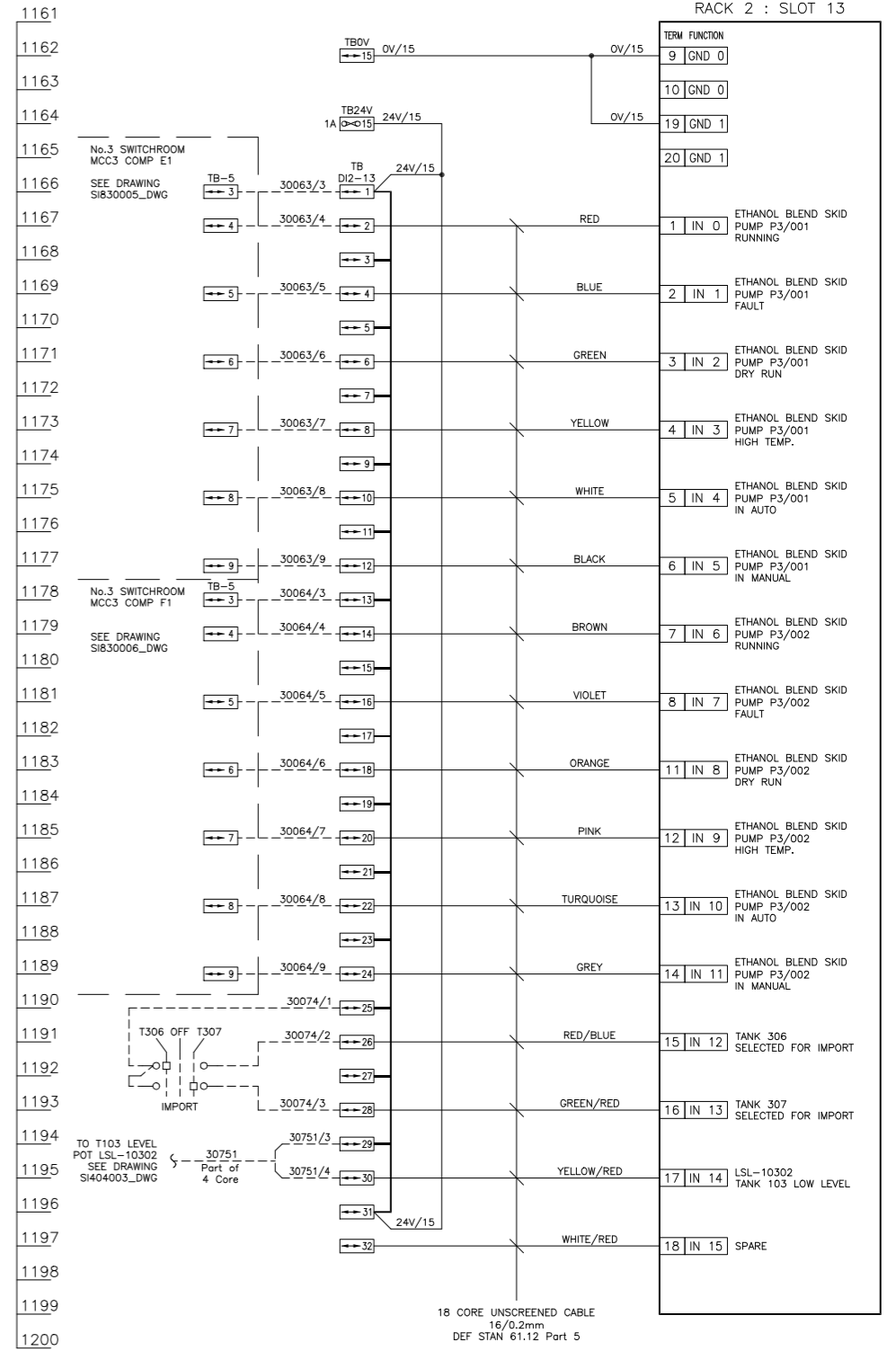
LAST NUMBER USED : 305
SPARE TO : 319

DIGITAL INPUT CARD
1756-IB16
RACK 2 : SLOT 12



18 CORE UNSCREENED CABLE
16/0.2mm
DEF STAN 61.12 Part 5

DIGITAL INPUT CARD
1756-IB16
RACK 2 : SLOT 13



LAST NUMBER USED : 310
SPARE TO : 319

REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION	REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION
H	03/02/15	P.P.	P.P.	M.M.	M.M.	AS BUILT - S1404 PROJECT	A	21/05/09	P.P.	P.P.	M.M.	M.M.	ISSUED FOR CONSTRUCTION
							B	05/06/09	P.P.	C.F.	M.M.	M.M.	AS BUILT
							C	10/06/09	P.P.	C.F.	M.M.	M.M.	AS BUILT-FUELS PLC UPGRADE
							D	06/07/09	D.B.F.	D.A.Y.	M.M.	M.M.	GANTRY A VAPOUR VALVES
							E	08/07/09	D.B.F.	D.A.Y.	M.M.	M.M.	ADDITIVE 3
							F	25/11/10	P.P.	P.P.	M.M.	M.M.	ETHANOL BLENDING ADDED
							G	25/02/11	P.P.	P.P.	M.M.	M.M.	VAPOUR VALVE TAG REVISED

