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INTER TERMINALS TYNESIDE LTD
FLUOROBENZENE GANTRY / TANK 24
DOCUMENTATION MANUAL

Rev	Date	By	Checked	Approved	Description	Client Ref.
A	08.10.97	D. Smith	DRR	DRR	Original Issue	Document No. SI347001_MNL
B	04.11.97	D. Smith	DRR	DRR	Updated	
C	25.11.97	D. Smith	DRR	DRR	Updated	
D	22.09.98	D. Smith	DRR	DRR	Updated	Page 1 of 4
E	19.09.14	D. Smith	MM	MM	General Update	
F	02.02.17	D. Smith	MM	MM	General Update	
G	01.03.17	D. Smith	MM	MM	Road Loading Overfill Mods	

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Contents

- 1 Register Control System
- 2 Reports
- 3 Specifications
- 4 Calculations
- 5 Drawings



Section 1
Register Control System



Register Control System

<u>Register No</u>	<u>Description</u>	<u>Issue</u>
SI347001_REG	Drawing Register	F
SI347002_REG	Report Register	D
SI347003_REG	Instrument Specification Register	D
SI347004_REG	Calculations Register	D



CLIENT:

Inter Terminals Tyneside Ltd

REV	DATE	BY	CHKD	APPD	CLIENT REF.
A	03.10.97	MS	DRR	DRR	
B	23.10.97	PJP	DRR	DRR	P & I REF.
C	25.11.97	PJP	DRR	DRR	SI347001_REG
D	22.09.98	AH	DRR	DRR	SHT 1 OF 1
E	22.09.14	DS	MM	MM	
F	02.02.17	DS	MM	MM	

DRAWING NO	REV	DESCRIPTION
SI347001_DWG	D	Inst/Elec Cable Overview Drawing
SI347003_DWG	A	MCC Compartment Details
SI347004_DWG	A	Logic Panel Front Layout
SI347005_DWG	C	Logic Panel Internal Layout
SI347007_DWG	E	Logic Drawing 1
SI347008_DWG	A	Logic Drawing 2
SI347012_DWG	C	Fluorobenzene Tanker Loading Batcher
SI347013_DWG	B	P107/P108 Vega Level Switches Loop
SI347014_DWG	B	RG2 Enraf Smart Radar Loop Sheet
SI347015_DWG	A	RTW High Level Loop Sheet
SI347024_DWG	A	CP2 Logic Panel Termination Details
SI347025_DWG	D	Fluorobenzene Control Unit Terminals
SI347026_DWG	C	Gantry Control Unit Front Layout
SI347027_DWG	D	IS Junction Box Internal Layout
SI347028_DWG	B	Road Loading Pump EEx'e' JB Layout
SI347030_DWG	C	Road Loading Pump MCC
SI347031_DWG	C	Offloading Pump MCC
SI347032_DWG	B	Power Distribution

Cable Schedule

SI347100_SCH	B	Cable Schedule
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Inter Terminals Tyneside Ltd

ISSUE	DATE	BY	CHKD	APPD	CLIENT REF.
A	03.10.97	MS	DRR	DRR	
B	13.10.97	PJP	DRR	DRR	P & I REF.
C	22.09.14	DS	MM	MM	SI347002_REG
D	02.02.17	DS	MM	MM	SHT 1 OF 1

REPORT NO	REV	DESCRIPTION
SI347001_RPT	A	Road Tanker & Overspill Prevention System Specification
SI347001_INS	B	Instrument & Electrical Installation Tender Package
SI204001_INS	A	Tank 24 Road Loading Upgrade Inst / Elec Scope of Works

P & I Design Ltd.

CLIENT:
Velva Liquids (North Shields) Ltd

Instrument Specification Register

ISSUE	DATE	BY	CHKD	APPD	CLIENT REF.
A	03.10.97	PJP	DRR	DRR	
B	13.10.97	PJP	DRR	DRR	P & I REF.
C	04.11.97	PJP	DRR	DRR	SI347003_REG
D	19.09.14	PJP	DRR	DRR	SHT 1 OF 1

P&I REF.	ISSUE	REVISION					P.O. No.	SUPPLIER	TAG No.	ITEM
		0	A	B	C	D				
PNL##A2_SPC		A	A	A			-	-	General Specification for the Manufacture of Instrument Control Consoles and Panels	
SI347001_SPC		A	B	B			Enraf	P24	Level Transmitter	
SI347002_SPC		A	A	A			Parmley Graham	J88A	Road Loading Pump	
SI347002_SPC		A	A	A			Parmley Graham	J89A	Offloading Pump	
SI347003_SPC		B	B	B			RGS	SOL12	Solenoid Valve	
SI347004_SPC		A	B	B			Vega	P107	Offloading Pump Level Probe	
SI347004_SPC		A	B	B			Vega	P108	Knock-out Pot Vapour Level Probe	
SI347005_SPC		A	B	B			Vega	P107	Isolating Pump High Level	
SI347005_SPC		A	B	B			Vega	P108	Knock-out Pot Vapour High Level	
SI347006_SPC		A	A	A	B		Fluidwell	FM3	Batch Controller	
SI347008_SPC		A	A	A			Radio Spares	N/A	Audible Alarm	
SI347009_SPC		A	A	A			RGS	N/A	Transfer Valve	
SI347010_SPC		A	B	B			IMI Norgren	N/A	Pneumatic Panel Supply	
SI347011_SPC		A	A	A			Pepperl & Fuchs	XY001	Batch Controller Power Supply	
SI347011_SPC		A	A	A			Pepperl & Fuchs	XY002	Batch Controller Power Supply	
SI347012_SPC		A	A	B			Pepperl & Fuchs	XY004	Isolating Unit	
SI347013_SPC		A	A	A			Pepperl & Fuchs	XY003	Isolating Unit	
SI347013_SPC		A	A	A			Pepperl & Fuchs	XY004	Isolating Unit	
SI347014_SPC		A	A	A			Parmley Graham	CP3	Control Unit	
SI347015_SPC		A	B	C	D		Apollo Flow Measurement	FM3	V-Cone	
SI347016_SPC		A	B	B			IFC	FM3	Flow Transmitter	
SI347017_SPC		A	A	A			J Hemy Systems	FJB27	Junction Box	
SI347018_SPC		A	A	B			J Hemy Systems	BJB09	Junction Box	
SI347020_SPC		A	B	B			Thermal Detection	TP88	Temperature Switch	
SI347020_SPC		A	B	B			Thermal Detection	TP89	Temperature Switch	
SI347021_SPC					C		John Clark Valves	-	Rotary Ball Valve	

CLIENT:

Inter Terminals Tyneside Ltd

ISSUE	DATE	BY	CHKD	APPD	CLIENT REF.
A	03.10.97	MS	DRR	DRR	
B	13.10.97	PJP	DRR	DRR	P & I REF.
C	22.09.14	DS	MM	MM	SI347004_REG
D	01.03.17	DS	MM	MM	SHT 1 OF 1

CALC. NO	NO. OF SHEETS	REVISION					DATE	DESCRIPTION
		ISSUE	0	A	B	C		
SI347001_CAL	2			A			08.10.97	Cable Calculation
SI347002_CAL	2			A			08.10.97	Cable Calculation
SI347003_CAL	1			A			25.09.97	Power Supply Calculation
16115CAL001				A			02.02.17	IS Calculation – Road Loading Overfill Probe

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SIMON STORAGE

TYNE TERMINAL

TANK 24 ROAD LOADING UPGRADE

INSTRUMENT / ELECTRICAL SCOPE OF WORK

Rev	Date	By	Checked	Approved	Description	Client Ref.
A	20/06/14	P. Potter	MM	MM	Issued for Review	

Document No.
SI204001_INS

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CONTENTS

- 1 REVISION HISTORY
- 2 INTRODUCTION
- 3 SCOPE OF WORK
 - 3.1 Flowmeter
 - 3.2 Batcher
 - 3.3 Junction Box FJB27
 - 3.4 Logic Panel CP2
 - 3.5 Gantry Control Unit CP3
 - 3.6 Local Pneumatic Panel
 - 3.7 Batching Valve
 - 3.8 Free Issue Equipment

APPENDIX

- I Drawings

1 REVISION HISTORY

Rev	Description
A	Issued for Construction



2 INTRODUCTION

This document details the scope of work required to upgrade the Tank 24 road loading facility at Simon Storage Tyne Terminal.

The flowmeter and batcher are to be replaced with different units with the batching valve also being replaced but on a like for like basis. Modification will be required to both the batcher logic wiring and the pneumatic supply to the control valve.

The works are limited in scope so only the affected drawings are included in this scope of work. The finished installation shall comply with drawings included in the appendices, the existing drawings are included for reference.

3 SCOPE OF WORK

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

Ensure the system is isolated both pneumatically and electrically before commencing any work.

3.1 Scope of Work – Flowmeter

The existing V-cone meter is to be removed and replaced with a turbine meter.

The works comprise, briefly :-

- De-gland cable FM3/JB27 at both the meter and the I.S. junction box FJB27 and remove the cable.
- The existing V-cone meter will be removed from the pipeline and replaced with the turbine meter by others. The turbine meter has a 12m. flying lead. The flying lead is to be glanded and terminated directly to the replacement batcher FM3. If the flying lead is not sufficiently long an intermediate junction box suitable for I.S. circuits shall be used.

3.2 Scope of Work – Batcher

The existing Schillings batcher is to be removed and replaced with a new Fluidwell batcher.

The works comprise, briefly :-

- De-gland cable IP1/FM3 at both the batcher and the pneumatic panel and remove the cable, plugging vacated cable entry at pneumatic panel.
- De-gland cable FJB27/FM3 from the Schillings batcher.
- Remove the existing batcher and mount the new Fluidwell batcher.
- Re-terminate cable FJB27/FM3 in the new batcher as shown on drawing SI347012_DWG Rev.B
- Terminate the flying lead cable from the new turbine meter in the batcher as shown on drawing SI347012_DWG Rev.B



3.3 Scope of Work – Junction Box FJB27

Referring to drawing SI347012_dwg, the works comprise, briefly :-

- Blank the gland hole vacated by cable FM3/FJB27.
- Remove the link from terminals 2 & 3.
- Move core CP2/1- from terminal 4 to terminal 2.

3.4 Scope of Work – Logic Panel CP2

Changes to the logic panel are shown on drawings SI347005_DWG, SI347007_DWG & SI347012_DWG.

The works comprise, briefly :-

- Remove I.S. barrier XY001. Re-terminate the incoming cable cores to the earth bar and remove wires 24V/7 & 0V/7 from the panel.
- Remove I.S. barrier XY003. Re-terminate the incoming cable cores to the earth bar and remove wires 165 & 0V/5 from the panel.
- Remove I.S. barrier XY004 (P+F ZG40/Ex) and replace with an MTL5014 barrier.
- Add relay R87. (4 pole changeover : 24Vdc coil)
- Remove wire 105 from terminal TB1/12 (Line 59)
- Add/modify wiring as shown in cloud on drawing SI347007_DWG.

3.5 Scope of Work – Gantry Control Unit

A second solenoid valve is to be added to the system. Changes to the wiring are shown on drawing SI347025_DWG.

The works comprise, briefly :-

- Re-ferrule core 12 of cable CP2/BJB09 from “105” to “170” at logic panel CP2 and road loading pump JB BJB09
- Re-ferrule core 12 of cable BJB09/CP3 from “105” to “170” at road loading pump JB BJB09
- In the Gantry Control Unit CP3 :-
 - Remove core 12 of cable BJB09/CP3 from terminal 15, re-ferrule from “105” to “170” and re-terminate in terminal 16
 - remove core 3 of cable J89A/CP3 (ferruled J89A/3) from terminal 15 and re-terminate in terminal 14.
 - remove core 4 of cable J89A/CP3 (ferruled J89A/4) from terminal 16 and re-terminate in terminal 15.
 - Remove core 13 of cable BJB09/CP3 (ferruled 106) from terminal 16 and re-terminate in terminal 15
- Supply and install a new 2 core cable SOL12A/CP3 from the Gantry Control Unit CP3 to the main feed SOV in the local pneumatic panel.
- Terminate the new cable in CP3 to terminal 16 & 18, as shown on drawing SI347025_DWG.



3.6 Scope of Work – Local Pneumatic Panel

The panel is to be re-piped to accommodate the two stage pneumatic control to the batching valve shown on drawing SI347012_DWG.

The works comprise, briefly :-

- Remove the manual open switch, blanking panel door suitably
- Remove the I/P converter.
- Install a second Solenoid valve and regulator.
- Install a new shuttle valve.
- Re-pipe as shown on drawing SI347012_DWG.
- Connect cable SOV12A/CP3 to the new Solenoid Valve

3.7 Scope of Work – Batching Valve

The existing batching valve is to be replaced with an identical unit.

The works comprise, briefly :-

- Remove tubing from existing valve
- The existing valve will be removed from the pipeline and replaced by others.
- Replace tubing to new valve

3.8 Free Issue Equipment

The following will be free issued to the installation contractor, all other equipment to complete the installation shall be provided by the installation contractor.

- Turbine meter
- Batcher
- I.S. isolator XY004
- Batching valve complete with actuator and positioner
- Pneumatic components for control panel comprising :-
 - 1 off 24Vdc solenoid valve (Note : existing 24Vdc solenoid valve to be recovered and re-used)
 - 2 off regulators with gauges
 - 1 off shuttle valve



Appendix I

Drawings

SI347001_DWG Rev B – Cable Overview (Existing System)
SI347001_DWG Rev C – Cable Overview (Revised System)

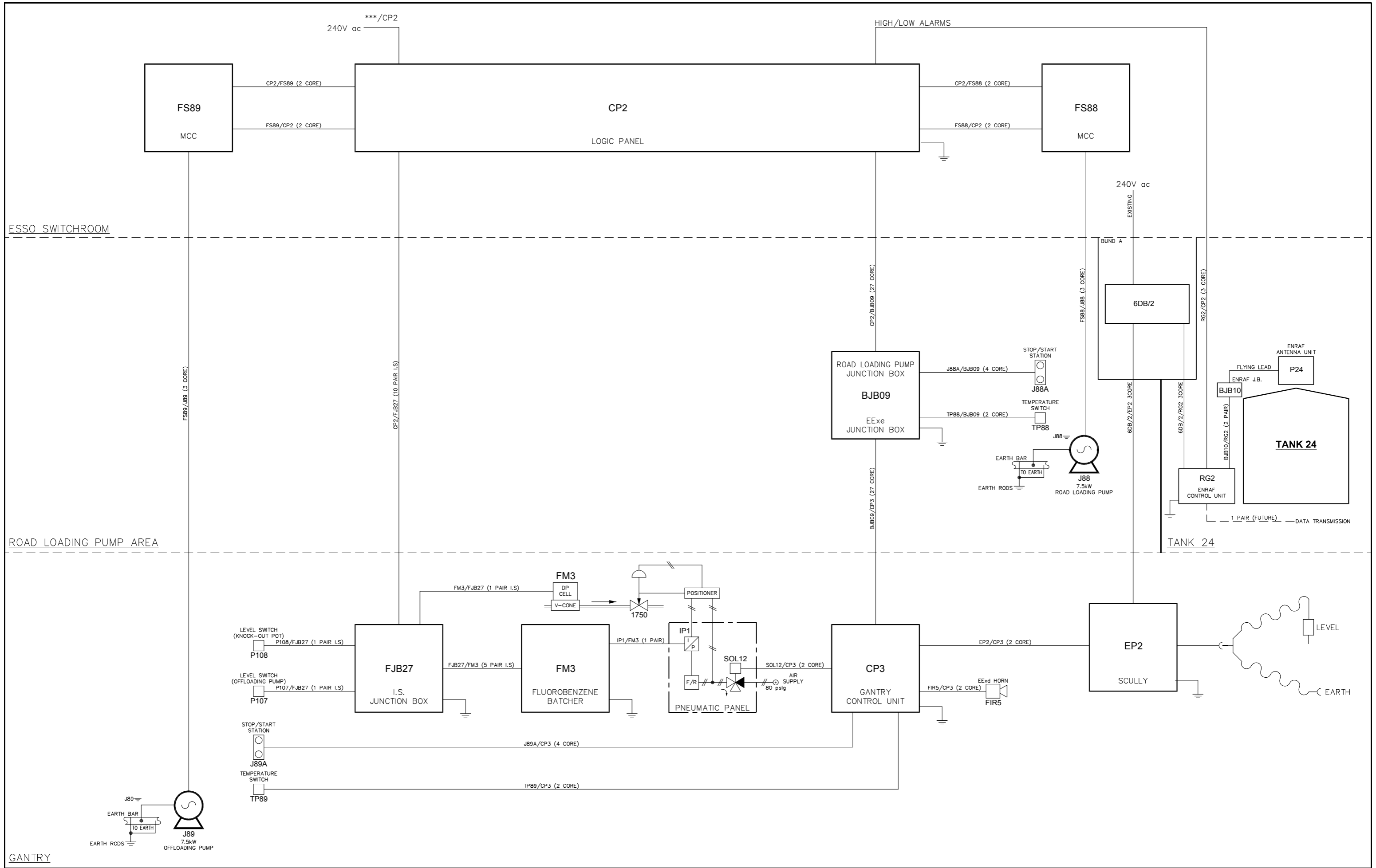
SI347005_DWG Rev A – CP2 Panel Layout (Existing Layout)
SI347005_DWG Rev B – CP2 Panel Layout (Revised Layout)