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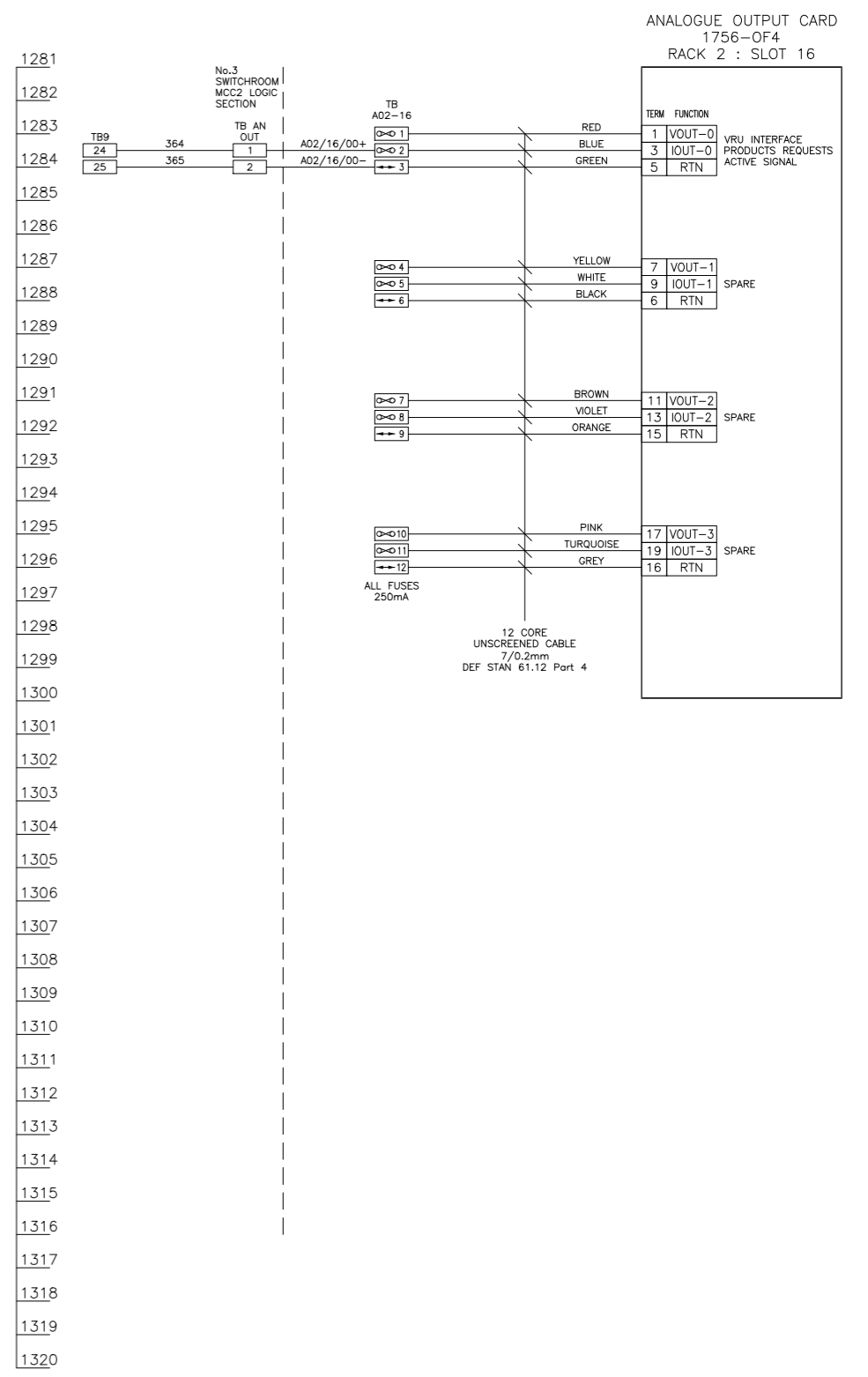
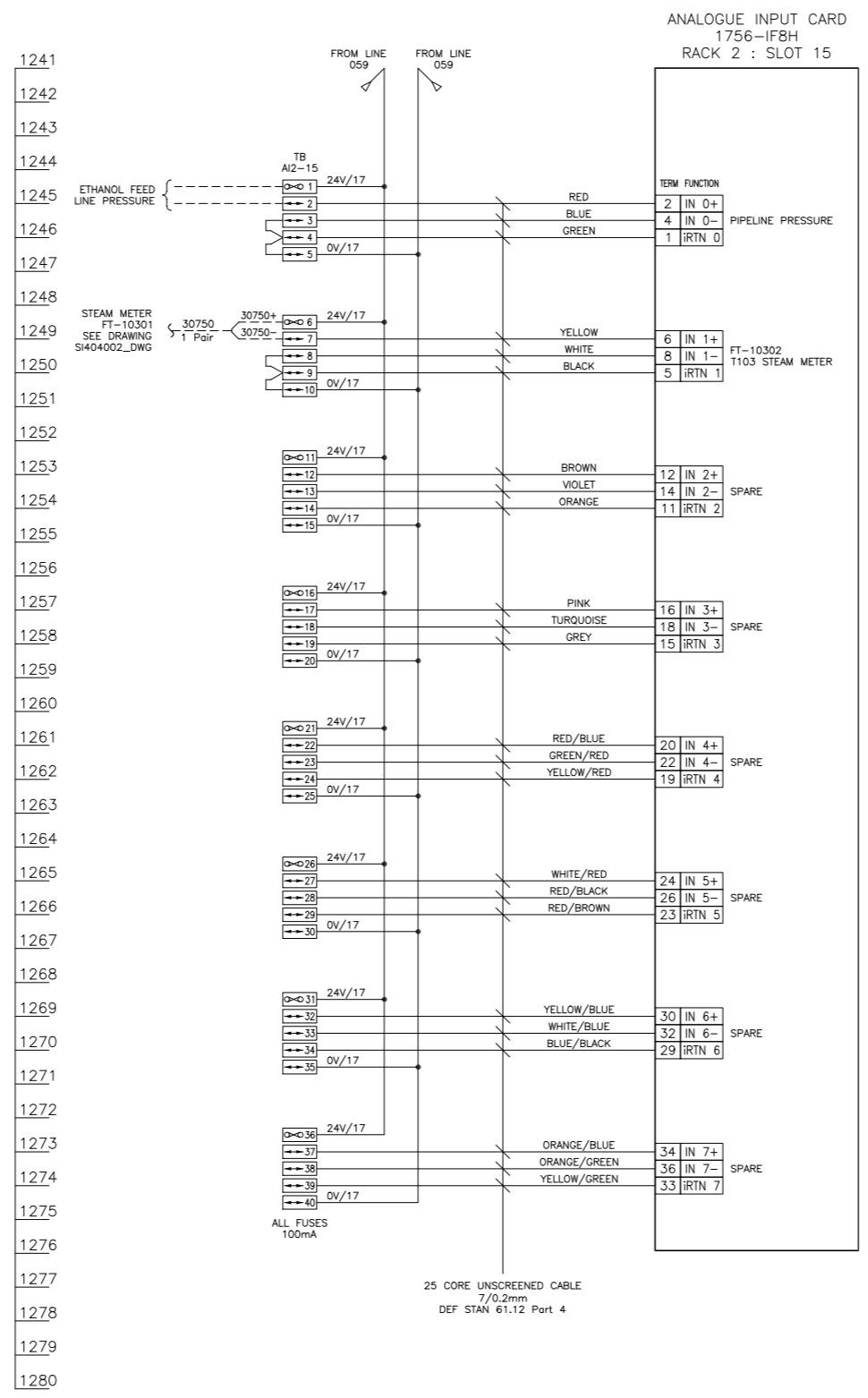
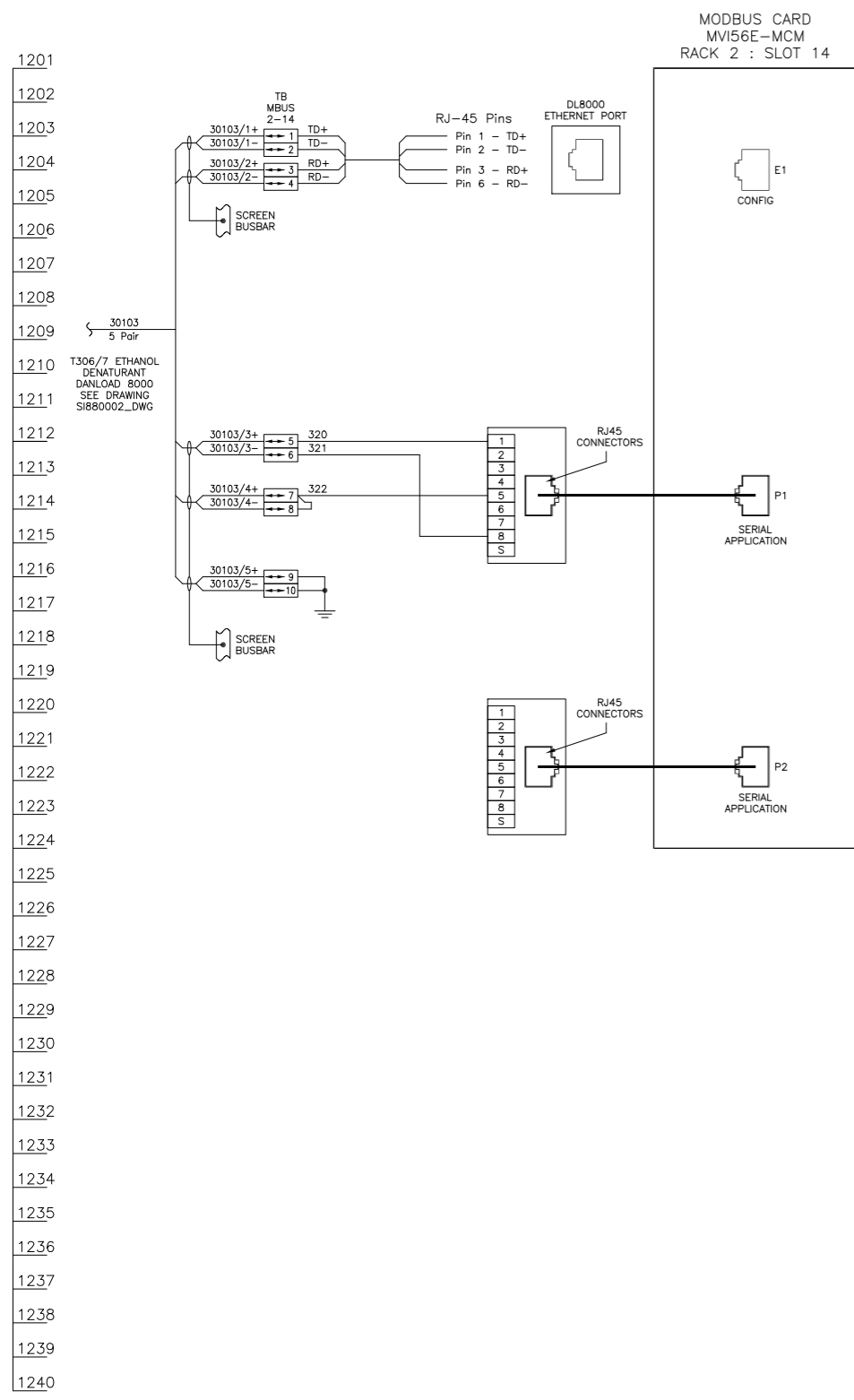
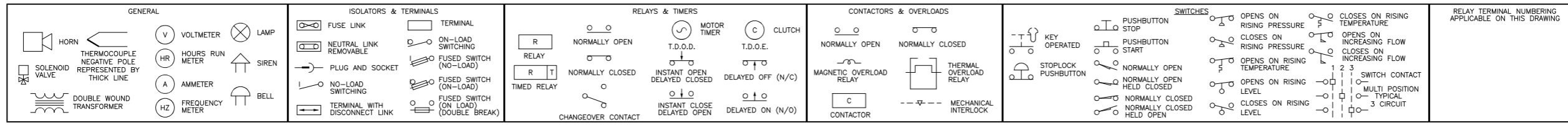
PLANT: IMMINGHAM WEST STORAGE DEPOT - SWITCHROOM 3
TITLE: PLC PANEL - LOGIC DRAWING 10

inter terminals
Immingham Storage Co Ltd
Immingham West Terminal
West Riverside
Immingham Dock
Immingham
N.E. Lincolnshire DN40 2QU

P & I Design Ltd
Tel: 01642 617444
www.pidesign.co.uk

SHEET 1 OF 1
P&I DRG No. S1317023_DWG

LEGEND OF GRAPHICAL SYMBOLS (ALL CONTACTS SHOWN IN THE DE-ENERGISED STATE)



LAST NUMBER USED : 322
 SPARE TO : 329

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REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION
A	21/05/09	P.P.	P.P.	M.M.	M.M.	ISSUED FOR CONSTRUCTION
B	05/06/09	P.P.	C.F	M.M.	M.M.	AS BUILT
C	10/06/09	P.P.	C.F	M.M.	M.M.	AS BUILT-FUELS PLC UPGRADE
D	24/09/10	P.P.	P.P.	M.M.	M.M.	ETHANOL BLENDING ADDED
E	25/01/11	P.P.	P.P.	M.M.	M.M.	ETHANOL DENATURANT ADDED
F	10/03/11	P.P.	P.P.	M.M.	M.M.	ETHERNET CONNECTIONS ADDED
G	03/02/15	P.P.	P.P.	M.M.	M.M.	AS BUILT - SI404 PROJECT

PLANT	IMMINGHAM WEST STORAGE DEPOT - SWITCHROOM 3
TITLE	PLC PANEL - LOGIC DRAWING 11
CLIENT DRG. No.	P&I DRG No. SI317024_DWG

inter terminals
 Immingham Storage Co Ltd
 Immingham West Terminal
 West Riverside
 Immingham Dock
 Immingham
 N.E. Lincolnshire DN40 2QU

P & I Design Ltd
 Tel. 01642 617444
 www.pidsign.co.uk

SHEET 1 OF 1

Section 4
Installation Scope of Work



P & I Design Ltd

Process Instrumentation Consultancy & Design

2 Reed Street, Gladstone Industrial Estate,
Thornaby, TS17 7AF, United Kingdom.
Tel. +44 (0) 1642 617444 Fax. +44 (0) 1642 616447
Web Site: www.pidesign.co.uk

SIMON STORAGE
IMMINGHAM STORAGE CO. LTD
WEST TERMINAL
FUELS FACILITY – GANTRIES A & B
I/O SCHEDULE

Rev	Date	By	Checked	Approved	Description	Client Ref.
A	12.05.09	A. Boalch	M. Morgan	M. Morgan	Gantries PLC Upgrade	Document No. SI169001_SCH
B	21.05.09	A. Boalch	M. Morgan	M. Morgan	T306 E100 Road Loading Added	
C	06.07.09	M. Morgan	A. Boalch	M. Morgan	Additive 3	
D	21/09/10	P. Potter	M. Morgan	M. Morgan	Ethanol Blending	
E	25/02/11	P. Potter	M. Morgan	M. Morgan	Vapour Valve Tag Revised	
F	18/03/11	M.Morgan	A. Boalch	M. Morgan	T105 Ethanol Denaturant	
G	25/02/15	M.Morgan	A. Boalch	M. Morgan	T103 Heated Diesel Project	

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1	I/O LAYOUT	3
2	I/O SCHEDULE	4
2.1	Digital Inputs.....	4
2.2	Digital Outputs.....	8
2.3	Analogue Inputs.....	10
2.4	Analogue Outputs.....	11

REVISION HISTORY

Rev	Description
G	VRU Temperature Monitoring project <ul style="list-style-type: none">High temperature alarm to annunciator added (O:02.10.14) Additions for T103 Heated Diesel project <ul style="list-style-type: none">XV10303 I/O added (I:02.06.14, I:02.06.15, O:02.10.15)LSL10302 added (I:02.13.14)FT10301 added (I:02.15.1)



1 I/O LAYOUT

Gantry Control PLC

IPC Blending Panel – Rack 02

PSU	CPU	ENET	DI	DI	DI	DI	DI	DI	DO	DO	DO	DO	DI	DI	MODBUS	AI	AO
	Slot 0	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5	Slot 6	Slot 7	Slot 8	Slot 9	Slot 10	Slot 11	Slot 12	Slot 13	Slot 14	Slot 15	Slot 16

Note

Gantry control PLC is a standalone PLC which is fitted to the IPC Blending control panel in No.3 switchroom. There is already an IPC blending control PLC fitted to the panel, therefore the gantry control PLC rack is ferruled as Rack 02 within the panel, in order to distinguish between the two systems.