SI347007_DWG Rev C – CP2 Panel Logic (Existing System)
SI347007_DWG Rev D – CP2 Panel Logic (Revised System)

SI347012_DWG Rev A – Loading System Connection Details (Existing System)
SI347012_DWG Rev B – Loading System Connection Details (Revised System)

SI347025_DWG Rev C – Control Unit CP3 Connection Details (Existing System)
SI347025_DWG Rev D – Control Unit CP3 Connection Details (Revised) System

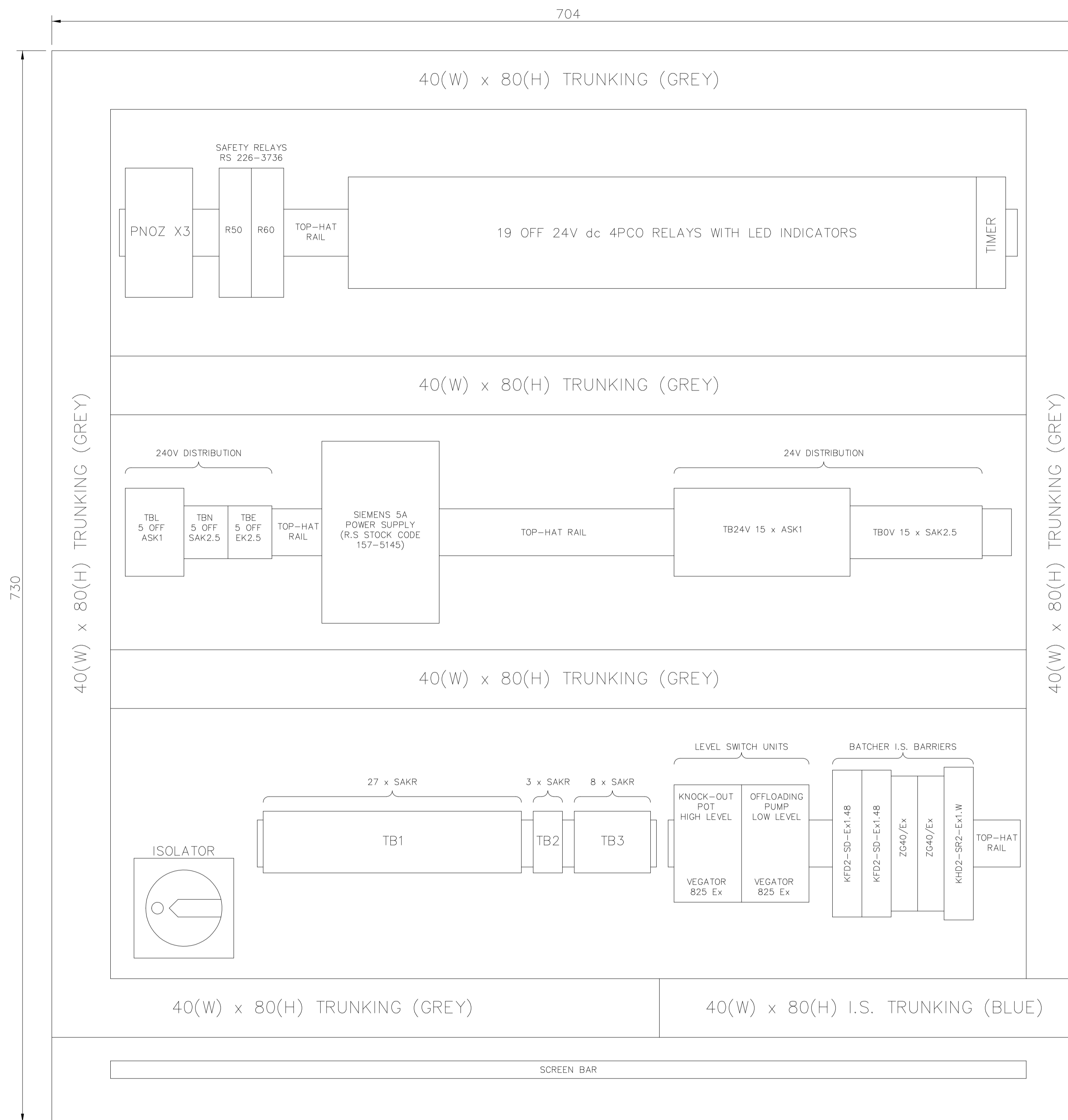




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A	08/10/97	M.S.	M.S.	D.R.R	D.R.R	ORIGINAL ISSUE
B	13/10/97	M.S.	A.H.	D.R.R	D.R.R	

PLANT	SIMON STORAGE - TYNE TERMINAL		
TITLE	FLUOROBENZENE SYSTEM TANK 24 INSTRUMENT/ELECTRICAL CABLE OVERVIEW		
	VELVA LIQUIDS Ltd, TYNE TERMINAL, NORTHUMBERLAND DOCK, NORTH SHIELDS, TYNE & WEAR, NE29 6DY.		
CLIENT DRG. No.		SHEET	01 OF 01
		P&I DRG No.	SI347001



RITTAL AE 1077
BACKPLATE

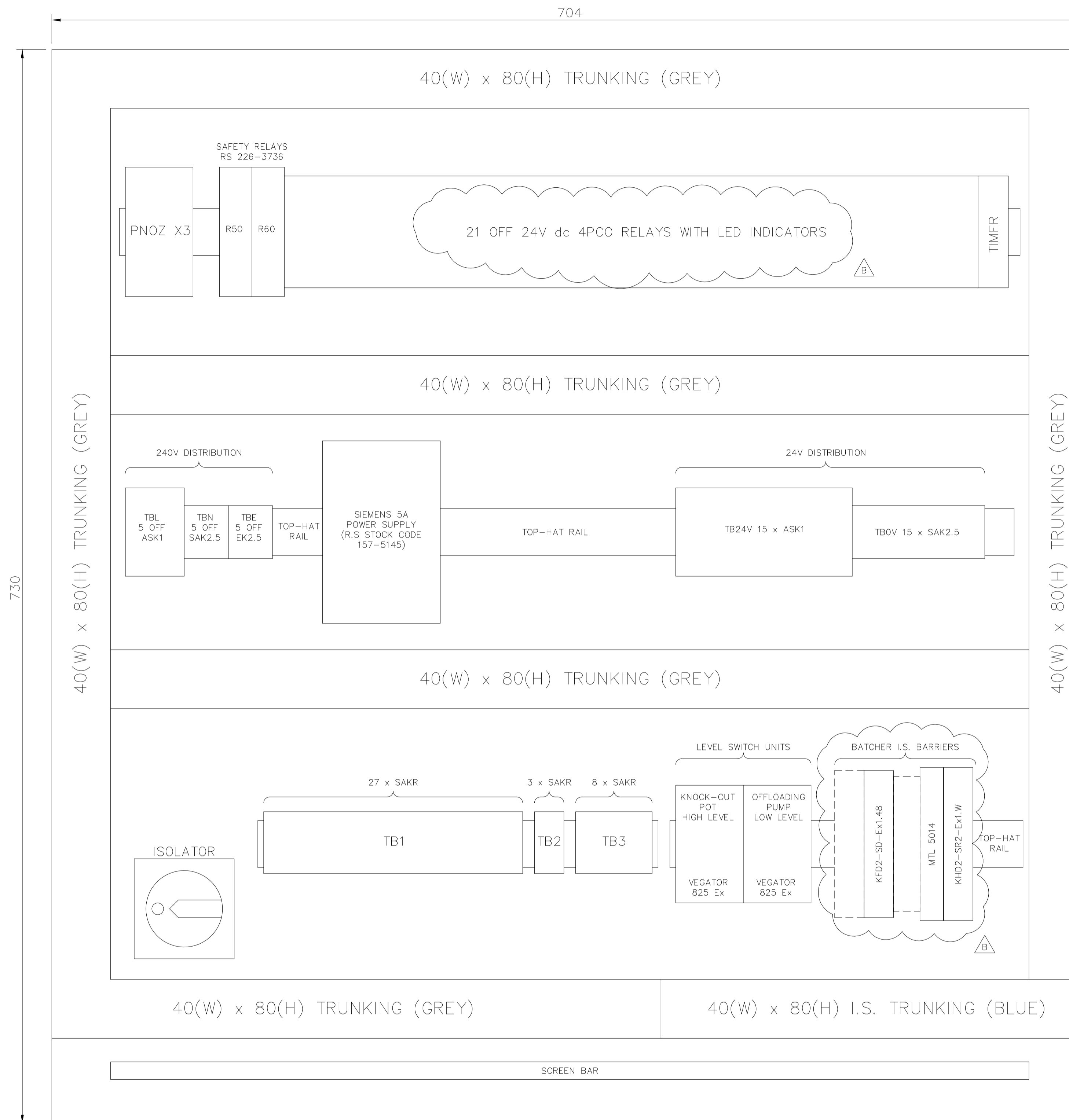
- NOTES:
1. ALL DIMENSIONS IN mm UNLESS OTHERWISE STATED.
 2. IP RATING: IP 56
 3. CABLE ENTRY: BOTTOM
 4. SEE DRAWING No. SI347004 FOR FRONT OF PANEL DETAILS

SCALE 1:2
WHEN PRINTED TO FULL A1
SIZE ONLY

REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION
A	08/10/97	M.S.	M.S.	D.R.R.	D.R.R.	ORIGINAL ISSUE

PLANT	SIMON STORAGE - TYNE TERMINAL		
TITLE	FLUOROBENZENE SYSTEM TANK 24 LOGIC PANEL INTERNAL LAYOUT		
DATE	08/10/97		
CLIENT DRG. No.	VELVA LIQUIDS LTD, TYNE TERMINAL, NORTHUMBERLAND DOCK, NORTH SHIELDS, TYNE & WEAR, NE29 6DY.		
SHEET	01 OF 01		
P&I DRG No.	SI347005		





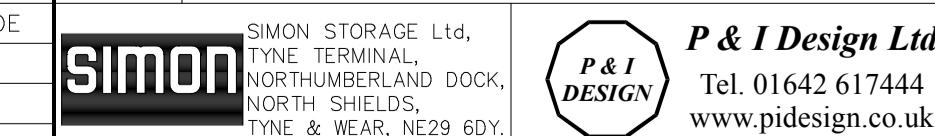
RITTAL AE 1077
BACKPLATE

- NOTES:
 1. ALL DIMENSIONS IN mm UNLESS OTHERWISE STATED.
 2. IP RATING: IP 56
 3. CABLE ENTRY: BOTTOM
 4. SEE DRAWING No. SI347004 FOR FRONT OF PANEL DETAILS