2 I/O SCHEDULE

2.1 Digital Inputs

Rack 02 Slot 02

ADDRESS	TAG	TYPE	RANGE	SERVICE
I:02.02.0	ESD	V.F.C	N/A	Gantry ESD
I:02.02.1	GA_LA01_Start	V.F.C	N/A	Gantry A – Loading Arm 01 Product Pump Request
I:02.02.2	GA_LA02_Start	V.F.C	N/A	Gantry A – Loading Arm 02 Product Pump Request
I:02.02.3	GA_LA03_Start	V.F.C	N/A	Gantry A – Loading Arm 03 Product Pump Request
I:02.02.4	GA_LA04_Start	V.F.C	N/A	Gantry A – Loading Arm 04 Product Pump Request
I:02.02.5	GA_LA05_Start	V.F.C	N/A	Gantry A – Loading Arm 05 Product Pump Request
I:02.02.6	GB_LA01_Start	V.F.C	N/A	Gantry B – Loading Arm 01 Product Pump Request
I:02.02.7	GB_LA02_Start	V.F.C	N/A	Gantry B – Loading Arm 02 Product Pump Request
I:02.02.8	GB_LA03_Start	V.F.C	N/A	Gantry B – Loading Arm 03 Product Pump Request
I:02.02.9	GB_LA04_Start	V.F.C	N/A	Gantry B – Loading Arm 04 Product Pump Request
I:02.02.10	GB_LA05_Start	V.F.C	N/A	Gantry B – Loading Arm 05 Product Pump Request
I:02.02.11	GC_LA01_Start	V.F.C	N/A	Gantry C – Loading Arm 01 Product Pump Request (Future)
I:02.02.12	GC_LA02_Start	V.F.C	N/A	Gantry C – Loading Arm 02 Product Pump Request (Future)
I:02.02.13	GC_LA03_Start	V.F.C	N/A	Gantry C – Loading Arm 03 Product Pump Request (Future)
I:02.02.14	GC_LA04_Start	V.F.C	N/A	Gantry C – Loading Arm 04 Product Pump Request (Future)
I:02.02.15	GC_LA05_Start	V.F.C	N/A	Gantry C – Loading Arm 05 Product Pump Request (Future)

Rack 02 Slot 03

ADDRESS	TAG	TYPE	RANGE	SERVICE
I:02.03.0	LP300_Selected	V.F.C	N/A	Pump Group 1 – Pump 1 Selected to LEAD
I:02.03.1	LP301_Selected	V.F.C	N/A	Pump Group 1 – Pump 2 Selected to LEAD
I:02.03.2	LP302_Selected	V.F.C	N/A	Pump Group 1 – Pump 3 Selected to LEAD
I:02.03.3	LP303_Selected	V.F.C	N/A	Pump Group 1 – Pump 4 Selected to LEAD
I:02.03.4	LP304_Selected	V.F.C	N/A	Pump Group 2 – Pump 1 Selected to LEAD
I:02.03.5	LP305_Selected	V.F.C	N/A	Pump Group 2 – Pump 2 Selected to LEAD
I:02.03.6	LP306_Selected	V.F.C	N/A	Pump Group 2 – Pump 3 Selected to LEAD
I:02.03.7	LP307_Selected	V.F.C	N/A	Pump Group 3 – Pump 1 Selected to LEAD
I:02.03.8	LP308_Selected	V.F.C	N/A	Pump Group 3 – Pump 2 Selected to LEAD
I:02.03.9	LP309_Selected	V.F.C	N/A	Pump Group 3 – Pump 3 Selected to LEAD
I:02.03.10	AD1P1_Selected	V.F.C	N/A	Additive 1 – Pump 1 Selected to DUTY
I:02.03.11	AD1P2_Selected	V.F.C	N/A	Additive 1 – Pump 2 Selected to DUTY
I:02.03.12	AD2P1_Selected	V.F.C	N/A	Additive 2 – Pump 1 Selected to DUTY
I:02.03.13	AD2P2_Selected	V.F.C	N/A	Additive 2 – Pump 2 Selected to DUTY
I:02.03.14	AD1_Request	V.F.C	N/A	Additive 1 - Pump Request
I:02.03.15	AD2_Request	V.F.C	N/A	Additive 2 - Pump Request



2.1 *Digital Inputs (Cont...)*

Rack 02 Slot 04

ADDRESS	TAG	TYPE	RANGE	SERVICE
I:02.04.0	LP300_Running	V.F.C	N/A	Pump Group 1 – Pump 1 Running
I:02.04.1	LP301_Running	V.F.C	N/A	Pump Group 1 – Pump 2 Running
I:02.04.2	LP302_Running	V.F.C	N/A	Pump Group 1 – Pump 3 Running
I:02.04.3	LP303_Running	V.F.C	N/A	Pump Group 1 – Pump 4 Running
I:02.04.4	LP304_Running	V.F.C	N/A	Pump Group 2 – Pump 1 Running
I:02.04.5	LP305_Running	V.F.C	N/A	Pump Group 2 – Pump 2 Running
I:02.04.6	LP306_Running	V.F.C	N/A	Pump Group 2 – Pump 3 Running
I:02.04.7	LP307_Running	V.F.C	N/A	Pump Group 3 – Pump 1 Running
I:02.04.8	LP308_Running	V.F.C	N/A	Pump Group 3 – Pump 2 Running
I:02.04.9	LP309_Running	V.F.C	N/A	Pump Group 3 – Pump 3 Running
I:02.04.10	AD1P1_Running	V.F.C	N/A	Additive 1 – Pump 1 Running
I:02.04.11	AD1P2_Running	V.F.C	N/A	Additive 1 – Pump 2 Running
I:02.04.12	AD2P1_Running	V.F.C	N/A	Additive 2 – Pump 1 Running
I:02.04.13	AD2P2_Running	V.F.C	N/A	Additive 2 – Pump 2 Running
I:02.04.14	T209_Loading	V.F.C	N/A	Tank 209 Benzene Road Loading Active
I:02.04.15	Pump_Reset	V.F.C	N/A	Pump Fault Reset Pushbutton

Rack 02 Slot 05

ADDRESS	TAG	TYPE	RANGE	SERVICE
I:02.05.0	LP206_Selected	V.F.C	N/A	Pump Group 4 – Pump 1 Selected to LEAD
I:02.05.1	LP207_Selected	V.F.C	N/A	Pump Group 4 – Pump 2 Selected to LEAD
I:02.05.2	LP208_Selected	V.F.C	N/A	Pump Group 4 – Pump 3 Selected to LEAD (Future)
I:02.05.3	LP206_Running	V.F.C	N/A	Pump Group 4 – Pump 1 Running
I:02.05.4	LP207_Running	V.F.C	N/A	Pump Group 4 – Pump 2 Running
I:02.05.5	LP208_Running	V.F.C	N/A	Pump Group 4 – Pump 3 Running
I:02.05.6	AD3P1_Selected	V.F.C	N/A	Additive 3 – Pump 1 (ADP7) Selected to DUTY
I:02.05.7	AD3P2_Selected	V.F.C	N/A	Additive 3 – Pump 2 (ADP8) Selected to DUTY
I:02.05.8	AD3_Request	V.F.C	N/A	Additive 3 - Pump Request
I:02.05.9	GA_Permissive	V.F.C	N/A	Gantry A - Scully Permissive
I:02.05.10	GB_Permissive	V.F.C	N/A	Gantry B - Scully Permissive
I:02.05.11	GA_LA02_ETH	V.F.C	N/A	Gantry A - Loading Arm 02 Ethanol Blend Request
I:02.05.12	GB_LA01_ETH	V.F.C	N/A	Gantry B - Loading Arm 01 Ethanol Blend Request
I:02.05.13	GB_LA03_ETH	V.F.C	N/A	Gantry B - Loading Arm 03 Ethanol Blend Request
I:02.05.14	GB_LA05_ETH	V.F.C	N/A	Gantry B - Loading Arm 05 Ethanol Blend Request
I:02.05.15		V.F.C	N/A	Spare