SCALE 1:2
 WHEN PRINTED TO FULL A1
 SIZE ONLY

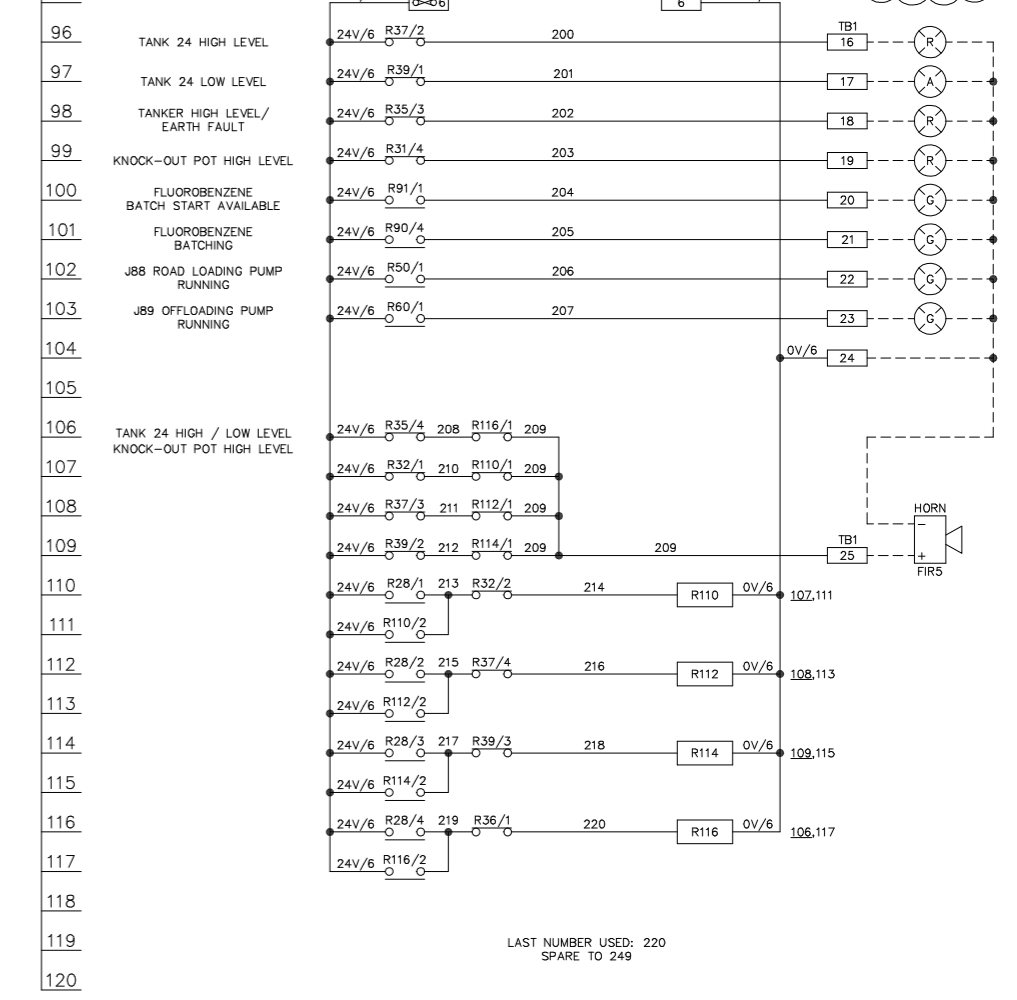
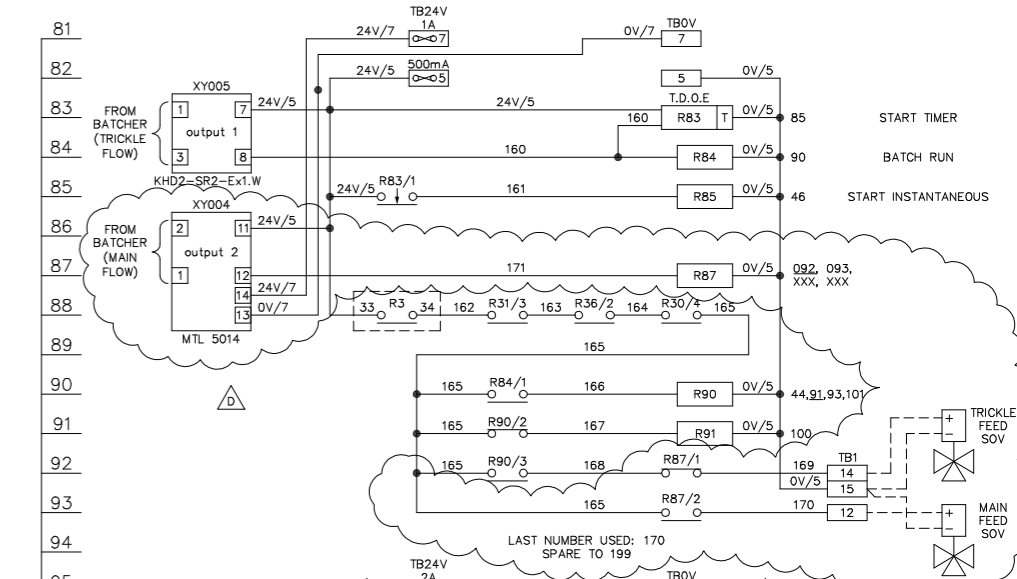
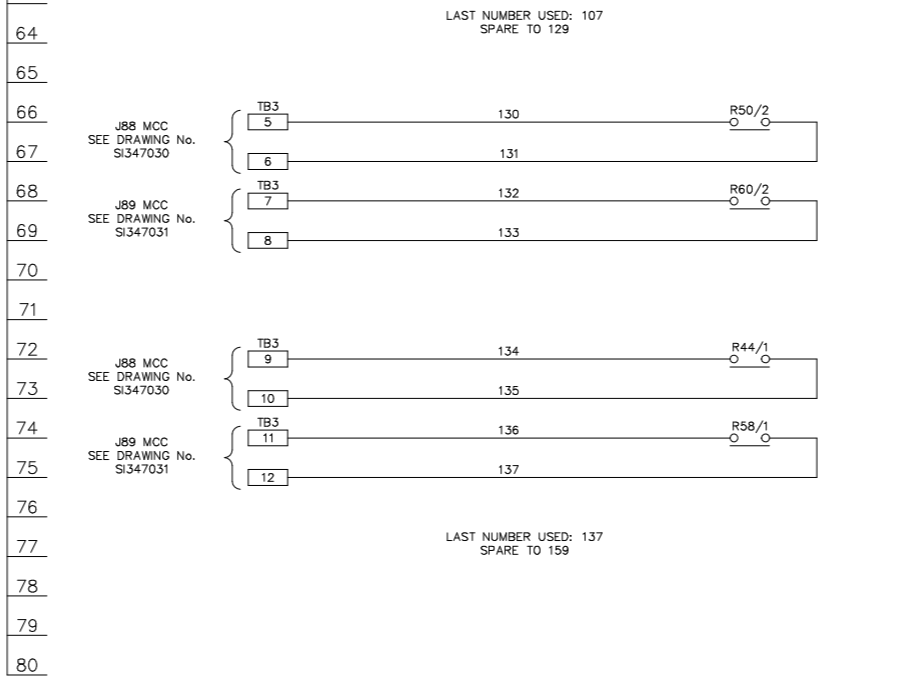
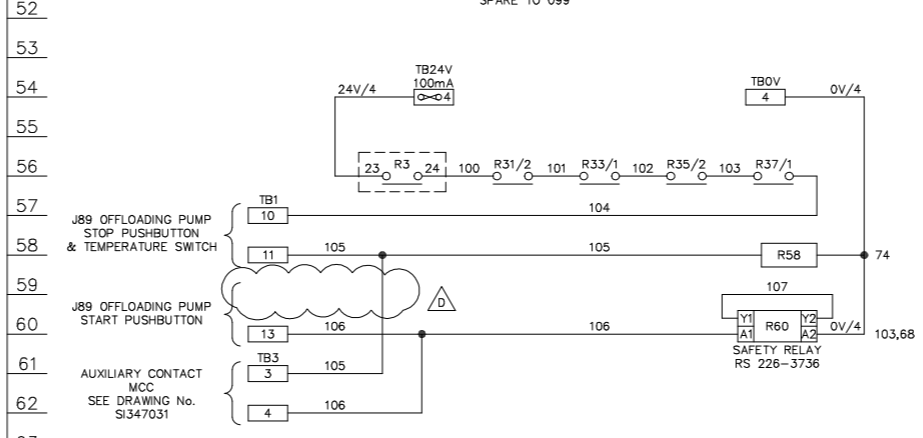
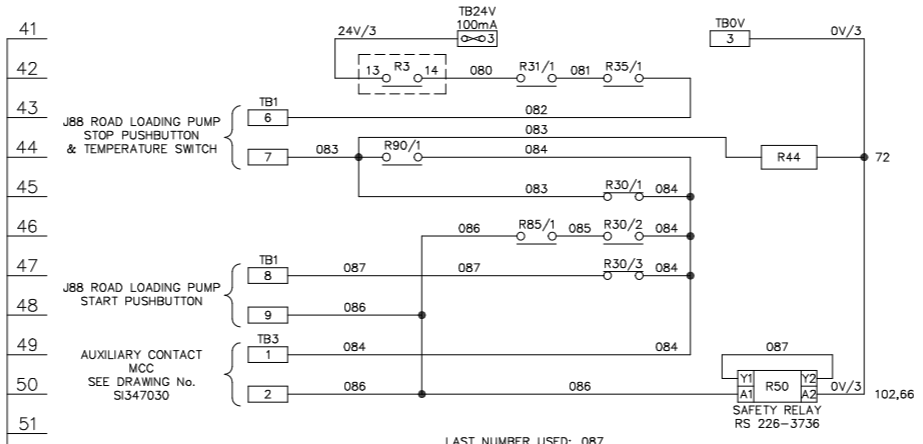
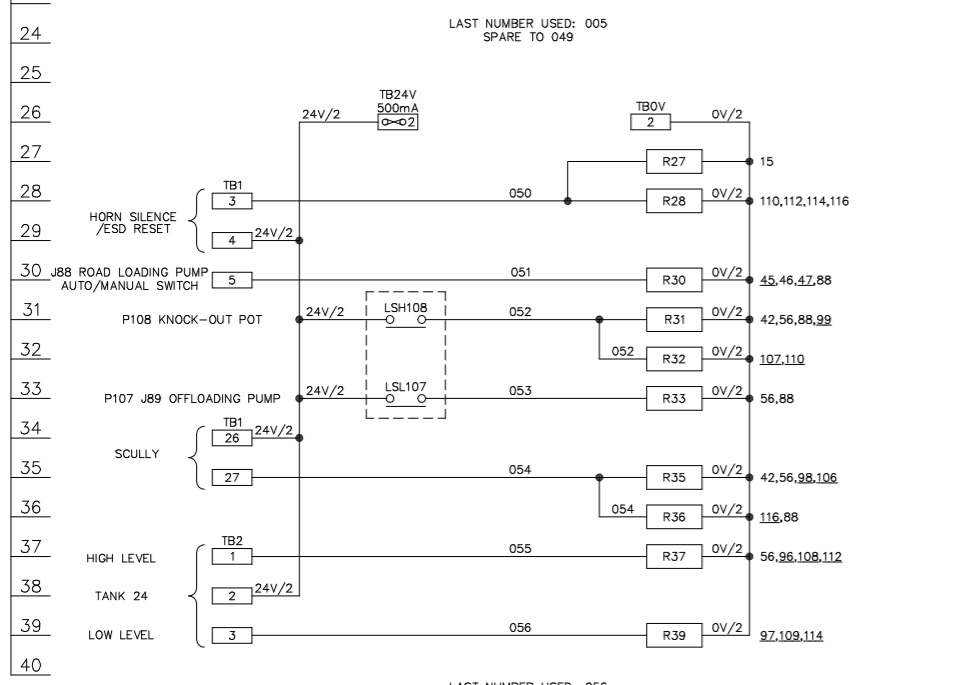
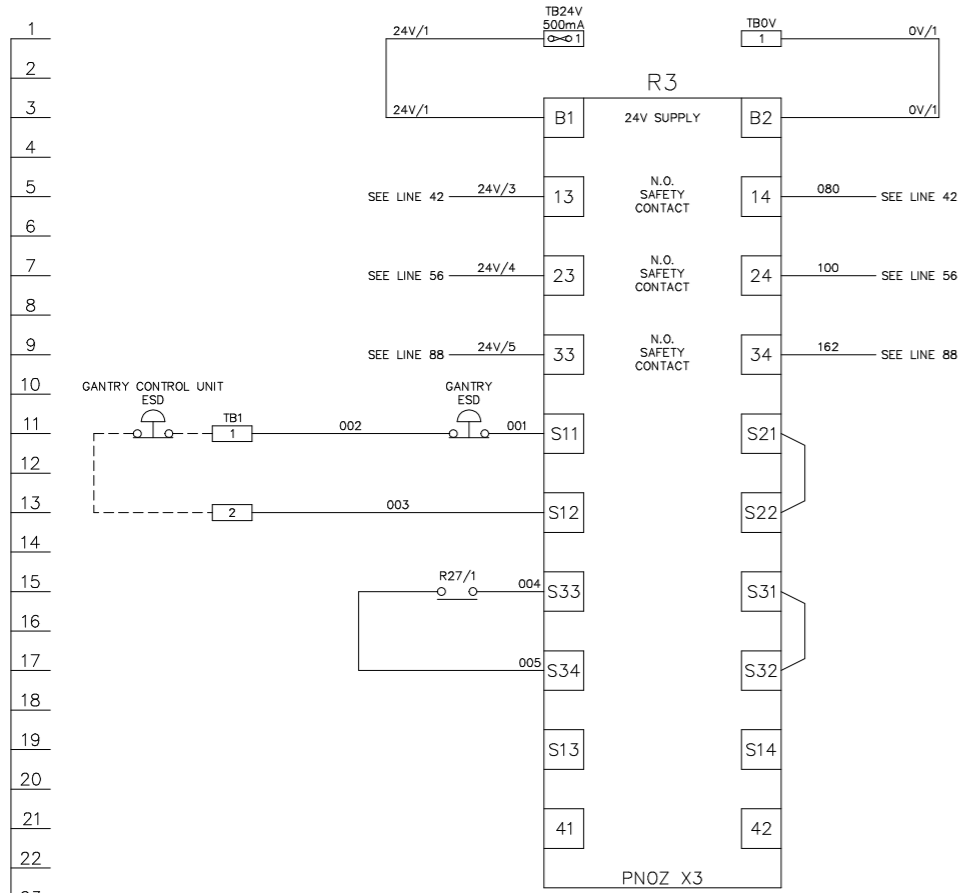
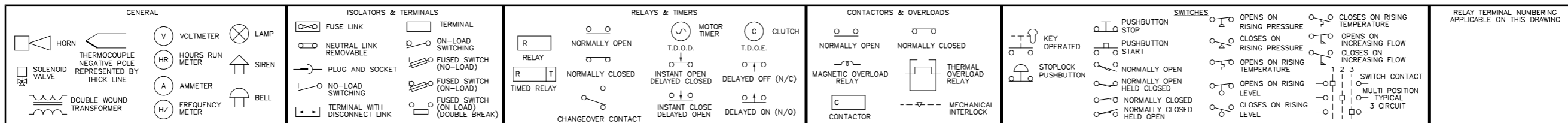
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B	19/05/14	P.P.	P.P.	M.M.	M.M.	BATCHER & METER UPGRADE

PLANT	VELVA LIQUIDS (North Shields) Ltd - TYNE TERMINAL
TITLE	FLOUROBENZENE SYSTEM - TANK 24 LOGIC PANEL INTERNAL LAYOUT
CLIENT DRG. No.	SIMON STORAGE Ltd, TYNE TERMINAL, NORTHUMBERLAND DOCK, NORTH SHIELDS, TYNE & WEAR, NE29 8DY.
P&I DRG No.	SI347005_DWG



SHEET 1 OF 1

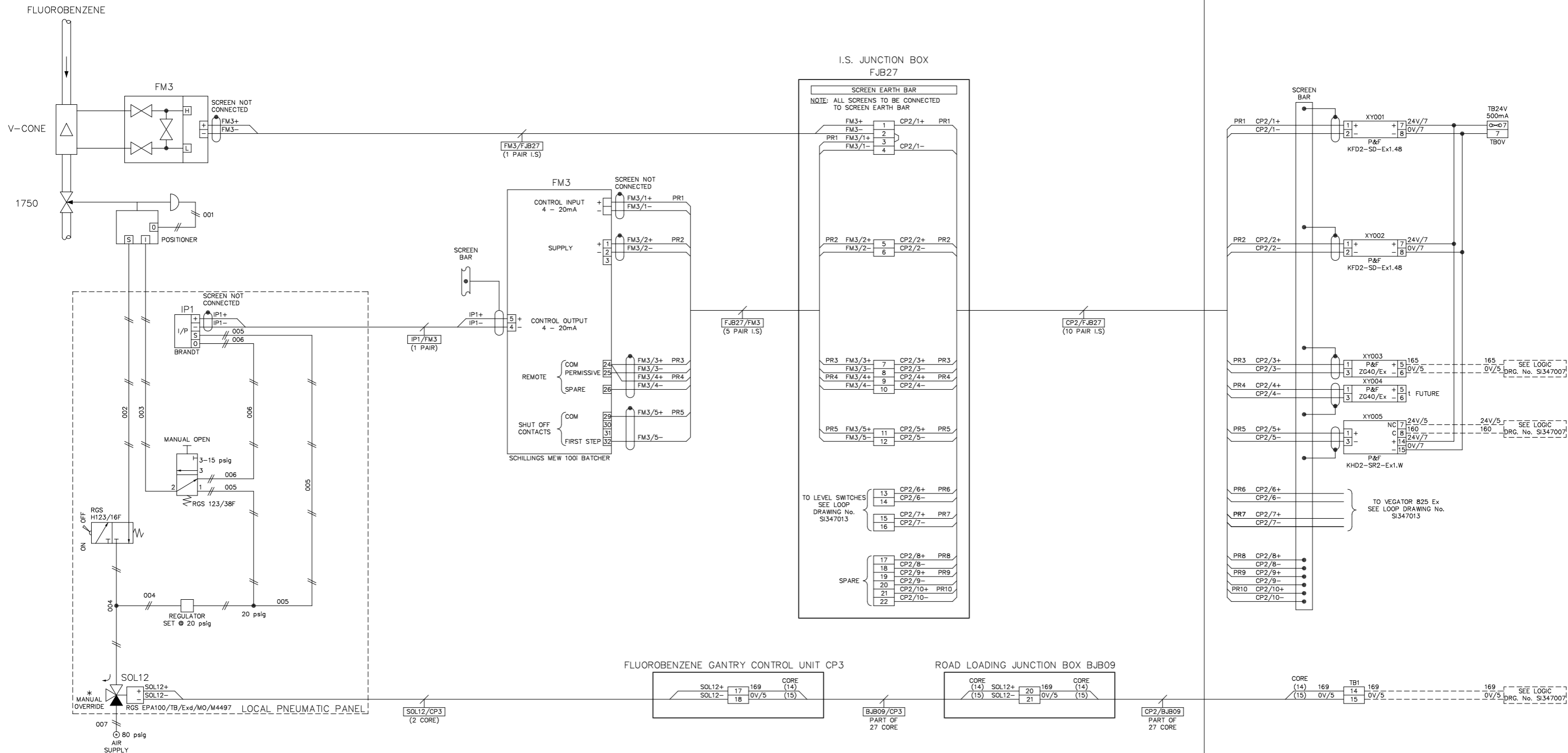
LEGEND OF GRAPHICAL SYMBOLS (ALL CONTACTS SHOWN IN THE DE-ENERGISED STATE)