2.1 *Digital Inputs (Cont...)*

Rack 02 Slot 06

ADDRESS	TAG	TYPE	RANGE	SERVICE
I:02.06.0	VX95_Request	V.F.C	N/A	Valve VX95 - Open Request
I:02.06.1	VX96_Request	V.F.C	N/A	Valve VX96 - Open Request
I:02.06.2	ZSOVX95	V.F.C	N/A	Valve VX95 - Open
I:02.06.3	ZSCVX95	V.F.C	N/A	Valve VX95 - Closed
I:02.06.4	ZSOVX96	V.F.C	N/A	Valve VX96 - Open
I:02.06.5	ZSCVX96	V.F.C	N/A	Valve VX96 - Closed
I:02.06.6	T95_Relief	V.F.C	N/A	T95 Relief Valve – Open
I:02.06.7	T96_Relief	V.F.C	N/A	T96 Relief Valve – Open
I:02.06.8	T95_Vapour	V.F.C	N/A	T95 Vapour Valve – Open
I:02.06.9	T96_Vapour	V.F.C	N/A	T96 Vapour Valve – Open
I:02.06.10	ZSC30605	V.F.C	N/A	Gantry A Vapour to VRU Valve - Open
I:02.06.11	ZSO30605	V.F.C	N/A	Gantry A Vapour to VRU Valve - Closed
I:02.06.12	ZSC30604	V.F.C	N/A	Gantry A Vapour to Vent Stack Valve - Open
I:02.06.13	ZSO30604	V.F.C	N/A	Gantry A Vapour to Vent Stack Valve - Closed
I:02.06.14	ZSO10303	V.F.C	N/A	T103 Steam valve XV10303 Open
I:02.06.15	ZSC10303	V.F.C	N/A	T103 Steam valve XV10303 Closed

Rack 02 Slot 07

ADDRESS	TAG	TYPE	RANGE	SERVICE
I:02.07.0	AD3P1_Running	V.F.C	N/A	Additive 3 – Pump 1 (ADP7) Running
I:02.07.1	AD3P1_Fault_DI	V.F.C	N/A	Additive 3 – Pump 1 (ADP7) Fault
I:02.07.2	AD3P1_DryRun	V.F.C	N/A	Additive 3 – Pump 1 (ADP7) Dry Run
I:02.07.3	AD3P1_HiTemp	V.F.C	N/A	Additive 3 – Pump 1 (ADP7) High Temperature
I:02.07.4	AD3P1_Auto	V.F.C	N/A	Additive 3 – Pump 1 (ADP7) Auto
I:02.07.5	AD3P1_Man	V.F.C	N/A	Additive 3 – Pump 1 (ADP7) Manual
I:02.07.6	AD3P2_Running	V.F.C	N/A	Additive 3 – Pump 2 (ADP8) Running
I:02.07.7	AD3P2_Fault_DI	V.F.C	N/A	Additive 3 – Pump 2 (ADP8) Fault
I:02.07.8	AD3P2_DryRun	V.F.C	N/A	Additive 3 – Pump 2 (ADP8) Dry Run
I:02.07.9	AD3P2_HiTemp	V.F.C	N/A	Additive 3 – Pump 2 (ADP8) High Temperature
I:02.07.10	AD3P2_Auto	V.F.C	N/A	Additive 3 – Pump 2 (ADP8) Auto
I:02.07.11	AD3P2_Man	V.F.C	N/A	Additive 3 – Pump 2 (ADP8) Manual
I:02.07.12		V.F.C	N/A	T105 Transfer Pump Dry Run
I:02.07.13		V.F.C	N/A	T105 Transfer Pump High Temperature
I:02.07.14		V.F.C	N/A	T105 Transfer Pump Fault
I:02.07.15		V.F.C	N/A	T105 Transfer Pump Auto



2.1 *Digital Inputs (Cont...)*

Rack 02 Slot 12

ADDRESS	TAG	TYPE	RANGE	SERVICE
I:02.12.0	SIS_ZSO30601	V.F.C	N/A	SIS - Tank 306 Import Valve Open
I:02.12.1	SIS_ZSC30601	V.F.C	N/A	SIS - Tank 306 Import Valve Closed
I:02.12.2	SIS_ZSO30602	V.F.C	N/A	SIS - Tank 306 Export Valve Open
I:02.12.3	SIS_ZSC30602	V.F.C	N/A	SIS - Tank 306 Export Valve Closed
I:02.12.4	SIS_ZSO30603	V.F.C	N/A	SIS - Tank 306 Export Valve Open
I:02.12.5	SIS_ZSC30603	V.F.C	N/A	SIS - Tank 306 Export Valve Closed
I:02.12.6	SIS_ZSO30701	V.F.C	N/A	SIS - Tank 307 Import Valve Open
I:02.12.7	SIS_ZSC30701	V.F.C	N/A	SIS - Tank 307 Import Valve Closed
I:02.12.8	SIS_ZSO30702	V.F.C	N/A	SIS - Tank 307 Export Valve Open
I:02.12.9	SIS_ZSC30702	V.F.C	N/A	SIS - Tank 307 Export Valve Closed
I:02.12.10	SIS_ZSO30703	V.F.C	N/A	SIS - Tank 307 Export Valve Open
I:02.12.11	SIS_ZSC30703	V.F.C	N/A	SIS - Tank 307 Export Valve Closed
I:02.12.12	T306_Loading	V.F.C	N/A	E100 Road Loading from Tank 306 Selected
I:02.12.13	T307_Loading	V.F.C	N/A	E100 Road Loading Tank from 307 Selected
I:02.12.14	T306_Blending	V.F.C	N/A	Ethanol Blending from Tank 306 Selected
I:02.12.15	T307_Blending	V.F.C	N/A	Ethanol Blending from Tank 307 Selected

Rack 02 Slot 13

ADDRESS	TAG	TYPE	RANGE	SERVICE
I:02.13.0	P3/001_Running	V.F.C	N/A	Ethanol Blend Skid Pump 1 Running
I:02.13.1	P3/001_Fault	V.F.C	N/A	Ethanol Blend Skid Pump 1 Fault
I:02.13.2	P3/001_DryRun	V.F.C	N/A	Ethanol Blend Skid Pump 1 Dry Run
I:02.13.3	P3/001_HiTemp	V.F.C	N/A	Ethanol Blend Skid Pump 1 High Temperature
I:02.13.4	P3/001_Auto	V.F.C	N/A	Ethanol Blend Skid Pump 1 Auto
I:02.13.5	P3/001_Man	V.F.C	N/A	Ethanol Blend Skid Pump 1 Manual
I:02.13.6	P3/002_Running	V.F.C	N/A	Ethanol Blend Skid Pump 2 Running
I:02.13.7	P3/002_Fault	V.F.C	N/A	Ethanol Blend Skid Pump 2 Fault
I:02.13.8	P3/002_DryRun	V.F.C	N/A	Ethanol Blend Skid Pump 2 Dry Run
I:02.13.9	P3/002_HiTemp	V.F.C	N/A	Ethanol Blend Skid Pump 2 High Temperature
I:02.13.10	P3/002_Auto	V.F.C	N/A	Ethanol Blend Skid Pump 2 Auto
I:02.13.11	P3/002_Man	V.F.C	N/A	Ethanol Blend Skid Pump 2 Manual
I:02.13.12	T306_Import	V.F.C	N/A	Tank 306 Selected to Import
I:02.13.13	T307_Import	V.F.C	N/A	Tank 307 Selected to Import
I:02.13.14	LSL10302	V.F.C	N/A	T103 Low Level switch
I:02.13.15		V.F.C	N/A	Spare



2.2 Digital Outputs

Rack 02 Slot 08 (240V Outputs)