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B	24/11/97	M.S.	N.L.	D.R.R.	D.R.R.	AS BUILT
C	18/09/98	D.P.	N.L.	D.R.R.	D.R.R.	GENERAL UPDATE
D	19/06/14	P.P.	P.P.	M.M.	M.M.	BATCHER & METER UPGRADE

PLANT: VELVA LIQUIDS (North Shields) Ltd - TYNE TERMINAL
 TITLE: FLOUROBENZENE SYSTEM - TANK 24 LOGIC DRAWING 1

CLIENT DRG. No. P&I DRG No. SI347007_DWG



HAZARDOUS AREA SAFE AREA

SAFETY PROTECTION		CERTIFIED EQUIPMENT			
REQUIRED	ACHIEVED	TAG No.	CERTIFICATE No.	CERTIFICATION	AUTHORITY

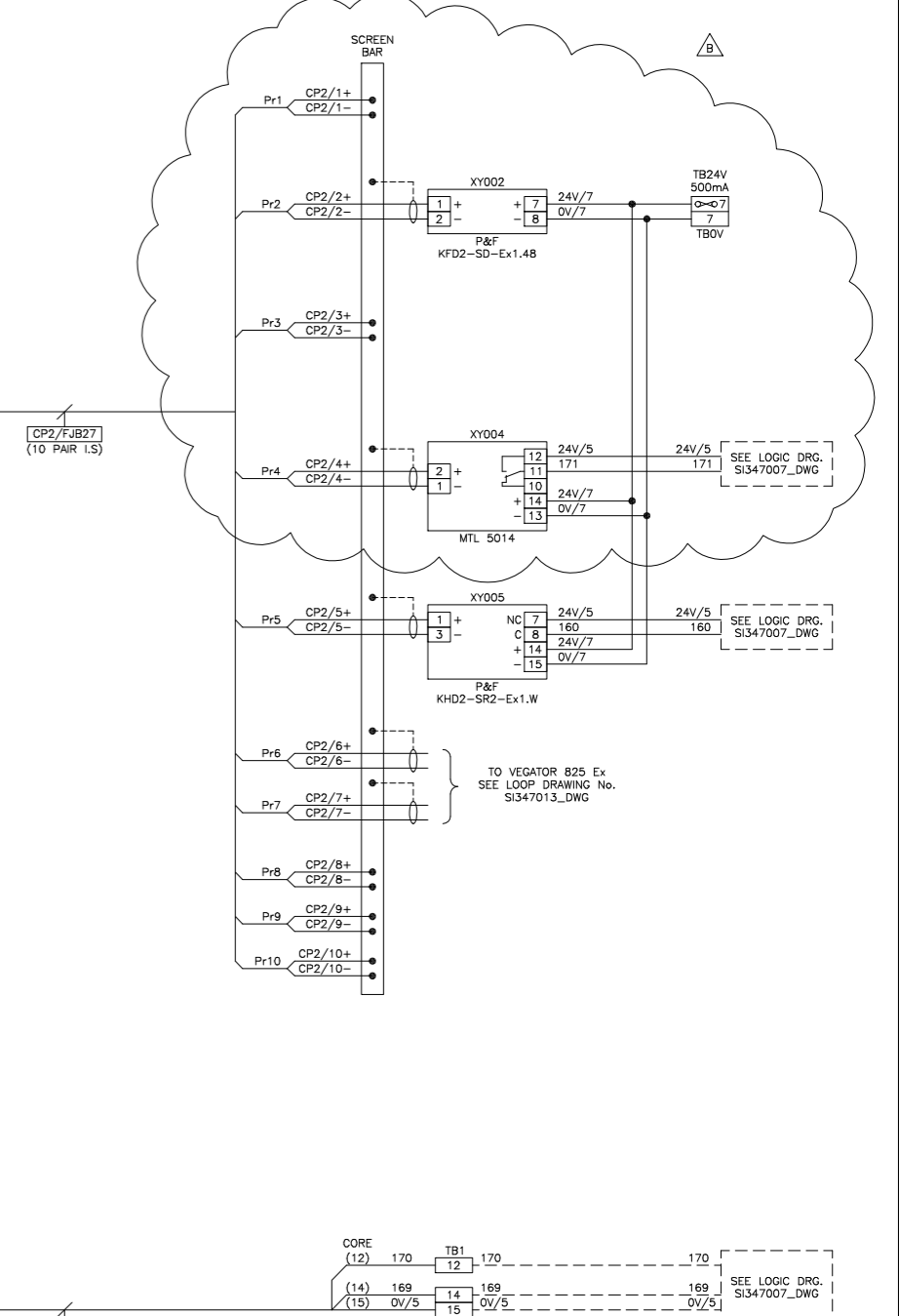
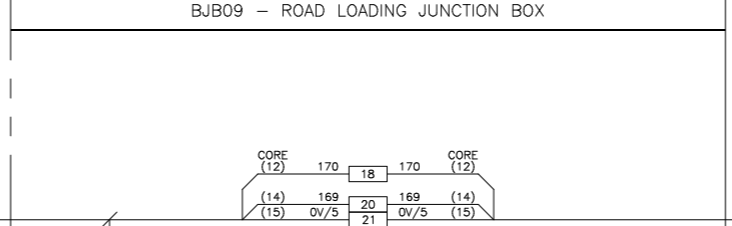
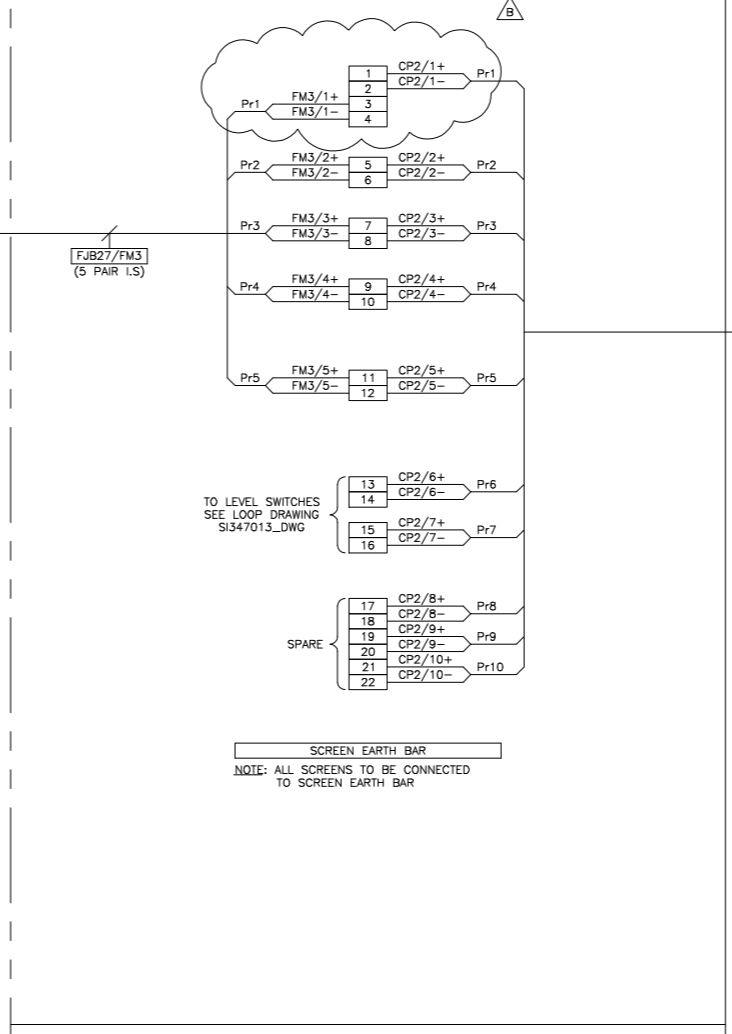
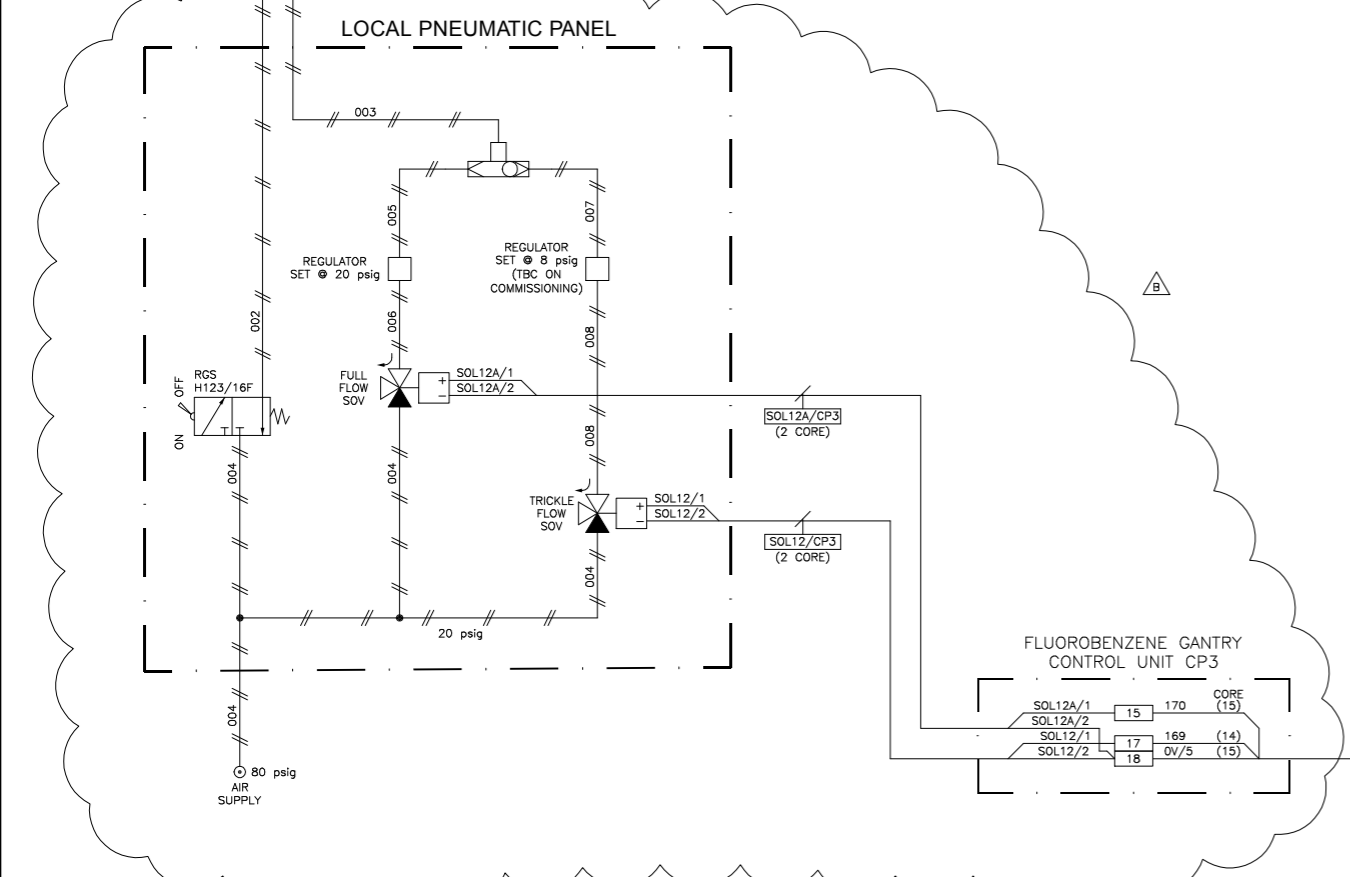
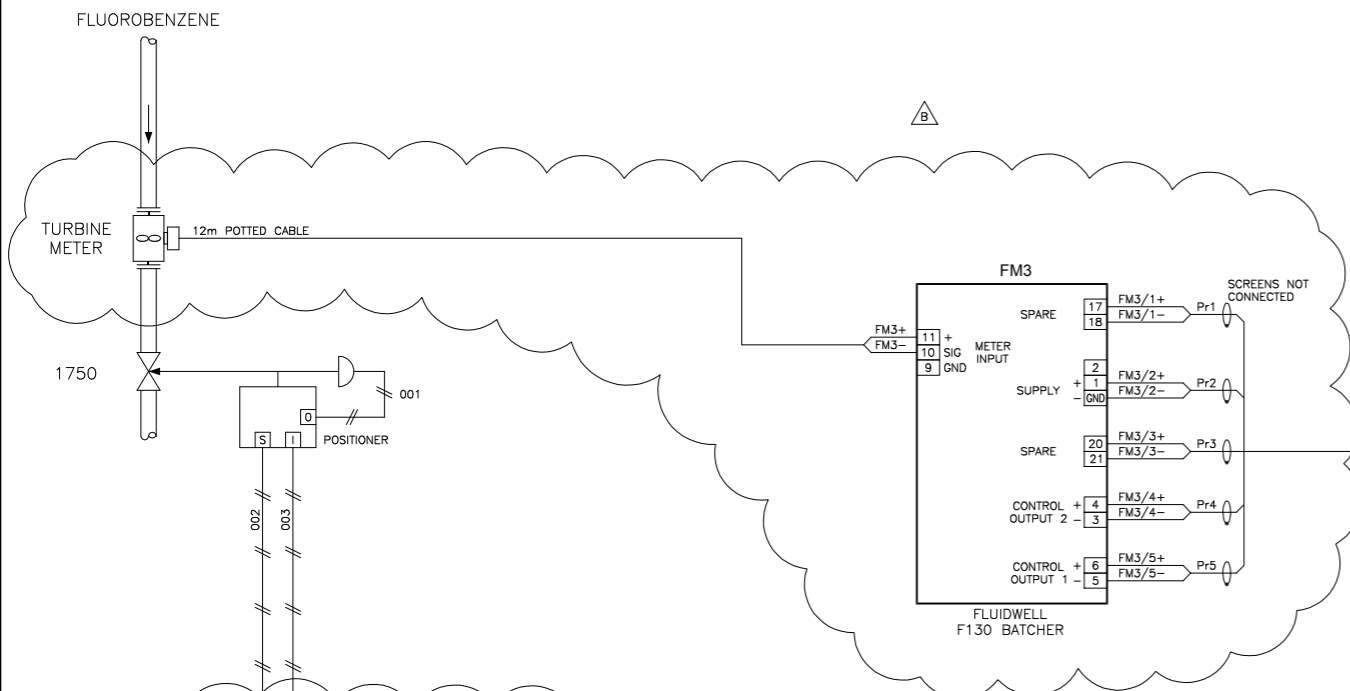
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A	02/10/97	M.S.	M.S.	D.R.R	D.R.R	ORIGINAL ISSUE

PLANT	SIMON STORAGE - TYNE TERMINAL	
TITLE	FLUOROBENZENE SYSTEM TANK 24 - FLUOROBENZENE TANKER LOADING BATCHER	
DATE	02/10/97	
CLIENT	VELVA LIQUIDS LTD, TYNE TERMINAL, NORTHUMBERLAND DOCK, NORTH SHIELDS, TYNE & WEAR, NE29 6DY.	
INSTRUMENT LOOP SHEET FOR USE IN HAZARDOUS AREA	SHEET	01 OF 01
CLIENT DRG. No.	P&I DRG. No. SI347012	

FIELD

FJB27 - I.S. JUNCTION BOX

LOGIC PANEL CP2



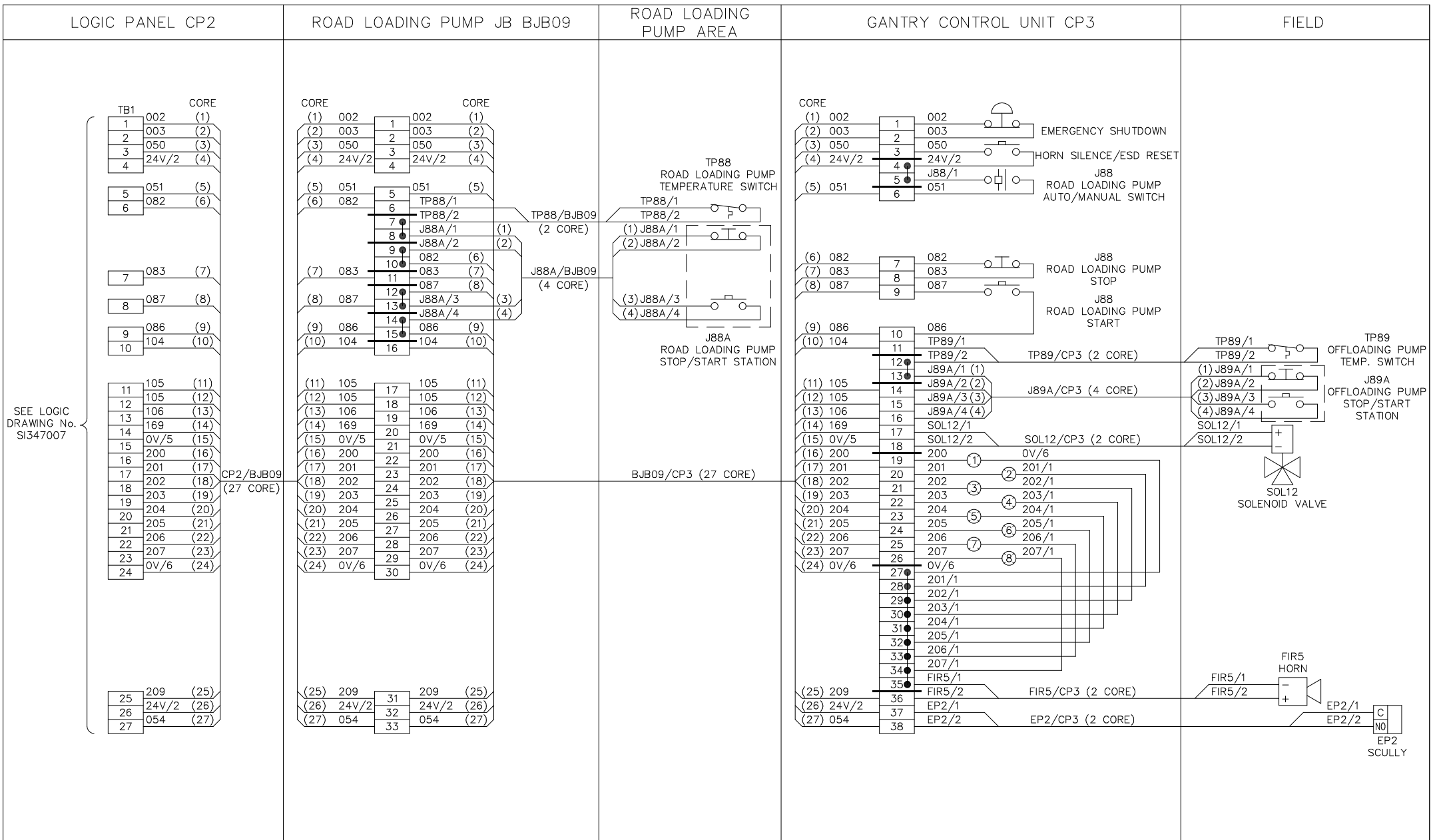
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REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION
A	02/10/97	M.S.	M.S.	D.R.R	D.R.R	ORIGINAL ISSUE
B	13/06/14	P.P.	P.P.	M.M.	M.M.	BATCHER & METER UPGRADE

PLANT	VELVA LIQUIDS (North Shields) Ltd - TYNE TERMINAL
TITLE	FLOUROBENZENE SYSTEM - TANK 24 TANKER LOADING BATCHER
CLIENT DRG. No.	P&I DRG No. SI347012_DWG

SIMON STORAGE Ltd, TYNE TERMINAL, NORTHUMBERLAND DOCK, NORTH SHIELDS, TYNE & WEAR, NE29 6DY.
 P & I Design Ltd, Tel. 01642 617444, www.pidesign.co.uk
 SHEET 1 OF 1

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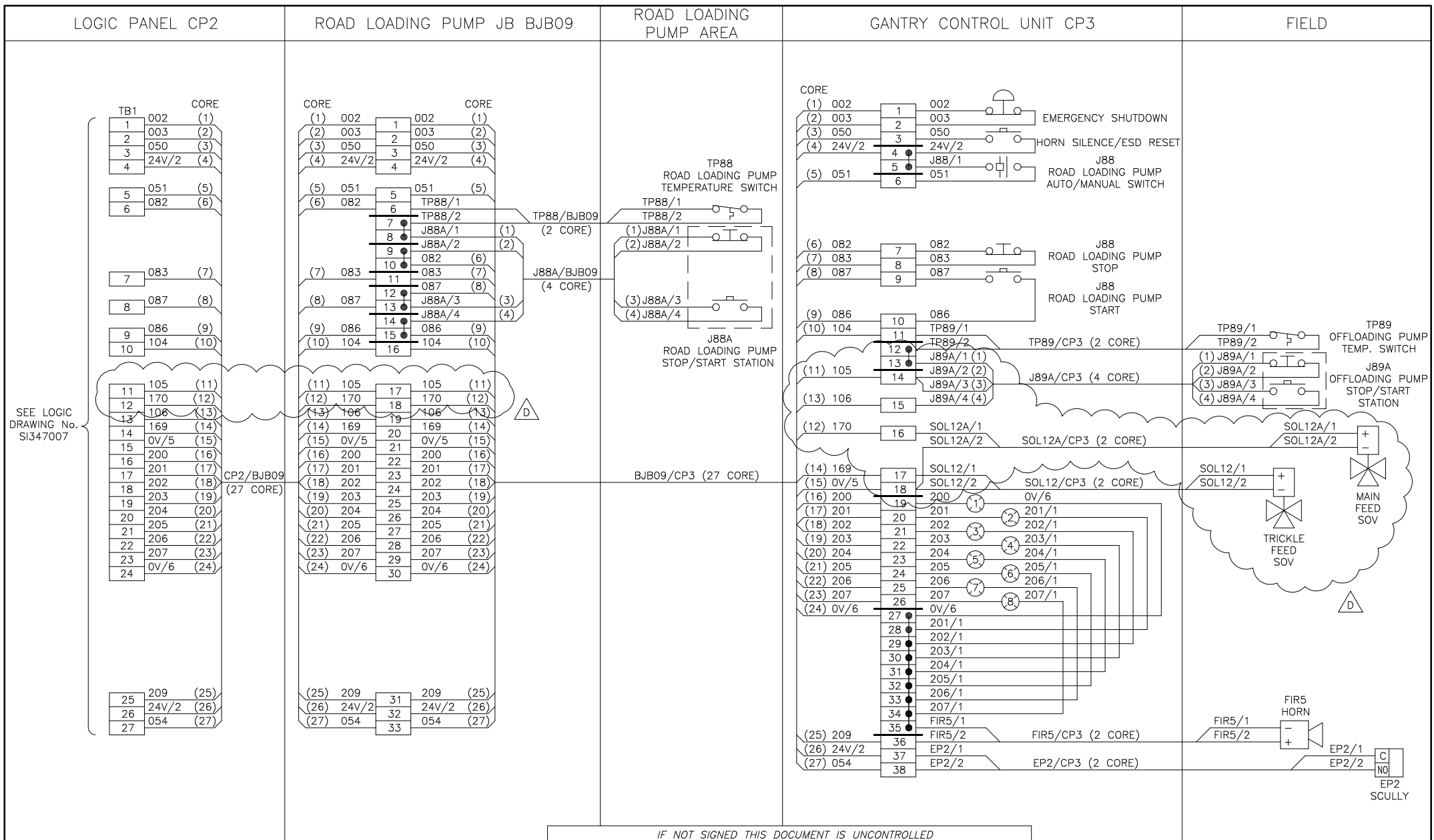
SEE LOGIC DRAWING No. SI347007

NOTES:
1. FERRULES TO EXCLUDE No's IN BRACKETS.

- LAMPS:**
- RED - TANK 24 HIGH LEVEL
 - AMBER - TANK 24 LOW LEVEL
 - RED - TANKER HIGH LEVEL / EARTH FAULT
 - RED - KNOCK-OUT POT HIGH LEVEL
 - GREEN - FLUOROBENZENE BATCH START AVAILABLE
 - GREEN - FLUOROBENZENE BATCHING
 - GREEN - J88 ROAD LOADING PUMP RUNNING
 - GREEN - J89 OFFLOADING PUMP RUNNING

REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION
A	25/09/97	M.S.	M.S.	D.R.R	D.R.R	ORIGINAL ISSUE
B	08/10/97	M.S.	M.S.	D.R.R	D.R.R	CABLE NUMBERS ADDED
C	24/11/97	M.S.	A.H.	D.R.R	D.R.R	ESD RESET ADDED

PLANT	SIMON STORAGE - TYNE TERMINAL	
TITLE	FLUOROBENZENE SYSTEM TANK 24 - GANTRY CONTROL UNIT INTERCONNECTION DIAGRAM	
		24/11/97
Simon Storage	Terminals	VELVA LIQUIDS Ltd, TYNE TERMINAL, NORTHUMBERLAND DOCK, NORTH SHIELDS, TYNE & WEAR, NE29 6DY.
		P & I DESIGN
	SHEET	01 OF 01
CLIENT DRG. No.	P&I DRG No. SI347025	



SEE LOGIC DRAWING No. SI347007

NOTES:
1. FERRULES TO EXCLUDE No's IN BRACKETS.

LAMPS:
1. RED - TANK 24 HIGH LEVEL
2. AMBER - TANK 24 LOW LEVEL
3. RED - TANKER HIGH LEVEL / EARTH FAULT
4. RED - KNOCK-OUT POT HIGH LEVEL
5. GREEN - FLUOROBENZENE BATCH START AVAILABLE
6. GREEN - FLUOROBENZENE BATCHING
7. GREEN - J88 ROAD LOADING PUMP RUNNING
8. GREEN - J89 OFFLOADING PUMP RUNNING

IF NOT SIGNED THIS DOCUMENT IS UNCONTROLLED

REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION
A	25/09/97	M.S.	M.S.	D.R.R	D.R.R	ORIGINAL ISSUE
B	08/10/97	M.S.	M.S.	D.R.R	D.R.R	CABLE NUMBERS ADDED
C	24/11/97	M.S.	A.H.	D.R.R	D.R.R	ESD RESET ADDED
D	24/06/14	P.P.	P.P.	M.M.	M.M.	BATCHER & METER UPGRADE

PLANT	VELVA LIQUIDS (North Shields) Ltd - TYNE TERMINAL	
TITLE	FLOUROBENZENE SYSTEM - TANK 24 GANTRY CONTROL UNIT INTERCONNECTION DIAGRAM	
	SIMON STORAGE Ltd, TYNE TERMINAL, NORTHUMBERLAND DOCK, NORTH SHIELDS, TYNE & WEAR, NE29 6DY.	
	P & I Design Ltd Tel. 01642 617444 www.pidesign.co.uk	
CLIENT DRG. No.	P&I DRG No. SI347025_DWG	
SHEET 1 OF 1		

SIMON STORAGE
TYNE TERMINAL
FLUOROBENZENE GANTRY / TANK 24
INSTRUMENT & ELECTRICAL INSTALLATION
TENDER PACKAGE

Written by ... PJP

Checked byDRR

Approved byDRR.....

CLIENT REF:
P & I DESIGN REF: 347
DOCUMENT NO: SI347001.INS
ISSUE: A DATE: 24.09.97
ISSUE: B DATE: 13.10.97
PAGE 1 OF 23

**Simon Storage, Fluorobenzene Gantry / Tank 24
Instrument & Electrical Installation Tender Package**

CONTENTS

- 1.0 Instructions to Tenderers
- 2.0 Methods of Work and Materials
- 3.0 Scope of Work
- 4.0 Contract Pricing Contents

APPENDICES

- I. Drawings and Cable Specifications
- II. Applicable Standards

**Simon Storage, Fluorobenzene Gantry / Tank 24
Instrument & Electrical Installation Tender Package**

1.0 Instructions to Tenderers

1.1 Introduction

The Tender shall be in respect of the proposed Works and shall be completed and submitted strictly in accordance with these instructions to Tenderers.

1.2 Date, Time and Mode of Delivery

The completed Tender packages together with any covering letter and with the remainder of the containing document all in originally bound form (taking account of additions/omissions, etc., notified in writing during the Tender period) together with other requirements shall be submitted by the time stated in the Purchaser's Letter of Invitation to Tender.

The envelope must not be marked nor delivered in any way which might disclose the identity of the Tenderer.

1.3 Alterations of Tender Documents

No authorised alteration shall be made in the Tender or the accompanying documents.

1.4 Enquiries to be Made Concerning the Tender

Any query in connection with the Tender shall be submitted to:-

Mr D. Ransome
P & I Design Limited
2 Reed Street
Gladstone Industrial Estate
Thornaby.
Tel: (01642) 617444
Fax: (01642) 616447

1.5 Sufficiency of Tender

Before submitting a Tender the Tenderer should obtain all information, familiarise himself with means of access, location, extent and nature of the Site, extent and nature of the Services to be provided, conditions under which the Services and Works will be carried out, conditions affecting supply of staff and labour and any other matters which may affect his Tender.

Applications for costs etc. on the ground of lack of knowledge in any respect of the aforementioned will be refused.

**Simon Storage, Fluorobenzene Gantry / Tank 24
Instrument & Electrical Installation Tender Package**

1.6 Confidentiality

The particulars of this document and any Tender submitted in respect hereof are private and confidential and shall not be used for any purpose other than the proposed contract. In the event of a Tender not being submitted or accepted all documents and drawings shall be returned to the person named in Clause 4 of these Instructions to Tenderers.

1.7 Contravention of Tender Requirements

Contravention of any of the requirements of these Instructions to Tenderers with regard to tendering shall render any Tender concerned liable to disqualification at the sole discretion of Simon Storage. Ltd.

1.8 Contract Agreement

The Contractor shall, when called upon, enter into and execute a Contract agreement.

1.9 Information to be Supplied by the Purchaser

In addition to the information to be provided by the Purchaser prior to the Contract award the Tenderer shall attach a Schedule of any further information which may be required from the Purchaser, together with a programme indicating when it will be required.

1.10 Tender Price

The Contractor shall make his Tender open for acceptance for a period of one month from date of receipt by the Purchaser.

Simon Storage, Fluorobenzene Gantry / Tank 24 Instrument & Electrical Installation Tender Package

2.0 Methods of Work and Materials

2.1 Installation Standards

Equipment and installation shall comply with all relevant standards, statutory instruments, regulations and authorities current and governing at the time, with particular reference to those detailed in Appendix II.

In interpretation of the standards shall prejudice any part of this specification where requirements may be in excess of those called for in the standards.

In the event of conflict between standards, the Purchaser's standards shall apply.

2.2 Materials

All materials used in manufacture, construction or installation shall be new and specifically suited for their duty or purpose.

The Contractor shall provide all miscellaneous materials, not of free-issue nor specifically defined by the Company, which are necessary to complete any installation to the required standard.