ADDRESS	TAG	TYPE	RANGE	SERVICE
O:02.08.0	LP300_Start	Relay	N/A	Pump Group 1 – Pump 1 Auto Start
O:02.08.1	LP301_Start	Relay	N/A	Pump Group 1 – Pump 2 Auto Start
O:02.08.2	LP302_Start	Relay	N/A	Pump Group 1 – Pump 3 Auto Start
O:02.08.3	LP303_Start	Relay	N/A	Pump Group 1 – Pump 4 Auto Start
O:02.08.4	LP304_Start	Relay	N/A	Pump Group 2 – Pump 1 Auto Start
O:02.08.5	LP305_Start	Relay	N/A	Pump Group 2 – Pump 2 Auto Start
O:02.08.6	LP306_Start	Relay	N/A	Pump Group 2 – Pump 3 Auto Start
O:02.08.7	LP307_Start	Relay	N/A	Pump Group 3 – Pump 1 Auto Start
O:02.08.8	LP308_Start	Relay	N/A	Pump Group 3 – Pump 2 Auto Start
O:02.08.9	LP309_Start	Relay	N/A	Pump Group 3 – Pump 3 Auto Start
O:02.08.10	AD1P1_Start	Relay	N/A	Additive 1 – Pump 1 Auto Start
O:02.08.11	AD1P2_Start	Relay	N/A	Additive 1 – Pump 2 Auto Start
O:02.08.12	AD2P1_Stop	Relay	N/A	Additive 2 – Pump 1 Auto Stop
O:02.08.13	AD2P2_Stop	Relay	N/A	Additive 2 – Pump 2 Auto Stop
O:02.08.14	AD2P1_Start	Relay	N/A	Additive 2 – Pump 1 Auto Start
O:02.08.15	AD2P2_Start	Relay	N/A	Additive 2 – Pump 2 Auto Start

Rack 02 Slot 09 (240V Outputs)

ADDRESS	TAG	TYPE	RANGE	SERVICE
O:02.09.0	LP300_Fault	Relay	N/A	Pump Group 1 – Pump 1 Fault Lamp
O:02.09.1	LP301_Fault	Relay	N/A	Pump Group 1 – Pump 2 Fault Lamp
O:02.09.2	LP302_Fault	Relay	N/A	Pump Group 1 – Pump 3 Fault Lamp
O:02.09.3	LP303_Fault	Relay	N/A	Pump Group 1 – Pump 4 Fault Lamp
O:02.09.4	LP304_Fault	Relay	N/A	Pump Group 2 – Pump 1 Fault Lamp
O:02.09.5	LP305_Fault	Relay	N/A	Pump Group 2 – Pump 2 Fault Lamp
O:02.09.6	LP306_Fault	Relay	N/A	Pump Group 2 – Pump 3 Fault Lamp
O:02.09.7	LP307_Fault	Relay	N/A	Pump Group 3 – Pump 1 Fault Lamp
O:02.09.8	LP308_Fault	Relay	N/A	Pump Group 3 – Pump 2 Fault Lamp
O:02.09.9	LP309_Fault	Relay	N/A	Pump Group 3 – Pump 3 Fault Lamp
O:02.09.10	AD1P1_Fault	Relay	N/A	Additive 1 – Pump 1 Fault Lamp
O:02.09.11	AD1P2_Fault	Relay	N/A	Additive 1 – Pump 2 Fault Lamp
O:02.09.12	AD2P1_Fault	Relay	N/A	Additive 2 – Pump 1 Fault Lamp
O:02.09.13	AD2P2_Fault	Relay	N/A	Additive 2 – Pump 2 Fault Lamp
O:02.09.14	Pump_Fault	Relay	N/A	Common Pump Fault Lamp
O:02.09.15	PLC_Healthy	Relay	N/A	PLC Healthy Lamp



2.2 *Digital Outputs (Cont...)*

Rack 02 Slot 10 (Note : Mixed 240Vac & 24Vdc Outputs)

ADDRESS	TAG	TYPE	RANGE	SERVICE
O:02.10.0	LP206_Start	Relay	240Vac	Pump Group 4 – Pump 1 Auto Start
O:02.10.1	LP207_Start	Relay	240Vac	Pump Group 4 – Pump 2 Auto Start
O:02.10.2	LP208_Start	Relay	240Vac	Pump Group 4 – Pump 3 Auto Start (Future)
O:02.10.3	LP206_Fault	Relay	240Vac	Pump Group 4 – Pump 1 Fault Lamp
O:02.10.4	LP207_Fault	Relay	240Vac	Pump Group 4 – Pump 2 Fault Lamp
O:02.10.5	LP208_Fault	Relay	240Vac	Pump Group 4 – Pump 3 Fault Lamp (Future)
O:02.10.6	AD3P1_Fault	Relay	240Vac	Additive 3 – Pump 1 (ADP7) Fault Lamp
O:02.10.7	AD3P2_Fault	Relay	240Vac	Additive 3 – Pump 2 (ADP8) Fault Lamp
O:02.10.8	AD3P1_Run_DO	Relay	240Vac	Additive3 – Pump 1 (ADP7) Running Lamp
O:02.10.9	AD3P2_Run_DO	Relay	240Vac	Additive3 – Pump 2 (ADP8) Running Lamp
O:02.10.10	Spare_Run_DO	Relay	240Vac	Future (Fitted) Running Lamp to Gantry A
O:02.10.11	Spare_Run_DO	Relay	240Vac	Future (Fitted) Running Lamp to Gantry A
O:02.10.12	XV30601_Open	Relay	24Vdc	Tank 306 Import Valve Open/Close
O:02.10.13	XV30701_Open	Relay	24Vdc	Tank 307 Import Valve Open/Close
O:02.10.14	VRU	Relay	24Vdc	VRU High Temperature Alarm
O:02.10.15	XV10303	Relay	24Vdc	T103 Steam Valve Open/Close

Rack 02 Slot 11 (24V Outputs)

ADDRESS	TAG	TYPE	RANGE	SERVICE
O:02.11.0	VX95_Open	Relay	N/A	Valve VX95 – Auto Open
O:02.11.1	VX96_Open	Relay	N/A	Valve VX96 – Auto Open
O:02.11.2	Valve_Fault	Relay	N/A	Common Valve Fault Lamp
O:02.11.3	PG01_Pump_Permissive	Relay	N/A	Pump Group 01 Permissive (LP300, 301, 302 & 303)
O:02.11.4	PG01_Bx_Permissive	Relay	N/A	Pump Group 01 DANLOAD Permissive
O:02.11.5	XV30605	Relay	N/A	Gantry A Vapour to VRU Valve – Auto Open
O:02.11.6	XV30604	Relay	N/A	Gantry A Vapour to Vent Stack Valve – Auto Open
O:02.11.7	Gantry_A_Permissive	Relay	N/A	Gantry A DANLOAD Permissive
O:02.11.8	AD3P1_Start	Relay	N/A	Additive 3 – Pump 1 (ADP7) Auto Start
O:02.11.9	AD3P2_Start	Relay	N/A	Additive 3 – Pump 2 (ADP8) Auto Start
O:02.11.10	P3/001_Start	Relay	N/A	Ethanol Blend Skid Pump 1 Auto Start
O:02.11.11	P3/002_Start	Relay	N/A	Ethanol Blend Skid Pump 2 Auto Start
O:02.11.12	XV30602_Open	Relay	N/A	Tank 306 Export Valve Open/Close
O:02.11.13	XV30603_Open	Relay	N/A	Tank 306 Export Valve Open/Close
O:02.11.14	XV30702_Open	Relay	N/A	Tank 307 Export Valve Open/Close
O:02.11.15	XV30703_Open	Relay	N/A	Tank 307 Export Valve Open/Close



2.3 Analogue Inputs

Rack 02 Slot 15

ADDRESS	TAG	TYPE	RANGE	SERVICE
I:02.15.0	PTxxxx	4 – 20 mA	tba	Ethanol Line Pressure
I:02.15.1	FT10301	4 – 20 mA	0 to 2000kg/h	T103 Steam Flowrate
I:02.15.2		4 – 20 mA		Spare
I:02.15.3		4 – 20 mA		Spare
I:02.15.4		4 – 20 mA		Spare
I:02.15.5		4 – 20 mA		Spare
I:02.15.6		4 – 20 mA		Spare
I:02.15.7		4 – 20 mA		Spare