2.3 Electrical Contractor

All work carried out shall be performed by a qualified electrical contractor, approved by the National Inspection Council for Electrical Installation. Contracting work shall comply with the relevant British Standards. The contractor shall ensure that either:-

All electricians employed on the project have a suitable qualification for working on Electrical Equipment in Hazardous Areas (COMPEX), or,

that the complete installation is checked and certified by a COMPEX certified person.

2.4 Position of Electrical Equipment and Appliances

The approximate positions of electrical apparatus such as motors, instruments, and distribution boards are shown on the drawings, but their exact positions shall be determined on site by an appointed representative of the Engineer.

The position of electrical apparatus shown on the drawings shall be assumed to be correct for the purposes of tendering, but they may be reasonably varied without extra cost.

The Contractor shall ascertain on site that his work will not foul other engineering services or equipment and any work which has to be re-done, due to negligence, in this respect shall be his responsibility.

Simon Storage, Fluorobenzene Gantry / Tank 24 Instrument & Electrical Installation Tender Package

2.5 Segregation of Service

All cable supports and cables shall be prevented from coming into contact with process equipment and piping by a spacing of 150mm.

Cables operating at a voltage of 110V AC and above shall be segregated from cables operating at a voltage of 24V DC and below.

2.6 Fixings

No structural steelwork shall be drilled for any purposes without the approval of the Engineer. In general, all fixing to steelwork shall be by means of studs welded to the steelwork or by clamp brackets or hook bolts. Permission shall be obtained from the Engineer for any other type of fixing. Any protective coating damaged by welding, etc. should be made good by a method approved by the Engineer.

The supply and fixing of all support brackets, clamps and spacers and any other steelwork, whether or not shown in detail on the drawings or otherwise, which may be required for the proper and effective fixing of any equipment shall be considered to be included in the material and labour for the supply and fixing of that equipment, unless this work is specifically detailed in the Schedules.

Where PVC sheathed cable is used, cable cleats and supports shall be as recommended by the cable manufacturer. They shall be designed to avoid any damage to the PVC sheaths by sharp edges and excess pressure.

Cables erected on walls or steelwork shall, so far as is practicable, be so supported that no flexing can occur. Generally cables shall be supported on cleats which clamp the cables to prevent longitudinal movement.

Light weight equipment and conduit saddles may be fixed to the building structure by means of screws in metal or plastic plugs. Wood or fibre plugs shall not be used.

Fixing to brickwork shall be made in the bricks and not in the joint. If it is not possible to make all the fixings in the brickwork, then the equipment shall be positioned to enable the upper fixings to be made in the brickwork.

Shot fixing bolts shall not be used.

Simon Storage, Fluorobenzene Gantry / Tank 24 Instrument & Electrical Installation Tender Package

2.7 Clean Up

During and on completion of installation work the Contractor shall remove all surplus equipment and material and leave areas in a 'brush clean' condition. Refuse shall be disposed of as directed by the Engineer.

Prior to testing (where damage could arise) and before offering any part of the installation for acceptance, the Contractor shall clean out all electrical enclosures and wipe down painted surfaces. If necessary, damage to paintwork shall be made good by touch-up.

Before finally leaving the site, the Contractor shall remove all his accommodation, plant, tackle and tools of the trade to the satisfaction of the Engineer.

2.8 Earthing

2.8.1 General Soil Conditions

No information is available.

2.8.2 System Earthing

The neutral shall not be regarded as an earth conductor.

In areas where earth rods are to be driven into the ground, it shall be the contractors responsibility to ensure that there are no other underground services in the immediate vicinity.

2.8.3 Equipment Earthing

The main earthing bar on the MCC is connected by a separate earth conductor to its main earth point. All non-live metalwork shall be directly or indirectly bonded to the Main Earth Bar within the MCC. Such metalworks will include electrical equipment enclosures, motor frames, tray/ladder rack to be continuously bonded, cable armouring and glands. All glands which are through clearance holes require an earth tag and connection to the earth system by 6 sq.mm cable. Care must be taken to ensure that paint, etc. is cleaned away from under earth connections so that there is good earth continuity.

Direct bonding shall be taken to mean dedicated earth conductors within, or separate from, plant cable. Separate conductors shall be multi-stranded copper with a green/yellow sheath, size as specified in the drawings. Indirect bonding shall be taken as earth paths through armouring.

Note: (Dedicated earth conductors preferred).

However, a combination of both may be employed, providing that the value of the earth loop impedance allows flow of fault current sufficient to rupture associated protective fuses within five (5) seconds.

Simon Storage, Fluorobenzene Gantry / Tank 24 Instrument & Electrical Installation Tender Package

2.8 Earthing (Cont.)

2.8.4 Lightning Protection

Lightning protection is not anticipated for the plant.

2.9 Cabling

2.9.1 General

The schedules detail the cables with the estimated lengths for tendering purposes only. It is the Installation contractors responsibility to site measure prior to any cable installation and any cost variation must be advised to the Engineer for approval before installation.

All cables above 16 sq mm section shall have shaped conductors.

Before any armoured cable is installed, triplicate copies of the test certificate giving details of these tests shall be submitted to the Engineer for approval.

When delivered to site, each coil of cable shall have attached the manufacturer's test certificate.

When cables are steel wire armoured, the conductance of the armour shall be not less than 50% of the conductance of one phase core.

2.9.2 Installation

Bending radii shall conform to the maker's recommendations but in no case shall be less than:

8 x OD for armoured cables.

Cables shall be identified with durable, non-corrodible tags, of the Critchley K type or equivalent, inscribed with the reference number allocated in the cable schedules and fixed securely to the cable.

All cables shall be tagged as follows:

- a. At each termination.
- b. Where they enter and leave underground ducts.
- c. At each side of any barrier through which they run.
- d. Where they rise from one level to another.

All cores shall be terminated using approved crimped lugs of appropriate size. Spare cores shall be made off to unused terminals.

The cores of cables of section larger than 4mm² shall be connected by a means approved by the Engineer.

Simon Storage, Fluorobenzene Gantry / Tank 24 Instrument & Electrical Installation Tender Package

2.9.2 Installation (Cont.)

Cable joints shall not be used unless specified or on the written authority of the Engineer.

Cores shall be marked to comply with the references given in the cable schedules using Critchley Z type or equivalent. They shall be identified having black characters reading from the terminals outwards. Clip-on ferrules will **not** be accepted.

Insulated cables shall have standard Hawke compression CW type gland of the appropriate size. EEx 'd' glands to be used on EExd equipment. EEx 'e' glands to be used for I.S. cables and EEx 'e' equipment.

Each gland shall be bonded to its cable armouring, where applicable and unless otherwise specified, and to be complete with earth tag and locknut.

Each gland shall be fitted with a PVC slip-over shroud, unless otherwise agreed with the Engineer.

Cables shall be protected against mechanical damage at vulnerable points. This particularly applies in exposed locations where cables emerge from ground or floor.

2.9.3 Cables in Ground

When excavating trenches for underground cables, due account shall be taken of ground conditions. Cables in normal ground shall be laid in trenches 500mm deep minimum unless agreed otherwise. Before any excavation starts, the Contractor shall check if there is any record of other underground services along the route.

Trench bottoms shall be cleared of irregular and sharp objects before applying bedding.

Cables shall be laid the appropriate distance apart (dictated by rating factors) on a bed of clean, dry, builders' sand, 75mm deep.

Cables shall be blinded with a similar layer as soon as possible after installation.

The trench shall be backfilled a further 150mm with riddled, excavated spoil.

Interlocking cable tiles or continuous marker tape, giving clear warning or danger, shall be placed over each cable or closely associated groups of cables.

Backfill to surface shall be allowed to settle before final topping and grading.

Approved route markers shall be installed where cables enter or leave buildings, at changes of direction and at appropriate intermediate intervals.

Pilot cables shall run continuously with their associated main cable, where the route is common.

**Simon Storage, Fluorobenzene Gantry / Tank 24
Instrument & Electrical Installation Tender Package**

2.10 Cable Supports

2.10.1 Cable Ladder

Cable ladder should be installed as required in this specification.

The ladder shall be Swift type which is Hot Dip Galvanised to BS729:1971.

Standard metric widths shall be used.

Radius bends, tees, sets, reducers or other fittings shall be proprietary type by the ladder manufacturer and his installation instructions shall be followed. Earth Continuity connectors are to be fitted to all racking.

It shall be the contractors responsibility to provide the main supports for the racks as well as the fixing of the racks to the main supports.

Non Standard fittings will only be allowed where expressly agreed.

Cables shall not be tiered more than two deep, in which case the larger should be nearer to the end of the ladder.

Ladders shall be supported over their full width and secured to each support.

All bolts, nuts or washers shall be metric and sheradised, plated or otherwise effectively protected against corrosion.

Excessive bolt projections which may make the removal of nuts at a later date difficult will not be accepted.

When fully loaded, no span shall have a sag detectable by the eye.

Ladder runs shall be completely erected before cable laying commences and any rags, burrs or raw edges suitable treated.

Simon Storage, Fluorobenzene Gantry / Tank 24 Instrument & Electrical Installation Tender Package

2.10.2 Cable Trays

Cable trays shall be heavy duty pattern formed from galvanised sheet steel. The tray shall have side flanges not less than 25mm deep with returned edges and be coated fabrication. Material gauge shall be 1.5mm (16 SWG) minimum except that for tray widths less than 400mm, the gauge may be reduced subject to the flange depth and the approval of the engineer. Factory made tee sections and bends shall be used where possible.

The cutting of trays shall be kept to a minimum but where unavoidable, the edges shall be suitably treated. Fasteners shall not present any obstruction on the tray. Capacity amounting to 25% usable tray area shall be left spare.

For those portions of cable route where the cables are to be laid on cable tray, they shall be laid flat and straight and shall be properly dressed into position and fastened to the tray at intervals not greater than 500mm. Where the tray is run horizontally but arranged in the vertical plane, fastener spacing shall be as detailed in the IEE Regulations. Care shall be taken to space the cables to allow adequate cooling in accordance with the IEE Wiring Regulations and not more than two layers of cables shall be run on one tray.

2.10.3 Channel

"Unistrut" type channel may be used for individual cable runs. Where cables are installed in the channel capping is to be fitted. The channel and capping are to be of the galvanised type.

Where channel is to be used it must be with the approval of the Engineer.

2.10.4 Routes

Specific routing will be influenced by local circumstances.

Final details of all routes shall also be agreed with the Engineer before commencing pulling.

In all cases particular attention shall be paid to installation to as to prevent:

- a. Cable support fixings adversely affecting the strength of structures to which they are attached.
- b. Cable routes fouling access to other equipment and plant areas.
- c. Cables being at risk of damage caused by normal circumstances.

Simon Storage, Fluorobenzene Gantry / Tank 24 Instrument & Electrical Installation Tender Package

2.11 Testing and Commissioning

2.11.1 Testing

On completion of any installation work the Contractor shall carry out tests to ensure that it has been correctly executed and is safe to commission. This section provides a guide to the minimum normal requirements. Additional or special testing of particular equipment or components may be necessary and if so shall be carried out in accordance with any applicable instructions or recommendations. These tests must be carried out by a COMPEX certified person.

Visual Inspection, during the course of installation the Contractor shall check completed work for loose connections, removal of installation debris, temporary links etc. Before testing, a final inspection shall take place to ensure that tests may commence in safety. visual inspection shall also include tags, labels, terminal numbers and the like.

Safety Procedures, for any tests which may involve danger to personnel, the Contractor shall 'tape off' the area and display warning notices.

Earth Tests, as soon as possible after establishment, the value of the plant earth(s) shall be measured, preferably using an instrument specifically for this purpose. Tests shall preferably be carried out in dry weather.

Continuity of all earth paths shall be checked, loop impedance values shall be measured and recorded for all or sample circuits at the discretion of the Engineer. Any sample testing shall involve circuits furthest from the point of supply.

Insulation Tests, insulation tests shall be carried out on all cables and equipment using a 'Megger' of appropriate voltage. Low voltage devices (e.g. electronic circuitry) which could suffer damage thereby, shall be disconnected prior to testing.

Di-electric tests on insulating oil shall be carried out only if required by the Engineer.

Pressure Tests, it may be assumed that pressure testing (over-potential) of equipment will have taken place at works prior to despatch and need be repeated only if required by the Engineer.

In general and unless expressly excluded, all HV cables shall undergo a site pressure test prior to energising.

Injection Tests, injection tests on protective relays shall be carried out at the discretion of the Engineer.

Phase Rotation, supplies to principle load centres shall be checked for correct phase rotation.

**Simon Storage, Fluorobenzene Gantry / Tank 24
Instrument & Electrical Installation Tender Package**

2.11.1 Testing (Cont.)

Rotating Machines, all motors shall be 'jogged' on agreement with the Engineer, for direction then run on light load (with overload relays set low) to check for noise and vibration. Any drain plugs shall be removed to check for condensation, then replaced.

Lighting Levels, illumination levels shall be measured against specification in the absence of daylight.

Noise Levels, will not normally require measuring unless required by the Engineer.

Witnessing, the Contractor shall give reasonable notice of testing to the Engineer who may wish to witness same.

Records, all test results shall be recorded on the schedules accompanying this specification which shall then be submitted for acceptance with this specification.

2.11.2 Commissioning

Electrical

The installation shall be pre-commissioned by carrying out full functional tests at rated voltages.

These operations will normally be carried out jointly by the Engineer and the Contractor will include:-

Prolonged running of rotating machines (on load if possible) to check for smooth operation and temperature rise. During these tests the Contractor shall check metered currents, where applicable, and set overload relays and ammeter markers to suit conditions.

Active tests on all circuits to ensure that all components are operating correctly.

Sequence tests on all circuits to prove interlock and alarm features.

If required by the Engineer, the Contractor shall provide qualified assistance on a standby basis during full plant commissioning under process conditions.

Rates would be agreed in advance, in this event.

Simon Storage, Fluorobenzene Gantry / Tank 24 Instrument & Electrical Installation Tender Package

3.0 Scope of Work

3.1 General

This scope of work is for the Instrument & Electrical installation on the Fluorobenzene Project. All documents within this tender are to form the basis for the contract price. The Switchroom is designated a safe area, the tank farm and Gantry are Zone I IIB T4.

3.1.1 General Conditions of Contract

Simon Storage Conditions of Contract apply. Also see Section 2.3 regarding COMPEX certification.

3.2 Requirement of Contract

This contract is to include the following:-

3.2.1 Safety

Preparation and approval of CDM is required for this element of the project.

3.2.2 Installation

All labour, including unskilled, skilled and supervisory staff involved in the off-loading of equipment at the site and in the complete installation, assembly and testing of all the items included in the contract.

All materials required for the contract including earth conductors and furse clamp/fixings, cable ladder, tray, channel, supports, cable as detailed in the schedules.

All tools and equipment, including lifting equipment, scaffolding, general plant required in the performance of the contract and all necessary testing equipment.

The provision of all site facilities and any temporary electricity supplies.

All builders work including drilling and fixing to the civil structure, any necessary grouting and the sealing of holes, ducts and trenches after cable installations.

All fixings, nuts, bolts, studs, washers, gaskets and any other appurtenances necessary to provide a complete and operational installation.

The drawings and schedules detailed in Appendix I of this Tender Package are to provide the basis for the tender price.

Simon Storage, Fluorobenzene Gantry / Tank 24 Instrument & Electrical Installation Tender Package

3.3 Scope

The purpose of this project is a Fluorobenzene loading/offloading gantry and transfers to/from Tank 24.

An overview drawing SI347001 details the cable and installation requirements.

All junction boxes, instruments, stop/starts and MCC will be provided free issue.

It is the Contractors responsibility to provide all rack, tray, cable, glands, fixings and markers.

3.3.1 Rack and Tray

A new 300mm heavy duty tray is to be provided for instrumentation signals. This tray will run above the existing electrical tray from the point where the underground cables rise at the rear of the bund wall on enclosure B to the new gantry.

A new 300mm heavy duty tray is to be provided from the existing electrical tray adjacent to the pipebridge on enclosure B bund wall, across the pipebridge to the new gantry.

Local trays are to be installed around the gantry for both instrumentation and electrics.

3.3.2 Mounting of Equipment

The Contractor is to take delivery of and install the following free issue equipment:-

Gantry Area

Scully EEx'd' Enclosure.
Scully EEi Indicator, Plug and Socket Assembly.
Horn.
Gantry Control Unit JB.
Gantry Pneumatic Panel.
D.P. Transmitter.
Batcher.
I.S. Junction Box.
Offloading Pump Stop/Start Station.

Road Loading Pump Area

EEx'e' Junction Box.
Road Loading Pump Stop/Start Station.

Simon Storage, Fluorobenzene Gantry / Tank 24 Instrument & Electrical Installation Tender Package

3.3.2 Mounting of Equipment (Cont.)

Tank 24 Area

Enraf Junction Box at top of tank.
Enraf Control Unit at bottom on tank.

Switchroom

Logic Control Panel.

3.3.3 Installation of Cables

Drawing SI347001 and cable schedule SI347100 detail the cables and pneumatic tubes to be installed.

3.3.4 Installation of Earth Rods and Earth Bar

Earth rods are to be supplied and installed near the gantry area. An earth bar is to be supplied and fitted at the gantry.

3.4 Testing and Documentation

The completed installation is to be tested as detailed previously. Test records for the complete installations are to be provided.

3.5 Site Visit before Tender Submission

A site visit is required to ensure that the work associated with this project is fully understood. The site visit is to be organised by contacting D. Ransome at P & I Design Ltd.

**Simon Storage, Fluorobenzene Gantry / Tank 24
Instrument & Electrical Installation Tender Package**

4.0 Contract Pricing Contents

4.1 Introduction

The Tenderer must complete the Schedules attached, completing the lists of categories of unit rates for variations. The Tenderer must not re-type or make any other alterations to the wording.

Engineer authorised variations in respect of the provision of the aforementioned services to be paid in accordance with Section 4.3.4.

Payment under hourly/day rates for variations to Contract will only be made to the Contractor for Personnel approved by the Purchaser and will only be made in respect of all approved hours worked, or pro-rata to the nearest half hour, half day or whole day respectively.

**Simon Storage, Fluorobenzene Gantry / Tank 24
Instrument & Electrical Installation Tender Package**

4.2 Pricing Preambles/Notes on Pricing

4.2.1 General

These Pricing Preambles relate to Rates, Sums and Amounts entered in Schedules which form part of the Contract.

In arriving at said Rates, Sums and Amounts, the Contractor will be deemed to have taken account of the Conditions of Contract, the Specification/Scope of Work, the Particular Specification, these Pricing Preambles and any other matters which affects said Rates, Sums and Amounts.

Rates, Sums and Amounts, except where otherwise provided in the Contract shall be fixed for the duration of the Contract.

Completion of Lump Sums, Normal Time Rates.

- 4.2.1.1** A Rate, Sum or Amount shall be entered by the Contractor against each reference or item and reference or items against which no Rate, Sum or Amount is entered shall be deemed to be covered by other Rates, Sums or Amounts entered elsewhere in the Schedules.
- 4.2.1.2** The Contractor shall omit from his Tender any Value Added Tax chargeable or any taxable supplies made under Contract to the Purchaser and payable by him as a taxable person to the Commissioners of Customs and Excise.
- 4.2.1.3** The Contractor shall allow for compliance in all respects with the applicable British Standard, Codes of Practice and any other Standards or Codes specified. The Contractor shall be fully responsible for obtaining such documents and familiarising himself with same.
- 4.2.1.4** The Contractor shall allow for compliance with all statutory safety regulations work including those of the Purchaser and executing the Services in such an order or sequence as may be required to accord with the overall Project programme requirements.

**Simon Storage, Fluorobenzene Gantry / Tank 24
Instrument & Electrical Installation Tender Package**

4.3 Schedule of Rates

4.3.1 General

4.3.1.1 Schedule of Rates

The Schedule is to be priced on 1997 rates for labour and materials.

4.3.1.2 Man-hours

The Man-hour Rates which the Contractor inserts in the Schedule shall be deemed to include, but not necessarily be restricted to all allowances required for the following:

All cost associated with the employment of labour including the requirements of Government enactment's (V.A.T. excepted) and/or other suitable National Working Rule Agreement.

Supervision by non-working trade supervisors, other than those allowed separately by the Contractor in the General Preliminaries section of the Tender.

All man-hours and costs associated with collecting "Free Issue" materials from the Purchaser's stores or compounds and transporting to the Contractor's store or workshop, including all loading, unloading, stacking and storage. Also any costs associated with off-loading, stacking and storage of materials supplied by the Contractor. Compilation of stores record system and final reconciliation for all "Free Issue" materials. Generally this store will be located on the site.

Loading and transporting from the Contractor's store or compound and assembling and installing in the final position.

The installation of all work and operations required by the Specifications and Works Rules and Regulations.

The carrying out of any tests including submission of samples where required. Any necessary site measurement and sketching for fabrication and erection purposes.

Marking up construction drawings to record the "As Built" installation.

All necessary allowances for small hand tools and consumables which are not included as Constructional Plant in the General Preliminaries section of the Tender.

Protecting the works during construction period from damage and for making good reinstating damage caused.

All required allowances for overhead and profit.

**Simon Storage, Fluorobenzene Gantry / Tank 24
Instrument & Electrical Installation Tender Package**

4.3.2 Materials

The material prices which the Contractor inserts in the Schedule of Rates shall be deemed to include the following:-

All costs associated with delivery to the Contractor's site stores or compound.

Any demurrage charges or costs associated with returning packing cases, drums and the like for materials supplied by the Contractor.

All necessary allowances for waste.

All necessary allowances for consumables.

All necessary fixing devices.

4.3.3 Testing

The man-hour rates shall include for all testing.

4.3.4 Schedule of Day work Rates

Variations shall be valued on a lump sum basis. Such lump sums shall be derived from the Schedule of Rates below and the man-hour estimates for the variations which the Engineer has agreed in writing and all of which shall be subject to the issue of a Variation Order.

Position	40 Hour Rate	Time & ½ Rate	Double Time
Site Supervision Working Foreman Approved Electrician Instrument Technician Labourer			

Percentage to be added to net cost of materials %

Site Establishment

Cost inclusive of site management, office facilities, £
messing, toilets and constructional equipment at a
weekly rate.

**Simon Storage, Fluorobenzene Gantry / Tank 24
Instrument & Electrical Installation Tender Package**

4.4 Programme

4.4.1 Provisional Programme

The following information is supplied for the guidance of the Tenderer and is provisional only, based upon the information available at the time of issue of the Tender:

- i. Tender required by - 27.10.97
- ii. Earliest date on which order can be placed - 29.10.97
- iii. Earliest date for installation of equipment - 24.11.97
- iv. Latest date for completion, including all testing - 12.11.97

**Simon Storage, Fluorobenzene Gantry / Tank 24
Instrument & Electrical Installation Tender Package**

Contract Pricing Schedules

4.5 Tender Pricing Summary

This tender summary to be completed by the tenderer, applies to the Scope of Work.

1.	Section 3.3.1	£
2.	Section 3.3.2	£
3.	Section 3.3.3	£
4.	Testing and Documentation	£
5.	Miscellaneous (please state)	£

Sub Total	£
Site Establishment Total (based on weeks) (See Section 4.3.4)	£
Total Tender Price	£

**Simon Storage, Fluorobenzene Gantry / Tank 24
Instrument & Electrical Installation Tender Package**

APPENDICES

- I. Drawings and Cable Specifications
- II. Applicable Standards

**Simon Storage, Fluorobenzene Gantry / Tank 24
Instrument & Electrical Installation Tender Package**

APPENDIX I

Drawing & Cable Specification Register

<u>Drawing No.</u>	<u>Description</u>
SI347001	Instrument/Electrical Cable Overview
SI347003	MCC Compartment Details
SI347007	Logic Drawing 1
SI347012	Fluorobenzene Tanker Loading Batcher
SI347013	P107/P108 Vega Level Switches Loop
SI347014	LT24 Enraf Smart Radar Loop Sheet
SI347025	Fluorobenzene Control Unit Interconnection Diagram
SI347026	Gantry Control Unit Front Layout
SI347027	IS Junction Box Internal Layout
SI347028	Road Loading Pump EEx'e' JB Layout
	CABLE_SPEC_E
	CABLE_SPEC_F
	CABLE_SPEC_J

**Simon Storage, Fluorobenzene Gantry / Tank 24
Instrument & Electrical Installation Tender Package**

APPENDIX II

Applicable Standards

Specifications and Codes of Practice of the BSI

IEE Regulations, 16th edition, 1991

Regulations under the Electricity Acts

Requirements of HM Factory Inspectorate

Any applicable requirements of other National or Local Authorities

Simon Storage Safety Regulations for Contractors (Doc63/PLJ/300392)

Simon Storage General Conditions of Contract. (AJH/SS-SST/GENCON/1/17.12.90.)

The Contractor is to request a copy of Simon Storage Regulations and Conditions of contract if not already in possession.

SIMON STORAGE LTD
TYNE TERMINAL
FLUOROBENZENE / TANK 24 GANTRY PROJECT
ROAD TANKER EARTH AND OVERSPILL PREVENTION SYSTEM
SPECIFICATION

Written by ...MS

Checked by ...DRR

Approved by ..DRR

CLIENT REF:
P & I DESIGN REF: 347
DOCUMENT NO: SI347001.RPT
ISSUE: A DATE: 19.09.97
PAGE 1 OF 3

**Simon Storage Ltd - Tyne Terminal
Fluorobenzene / Tank 24 Gantry Project
Road Tanker Earth and Overspill Prevention System Specification**

Contents

- 1.0 General**
- 2.0 System Description**
- 3.0 Equipment**
- 4.0 Documentation**

**Simon Storage Ltd - Tyne Terminal
Fluorobenzene / Tank 24 Gantry Project
Road Tanker Earth and Overspill Prevention System Specification**

1.0 General

This specification details the requirements of a Road Tank Earth and Overspill protection system for the Simon Storage Fluorobenzene project.

Simon Storage Ltd. conditions of purchase shall apply.

1.1 Area Classification

All equipment supplied for this project shall be suitable for housing in a Zone 1 IIB T4 hazardous area. No electrical safe area is available.

1.2 Power Supply

A 240V 50Hz power supply is available up to a maximum of 6A.

2.0 System Description

The road tanker offloading facility consists of a tanker bay containing one loading arm. The loading arm is designed for connection to the bottom of road tankers equipped for bottom loading.

A protection system is required to monitor overspill in the road tanker also incorporating vehicle earthing and earth monitoring. Connection to the tanker will need to be by two flying leads from a mating socket which will plug into the Scully plug. The first flying lead requires a tanker earthing clip and the second a level switch. The level switch requires a screwed male thread for connecting into the top of the tanker. Size to be advised by Scully.

3.0 Equipment

3.1 Control Unit

An EEx'd' control box is to be supplied with a voltage of 240V 50 Hz. A volt free contact is required from the controller, the relay is to de-energise providing a normally open contact on overspill, earth fault or system fault. This contact will be wired (by others) to an external shutdown system.

4.0 Documentation

Drawings of the EEx'd' Control Unit showing front of panel, internal layout and full wiring details are to be produced. Drawings are to be issued following receipt of order.

Hazardous area and certificates of conformity are to be provided covering all items of equipment.

P & I Design Ltd.

Control Panel Specification

P & I REF.
PNL-##A2.SPC
SHT 1 OF 9

**General Specification for the Manufacture
of Instrument Control Consoles
and Panels**

CONTENTS

- 1.0 Scope
- 2.0 Construction
- 3.0 Arrangement of Equipment
- 4.0 Wiring
- 5.0 Terminals
- 6.0 Earthing
- 7.0 Instrument Tube and Fittings
- 8.0 Internal Lights and Socket Outlets
- 9.0 Labels
- 10.0 Inspection and Testing
- 11.0 Delivery
- 12.0 Documentation, Certification and Regulations

1.0 Scope

- 1.1 This specification covers the manufacture, testing and shipping of instrument panels and cubicles.

It should be read in conjunction with the relevant panel specification detailing the individual requirements of the panel, together with the drawings relating to the enquiry or order.

2.0 Construction

The type of construction will be specified together with the required IP rating, as detailed in BS EN 60947-1, Part 1, on the relevant panel specification. The type of construction falls into two categories:-

2.1 Custom Built Steelwork

This type of enclosure will be custom built for the purpose specified. The panel shall be constructed from prime quality sheet not less than 2mm thick, the panel cut-out drawing may detail a higher specification, where this happens, the drawing overrides this specification. In any event the front face of the enclosure must be capable of supporting any flush mounted equipment without distortion.

The construction must include removable gland plates with earth studs, a plinth and a means of lifting the enclosure without distortion. Earth studs of minimum 6mm thread, must be on the enclosure main frame, all mounting plates and doors. Any eyebolts used for lifting must be removable.

A suitable locking device should be provided on all doors. The doors will be suitably rigid and gasketed to conform to the relevant IP Rating.

2.2 Standard Enclosures

This type of enclosure are those available from batch manufactured suppliers, eg. Rittal, Sarell, Eldon. They are not purpose designed, but are of a general type. The panel manufacturer is to ensure that if this type of enclosure is used that it satisfies the relevant specification, including the IP Rating.

2.3 Panel Cut-Outs

All cut-outs shall be clean, of the correct size and shape, free from burrs and rough edges. Rectangular cut-outs must be parallel to each other and the top of the enclosure.

The panel cut-out drawing will give the sizes and tolerances of the required cut-outs.

P & I Design are to be informed on completion of mechanical work, in order that inspection can be arranged.

2.4 Finish

The enclosure must be free from any deformity, weld slag and shall be of a standard sufficiently high to obviate the need for excessive thickness of paint.

Before painting, all surfaces shall be cleaned.

Paint shall be applied and cured in conformance with the manufacturer's instructions.

The finished enclosure shall have a minimum film thickness of 100 microns. The finish shall be free from runs, blemishes and orange peel effect.

P & I Design are to be informed on completion of painting of the panel in order that inspection can be arranged.

3.0 Arrangement of Equipment

3.1 The enclosure layout will normally be detailed on the cut-out layout drawing. In any case the layout shall provide easy and safe access to all equipment.

3.2 Ventilation of the panel must be provided if any temperature rise will cause instruments to be subjected to ambient conditions close to or outside their limitations.

3.3 Suitable segregation shall be given to different categories of equipment, eg. electrical, instrumentation, intrinsically safe, etc.

3.4 Plastic trunking of the slotted type shall be provided to enclose all the panel wiring. Trunking shall be suitably segregated for different categories of cable and should not be filled to more than 60% of their capacity.

3.5 Where trunking is used for IS. circuits, it shall be coloured blue.

4.0 Wiring

4.1 As stated in 3.4, wiring shall be run in plastic trunking, where wiring exits trunking it must not exceed 100mm before being terminated.

Where it is necessary to wire to equipment on doors or hinged plates, it is acceptable to use a spiral bound support system with suitable protection to prevent strain or chaffing of the wiring.

4.2 Wiring shall be segregated into separate groups and trunking as detailed:-

Intrinsically safe circuits.

Power circuits - 415V/240V/110V.

Digital circuits - 24VDC.

Analogue circuits.

4.3 The panel specification relating to the actual project gives the size and colour of each category of cable.

4.4 All cables are to be identified at both ends as detailed on the wiring diagrams.

4.5 All multi-stranded cables shall be terminated with twin grip insulated crimps, boot lace, or other type of crimp, as detailed in the relevant panel specification. Care shall be taken to ensure that no strand or strands of conductor are exposed beyond the insulation.