2.4 Analogue Outputs

Rack 2 Slot 16

ADDRESS	TAG	TYPE	RANGE	SERVICE
O:02.16.0	VRU_Output	N/A	4 – 20mA	VRU Interface – Product Requests Active Signal
O:02.16.1			N/A	Spare
O:02.16.2			N/A	Spare
O:02.16.3			N/A	Spare



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SIMON STORAGE

IMMINGHAM WEST TERMINAL

TANK 103 – HEATED DIESEL PROJECT

INSTRUMENT & ELECTRICAL INSTALLATION

SCOPE OF WORK

Rev	Date	By	Checked	Approved	Description	Client Ref.
A	23/10/14	MM	PP	M.M.	Issued for Construction	Document No. SI404001_INS

IF NOT SIGNED THIS DOCUMENT IS UNCONTROLLED

CONTENTS

1	Revision History.....	2
2	Introduction	3
3	Scope of Work.....	3

APPENDIX

- I Cable Overview Drawings
- II Schedules & Specifications

1 REVISION HISTORY

Rev	Description
A	Original Issue
B	
C	
D	



2 INTRODUCTION

This document details the scope of work to provide the instrument and electrical installation for the Tank 103 Heated Diesel Project at Simon Storage Ltd. ISCO West Terminal.

The project is to provide a steam heating facility for Tank 103 together with modifications to Fuels Gantry A to assign arms FA4 & FA5 to Tank 103. The gantry works are already covered under the main fuels gantry upgrade scope of work and will be dealt with separately to this scope of work.

It is to be read in conjunction with specification SI002001_INS - Standard Specification for Instrument & Electrical Installations.

The installation contractor shall make an allowance to manage all aspects of the installation.

3 SCOPE OF WORK

The scope of work is as detailed in the following sections and as shown on the documentation listed below.

Cable Overview	SI404001_DWG Rev A
Cable Schedules	SI404001_SCH Rev A SI404002_SCH Rev A

3.1 Scope of Work – Field

The works comprise, briefly:-

- Supply & installation of cables from the Main PLC panel in No.3 switchroom to the field equipment
- Supply & installation of local valve junction box

3.2 Scope of Work – No.3 Switchroom Main PLC Panel

The contractor will be required to make modifications/additions to the existing PLC extension logic panel.

Works comprise :-

- Termination of cables to existing PLC I/O card terminal blocks and 24V distribution rail as detailed on cable schedules
- Extension of PLC Rack 2 Slot 10 digital output terminal rail (TB DO2-10) to provide one additional terminal (Terminal 33)
- Internal panel wiring from 24/18 & 0V/18 distribution rail to TB DO2-10

3.4 Scope of Work – Containment

Containment is to be assessed with the ISCo engineer and additional containment provided as agreed, if necessary.



3.5 Contractor Supplied Equipment

The contractor shall supply and install the following equipment. All equipment shall be suitably rated for the environment in which it is to be installed (site hazardous area drawing available on request). Where not fully specified, equipment shall conform with normal site standards for similar installations.

- 1 off Valve local Junction Box.

3.6 Free Issue Equipment

The contractor shall supply labour and materials to take delivery, offload and position the following free issue equipment. Equipment requiring a direct connection into the process lines will be mechanically completed by others.

- 1 off Steam flowmeter
- 1 off Steam Control Valve
- 1 off Tank Low Level Switch



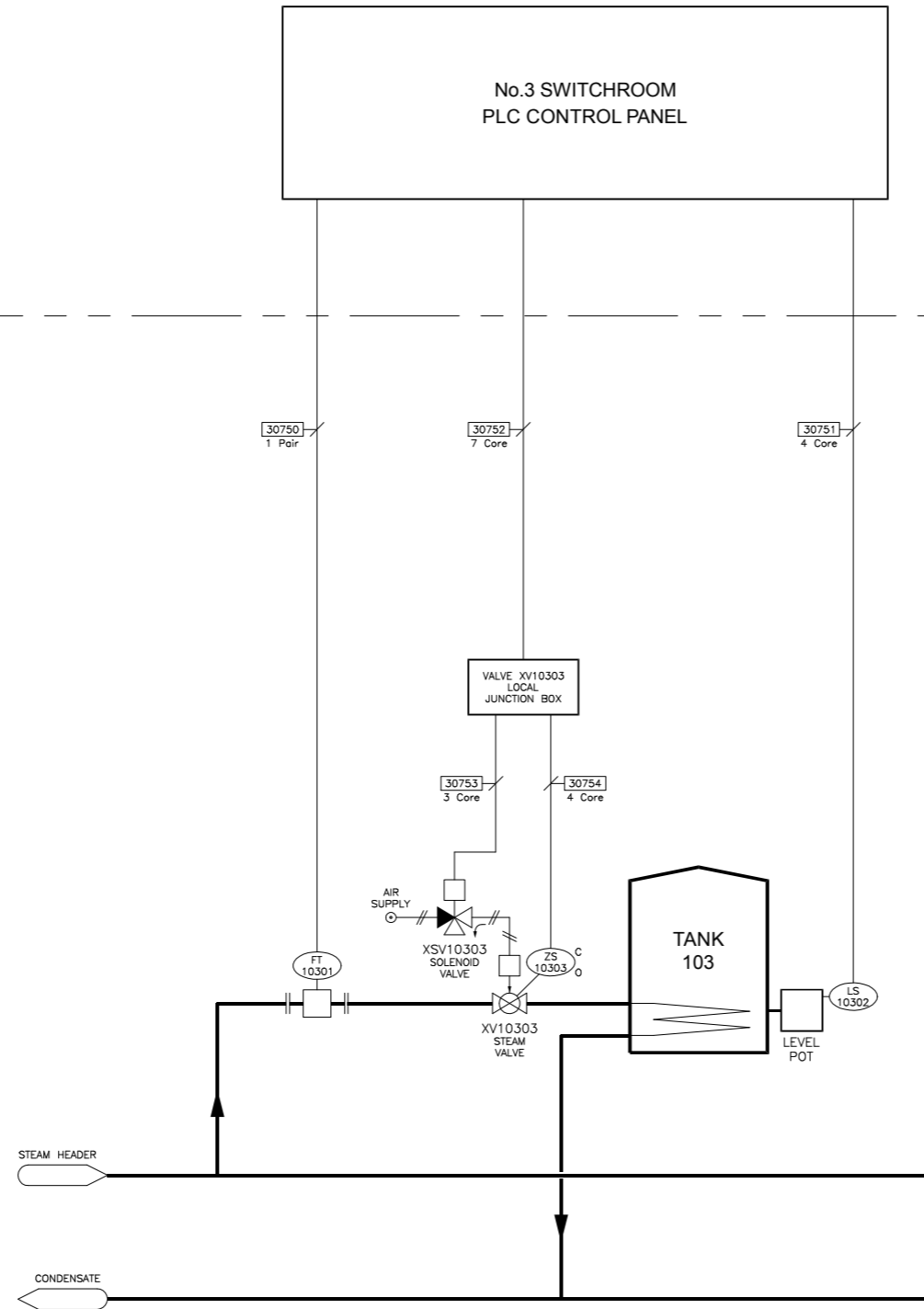
Appendix I

Drawings

SI404001_DWG Rev A



No.3 SWITCHROOM



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REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION
A	23/10/14	P.P.	P.P.	M.M.	M.M.	ISSUED FOR CONSTRUCTION

PLANT	IMMINGHAM STORAGE Co. - WEST TERMINAL
TITLE	TANK 103 HEATING CONTROL CABLE OVERVIEW
P & I Design Ltd <small>IMMINGHAM WEST TERMINAL, WEST RIVERSIDE, IMMINGHAM DOCK, IMMINGHAM, N.E. LINCOLNSHIRE, DN40 2GU</small> Tel. 01642 617444 www.pidesign.co.uk	
CLIENT DRG. No.	P&I DRG No. SI404001_DWG
SHEET 1 OF 1	

Appendix II

Schedules & Specifications

SI404001_SCH Rev A

SI404002_SCH Rev A

Cable Specification - Type 'E'

Cable Specification - Type 'J'



INSTRUMENT/ELECTRICAL CABLE SCHEDULE

CABLE		CONDUCTORS		CABLE ROUTE				APPROX. LENGTH METRES	REMARKS
REFERENCE	TYPE	AREA mm ²	No.	FROM	GLAND TYPE	TO	GLAND TYPE		
30750	E01	1.5	1 Pair	No.3 Switchroom PLC Panel	ATEX II 2 G EExed	FT10301 - Steam Flow Meter	ATEX II 2 G EExed		
30751	J04	1.5	4 Core	No.3 Switchroom PLC Panel	ATEX II 2 G EExed	LSL10302 - Tank 103 Low Level Switch	ATEX II 2 G EExed		
30752	J07	1.5	7 Core	No.3 Switchroom PLC Panel	ATEX II 2 G EExed	Valve XV10303 Local Junction Box	ATEX II 2 G EExed		
30753	J03	1.5	3 Core	Valve XV10303 Local Junction Box	ATEX II 2 G EExed	XSV10303 - Tank 103 Steam Valve Solenoid	ATEX II 2 G EExed		
30754	J04	1.5	4 Core	Valve XV10303 Local Junction Box	ATEX II 2 G EExed	ZS10303 - Tank 103 Steam Valve Limit Switches	ATEX II 2 G EExed		
30755									
30756									
30757									
30758									
30759									

ALL MODIFICATIONS TO BE MADE ON MASTER SCHEDULE SI002003_SCH AND COPIED ONTO THIS SCHEDULE

TOTAL


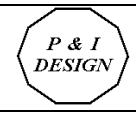
NOTES:

1) Refer to P&I Design Cable Specifications for details on Cable Type.







- Denotes Cable Modified
- Denotes Cable Deleted
- Denotes Cable Added
- Future Cables

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REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION
A	22/10/14	P.P.	P.P.	M.M.	M.M.	Issued for Construction

PLANT	ISCo West - No.3 Switchroom	
TITLE	Tank 103 Heating Control - Cable Schedule	
		
CLIENT DRG No	SHEET 1 OF 1 REF No. SI404001_SCH	

FIELD							XCV10303 Valve Local JB							SWITCHROOM No.3 - PLC PANEL (MAIN PLC PANEL)											
FIELD INSTRUMENT	TERMINAL No.	CABLE DETAILS					TERMINAL No.			JUNCTION BOX DETAILS					TERMINAL No.	PANEL TERMINATION DETAILS				INST. LOOP DIAGRAM	REMARKS				
		CABLE No.	TYPE	CORE No.	FERRULE No.	LENGTH METRES				CABLE No.	TYPE	CORE No.	FERRULE No.	LENGTH METRES		CABLE No.	TERMINAL NO.	CORE No.	FERRULE No.						
FT10301	1	30750	1 Pair	Pr1+	30750+										TB AI2-15						T103 Steam Flowmeter				
	2			Pr1-	30750-										6							7			
				Pr1SCN	30741/SCN										Screen Bar										
XSV10303	+	30753	3 Core	1	30753/1										TB DO2-10	24V/18	TB24V 18				XCV10303 T103 Steam Control Valve				
	-			2	30753/2										31							32	33	0V/18	18
	E			3	30753/3										Earth Bar										
ZS010303	C	30754	4 Core	1	30754/1				30752	7 Core					TB DI2-6						XCV10303 Open				
N.O.	2			30754/2	29										30										
ZSC10303	C			3	30754/3										6							30752/6	31		
N.O.	4			30754/4	7										30752/7							32			
LSL10302	1+	30751	4 Core	1	30751/1										TB24V						500mA				
	2-			2	30751/2										24V/19							0V/19			
	3			3	30751/3										TB DI2-13							29	30		
	4			4	30751/4																				

NOTES: 1) Future Level & Temperature switches to be linked out.	IF NOT SIGNED THIS DOCUMENT IS UNCONTROLLED								PLANT	Immingham Storage Co. - West Terminal	
	REV	DATE	BY	DRN	CHECKED	APPROVED	DESCRIPTION	PLANT	T103 Connection Schedule		
	A	23/10/14	MM	MM	PP	MM	Issued for Construction	TITLE			
 Denotes Item Modified  Denotes Item Deleted  Denotes Item Added  Future Use								 bulk liquid & gas network		SHEET 1 OF 1	
							CLIENT DRG No.	REF No. SH404002_SCH			

TYPE	E				
DESCRIPTION	Twisted Pairs, Collectively Screened - Armoured One pair, Two pair, Five pair, Ten pair or Twenty pair.				
MANUFACTURING SPECIFICATION	BS5308 Part 1 Type 2				
SERVICE	24V dc (Nominal) Digital, Pulse and Analogue Instrument Signals				
CONDUCTORS	Stranded Copper 0.5mm ² to 1.5 mm ²				
INSULATION	Polyethylene, with one core black and one core blue.				
MULTI-PAIR IDENTIFICATION	Both cores of each pair shall be indelibly numbered with the pair number at regular maximum intervals of 50mm				
LAYING UP	Cores twisted together in pairs.				
COLLECTIVE SCREEN	Laminated tape with the metallic side down and in continuous contact with a tinned copper drain wire.				
ARMOUR BEDDING	Polyethylene				
ARMOUR	Galvanised Steel Wire				
SHEATH	PVC For intrinsically safe circuits the sheath colour shall be blue, for other circuits the sheath colour shall be black (See Notes).				
NOTES	The cable type shall be followed by a number that defines the number of cores / pairs / triads within a given cable. In addition a suffix may be added where applicable as follows. <table border="0"><tr><td>Suffix</td><td>Description</td></tr><tr><td>I</td><td>Intrinsically Safe Circuit</td></tr></table> e.g. E10I indicates a ten pair type E cable with a blue sheath.	Suffix	Description	I	Intrinsically Safe Circuit
Suffix	Description				
I	Intrinsically Safe Circuit				

TYPE	J
DESCRIPTION	XLPE Insulated Power Cable - Armoured
MANUFACTURING SPECIFICATION	BS5467
SERVICE	Power Distribution / Control (Max. 440V ac.)
VOLTAGE	600/1000V.
CONDUCTORS	Stranded Copper
INSULATION	XLPE (Cross Linked Polyethylene)
CORE COLOUR CODE	1 core Brown 2 cores Brown, Blue 3 cores Brown, Black, Grey 4 cores Brown, Black, Grey, Blue 5 cores Brown, Black, Grey, Blue, Green/Yellow 7 cores } 12 cores White insulation with core number indelibly marked at 19 cores regular maximum intervals of 50mm 27 cores } 37 cores 48 cores }
SHEATH	Black PVC
ARMOUR BEDDING	PVC
ARMOUR	Single Core - Aluminium Wire Multi Core - Galvanised Steel Wire
NOTES	The cable type shall be followed by a number that defines the number of cores within a given cable. e.g. J12 indicates a twelve core type J cable.