4.6 All cables shall be terminated, under no account are cables to be hidden un-terminated in the trunking.

5.0 Terminals

- 5.1 Terminal type is given in the relevant panel specification.
- 5.2 Terminal segregation shall be maintained to keep categories of cables segregated as stated earlier.
- 5.3 All terminal rails shall be clearly marked and individual terminals shall be numbered.
- 5.4 The terminal mounting rail shall be installed as long as is practical to allow for future expansion.
- 5.5 Terminal rails with voltages greater than 24V shall have appropriate shrouding with a label indicating the voltage.

6.0 Earthing

- 6.1 All cubicle earth studs shall be bonded to the main earth terminal with flexible earth strip or cable of minimum size 6mm².

The cubicle shall be constructed to provide an effective earth path for the armouring of incoming field cables.

- 6.2 If the cubicle has Intrinsically Safe equipment requiring an I.S. Earth system, this shall be installed in accordance with BS 5345 Part 4.

The IS earth bar shall be clearly marked INTRINSICALLY SAFE EARTH insulated from the control panel and shall not be connected to any other earth in the cubicle.

7.0 Instrument Tube and Fittings

- 7.1 Instrument tubing and fittings for the air supply, inputs and outputs shall be of the material and size specified in the relevant panel specification.
- 7.2 Tubing within the cubicle shall be adequately supported, tubing can be run inside trunking.
- 7.3 To ensure no build up of pressure within a sealed cubicle, a suitable method of venting must be adopted to ensure the required IP rating is maintained.
- 7.4 If a nylon or poly tube is used the correct insert or insert olive shall be used to ensure the tube is not cut by compression of the fitting.

8.0 Internal Lights and Sockets

- 8.1 The power distribution drawings will show the requirements for lights and sockets within the cubicle.
- 8.2 For 240V sockets, metal clad sockets shall be used, each being a double outlet.
- 8.3 Lighting shall be sufficient to provide an acceptable working level within the cubicle.

9.0 Labels

- 9.1 All equipment both internal and external shall be suitably labelled.
- 9.2 Where components can be removed from base equipment, both must be labelled to ensure that on replacing the component there is no doubt which base unit goes with the component. eg. 11 pin relays and bases.
- 9.3 On internal equipment, if manufacturer's labelling is not suitable, then additional labelling shall be supplied.
- 9.4 Front of panel labels shall be fastened to the panel using non-corroding screws. This is also preferred for internal equipment, if practicable, if not then a twin sided adhesive tape can be used.

9.5 All labels will be manufactured from Traffolyte with black lettering on a white background, unless otherwise stated.

9.6 A label or terminal drawing shall be mounted in the enclosure detailing the fuse rating together with circuit reference.

10.0 Inspection and Testing

10.1 P & I Design reserve the right to inspect or progress the equipment at any stage during manufacture.

10.2 The panel manufacturer shall inspect the panel for the following:-

- Conformity to standards.
- Colour Coding and ferruling of all wiring.
- Safe and easy access to equipment.
- Earthing.
- Labelling.

10.3 Once the above inspection by the manufacturer is complete, he shall then continuity check all cabling. The panel manufacturer must not power up the panel until inspected by P & I Design Ltd.

10.4 On completion of Section 10.3, P & I Design will inspect the panel and be present during the time the panel is powered up.

10.5 P & I Design shall inform the manufacturer if functional testing will be carried out at the manufacturers works or elsewhere.

If it is at the manufacturers works, then full simulated tests, including testing of inputs, outputs, all instrumentation and shutdown logic will be performed by the manufacturer, witnessed by P & I Design.

If the testing is not at the manufacturers works, then if P & I Design find any faults or failings during testing, the manufacturer shall remedy the fault at the panel's location.

11.0 Delivery

The panel shall be adequately protected to prevent damage to the enclosure and its contents during loading, transportation and off loading.

12.0 Documentation and Certification

12.1 Where the enclosure utilises custom built steelwork, the manufacturer shall be responsible for preparing any drawings required, other than the panel cut-out/layout drawing supplied by P & I Design, to enable the enclosure to be built.

P & I Design require 2 copies of any such drawings prior to manufacture.

12.2 The manufacturer shall provide certificates for all tests conducted on the panel under his control.

12.3 The equipment supplied shall comply with and shall be constructed to allow operation and maintenance in accordance with the following regulations:-

IEE Regulations (Current Edition)
Health and Safety at Work Act 1974

P & I Design Ltd.

Instrument Specification

CLIENT: Simon Storage Tyne Terminal	REV	DATE	BY	CHKD	APPD	CLIENT REF. Fluorobenzene P & I REF. SI347001.SPC SHT 1 OF 2
	A	24/09/97	MS	DRR	DRR	
	B	13/10/97	PJP	DRR	DRR	

ITEM:	Level Transmitter (Micro Wave)	
GENERAL	Tag Number	P24
	Service	Fluorobenzene Tank 24 Level
	Area Classification	Zone 1 IIB T4
DETECTOR ELEMENT	Type	FM synthesised pulse reflectometer
	Location Classification	Zone 1
	Material :	Wetted Parts 316 St. St. PTFE coated
		Seals N/A
	Connections:	Size Manufacturer Standard
B		Type Flanged ANSI 150
		Rating 7 Bar
	Mounting:	Position Top
	Antenna Dimensions	Manufacturer Standard (Floating Deck)
	Measuring Range	0.5 to 40 metres
	Span Limits	0.5 to 40 metres
	Resolution	+/- 1mm
	Calibrated Range	0 - 10.7 metres (to be site calibrated)
HOUSING	Material	Cast Aluminium
	Enclosure Class	IP65
	Electrical Classification	EEx'd' IIC T6
	Electrical Connection	Flying lead into Enraf supplied Junction Box
TRANSMISSION	Type	EEx'd' Indicating Control Unit
	Supply	240V ac
	Output	Serial, ASCII coded, Bi-Phase Mark modulated
	Load (Max)	N/A Standard ENRAF fieldbus
	Electrical Connection	5 off 3/4" NPT
	Electrical Classification	EEx'd' IIC T6
OPTIONS		2 off volt free alarms (Low & High) EEx'd' Junction Box
PROCESS DATA	Fluid	Fluorobenzene
	Temperature Max./Min.	20°C
	Temperature Normal.	20°C
	Pressure Max./Min.	Atmospheric
	Pressure Normal.	Atmospheric
	Dielectric Constant Min.	N/A
MANUFACTURERS DATA	Supplier	Enraf
	Model Number	TBA
DOCUMENTATION	See Attached Documentation Specification	

CLIENT:
Simon Storage
Tyne Terminal

REV	DATE	BY	CHKD	APPD
A	24/09/97	MS	DRR	DRR
B	13/10/97	PJP	DRR	DRR

CLIENT REF.
Fluorobenzene
P & I REF.
SI347001.SPC
SHT 2 OF 2

Documentation Requirement

Item	Quantity	Description
1.		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.		MATERIALS TEST CERTIFICATES a. Mechanical. b. Chemical analysis.
4.	1	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.	1	RECOMMEND SPARES QUOTATION a. Two years service. b. Commissioning only.
6.	1	INSTALLATION, OPERATING AND MAINTENANCE MANUALS To include calibration instructions where applicable.
7.		SOFTWARE a. Programming manual. b. Operating manual.
8.		PRESSURE VESSELS Calculation sheets, spark test certificates (for lined vessels),hydraulic test certificates.
9.		ELECTRICAL a. Schematic and circuit diagrams. b. Certificates of conformity (to include EMC Directive 89/336/EEC). c. Hazardous area certification.
10.	1	INSTRUMENTATION a. Certificates of conformity (to include EMC Directive 89/336/EEC). b. Calibration certificates.
	1	c. Hazardous area certification.
11.		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.

P & I Design Ltd.

Instrument Specification

CLIENT:
Simon Storage
Tyne Terminal

REV	DATE	BY	CHKD	APPD
A	30.09.97	MS	DRR	DRR

CLIENT REF.
Fluorobenzene
P & I REF.
SI347002.SPC
SHT 1 OF 3

ITEM:	Electrical Component	
GENERAL	Tag Number Service Area Classification	See Sheet 2 See Sheet 2 Zone 1 IIB T4
UNIT	Type Supply Case Connections Mounting Enclosure Class Electrical Classification	Control Station (Stop/Start) 24V dc Manufacturers Standard 1 x M20 Cable Entry (Bottom) Surface IP 67 EEx de IIC T6
OUTPUT	Type	Standard Push Button with 'START' Legend + Standard Push Button With 'STOP' Legend, 1 n/o + 1 n/c.
OPTIONS		
MANUFACTURERS DATA	Supplier Model Number	Parmley Graham Ltd. ABB Control GHG 411 8251 R0005
DOCUMENTATION	See attached Documentation Specification	

P & I Design Ltd.

Instrument Specification

CLIENT:
Simon Storage
Tyne Terminal

REV	DATE	BY	CHKD	APPD
A	30.09.97	MS	DRR	DRR

CLIENT REF.
Fluorobenzene
P & I REF.
SI347002.SPC
SHT 2 OF 3

TAG No.	SERVICE	RANGE	COMMENTS
J88A	J88 Road Loading Pump	N/A	
J89A	J89 Offloading Pump	N/A	

CLIENT:
Simon Storage
Tyne Terminal

REV DATE BY CHKD APPD
A 30.09.97 MS DRR DRR

CLIENT REF.
Fluorobenzene
P & I REF.
SI347002.SPC
SHT 3 OF 3

Documentation Requirement

Item	Quantity	Description
1.	-	APPROVAL DOCUMENTATION To be supplied before manufacture commences
2.	-	GENERAL ARRANGEMENT DRAWING Cross-sectioned to show all details necessary for repair and maintenance purposes.
3.	-	MATERIALS TEST CERTIFICATES a. Mechanical. b. Chemical analysis.
4.	-	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.	-	RECOMMEND SPARES QUOTATION a. Two years service. b. Commissioning only.
6.	-	INSTALLATION, OPERATING AND MAINTENANCE MANUALS To include calibration instructions where applicable.
7.	-	SOFTWARE a. Programming manual. b. Operating manual.
8.	-	PRESSURE VESSELS Calculation sheets, spark test certificates (for lined vessels),hydraulic test certificates.
9.	-	ELECTRICAL a. Schematic and circuit diagrams. 1 b. Certificates of conformity (to include EMC Directive 89/336/EEC). 1 c. Hazardous area certification.
10.	-	INSTRUMENTATION a. Certificates of conformity (to include EMC Directive 89/336/EEC). b. Calibration certificates. c. Hazardous area certification.
11.	-	SPECIAL REQUIREMENTS

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P & I Design Ltd.

Instrument Specification

CLIENT:
Simon Storage
Tyne Terminal

REV	DATE	BY	CHKD	APPD
A	30.09.97	MS	DRR	DRR
B	03.10.97	MS	DRR	DRR

CLIENT REF.
Fluorobenzene
P & I REF.
SI347003.SPC
SHT 1 OF 2

ITEM: Solenoid Valve
Direct

GENERAL Tag Number SOL12
Service Fluorobenzene Transfer Valve SOV
Area Classification Zone 1 IIB T4

BODY Type Mazak - Normally Closed
Number of Ways 3
Action Spring Return
Construction Manufacturers Standard
Connections:Size/Type 1/8" BSP
Mounting Din Rail

SOLENOID Type Manufacturers Standard
Voltage 24V dc
Enclosure Class IP 66
Electrical Classification EExd IIC T4
Electrical Connection M20 x 1.5

OPTIONS Manual Override & Din Rail Mounted

PROCESS DATA Fluid Instrument Air
Pressure Max. 80 psig
Oper. Diff. Max./Min. 80 psig
Temperature Oper. Ambient

MANUFACTURERS DATA Supplier RGS
B Model Number EPA100/TB/Exd/MO/M4497

DOCUMENTATION See Attached Documentation Specification

CLIENT:
Simon Storage
Tyne Terminal

REV	DATE	BY	CHKD	APPD
A	30.09.97	MS	DRR	DRR
B	03.10.97	MS	DRR	DRR

CLIENT REF.
Fluorobenzene
P & I REF.
SI347003.SPC
SHT 2 OF 2

Documentation Requirement

<u>Item</u>	<u>Quantity</u>	<u>Description</u>
1.	-	APPROVAL DOCUMENTATION To be supplied before manufacture commences
2.	-	GENERAL ARRANGEMENT DRAWING Cross-sectioned to show all details necessary for repair and maintenance purposes.
3.	-	MATERIALS TEST CERTIFICATES a. Mechanical. b. Chemical analysis.
4.	-	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.	-	RECOMMEND SPARES QUOTATION a. Two years service. b. Commissioning only.
6.	1	INSTALLATION, OPERATING AND MAINTENANCE MANUALS To include calibration instructions where applicable.
7.	-	SOFTWARE a. Programming manual. b. Operating manual.
8.	-	PRESSURE VESSELS Calculation sheets, spark test certificates (for lined vessels),hydraulic test certificates.
9.	-	ELECTRICAL a. Schematic and circuit diagrams. b. Certificates of conformity (to include EMC Directive 89/336/EEC). c. Hazardous area certification.
10.	1 1	INSTRUMENTATION a. Certificates of conformity (to include EMC Directive 89/336/EEC). b. Calibration certificates. c. Hazardous area certification.
11.	-	SPECIAL REQUIREMENTS

IMPORTANT NOTICE:

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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.

P & I Design Ltd.

Instrument Specification

CLIENT: Simon Storage Tyne Terminal	REV A B	DATE 30.09.97 13.10.97	BY MS PJP	CHKD DRR DRR	APPD DRR DRR	CLIENT REF. Fluorobenzene P & I REF. SI347004.SPC SHT 1 OF 3
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ITEM:	Level Switch (Tuning Fork)	
GENERAL	Tag Number Service Area Classification	See Sheet 2 See Sheet 2 Zone 1 IIB T4
DETECTOR ELEMENT	Type Location Classification Material: Wetted Parts Seals B Connections: Size Type Rating Mounting: Position Probe Length	Vibrating Fork Zone 0 Stainless Steel N/A 2" RF Flange ANSI 150 Vertical 130M
HOUSING	Material Enclosure Class Electrical Classification Electrical Connection	Plastic - PBTP (Valox) IP 66 EEx ia IIC T6 M20 x 1.5
TRANSMISSION	Type B Supply B Output B Load Action Electrical Connection	2 Wire From Vegator 636 Ex. See Spec. SI347005.SPC To Vegator 636 Ex Vegator 636 Ex Maximum Fail Safe Mode - High Level Trip Screw Terminals for max. 2.5mm ² cable.
OPTIONS		
PROCESS DATA	Fluid Temperature Max./Min. Temperature Normal. Pressure Max./Min. Pressure Normal. Specific Gravity	Fluorobenzene 20°C 20°C 10 / 4 barg 6 barg 1.03
MANUFACTURERS DATA	B Supplier Model Number	Vega Vegaswing 81Ex-F2-Z-EXXVA. Insertion Length: 118mm
DOCUMENTATION	See Attached Documentation Specification	

P & I Design Ltd.

Instrument Specification

CLIENT:

Simon Storage
Tyne Terminal

REV	DATE	BY	CHKD	APPD
A	30.09.97	MS	DRR	DRR
B	13.10.97	PJP	DRR	DRR

CLIENT REF.

Fluorobenzene
P & I REF.
SI347004.SPC
SHT 2 OF 3

TAG No.

P107
P108

SERVICE

Offloading Pump Level Probe
Knock-out pot Vapour Level Probe

RANGE

COMMENTS

CLIENT:
Simon Storage
Tyne Terminal

REV	DATE	BY	CHKD	APPD
A	30.09.97	MS	DRR	DRR
B	13.10.97	PJP	DRR	DRR

CLIENT REF.
Fluorobenzene
P & I REF.
SI347004.SPC
SHT 3 OF 3

Documentation Requirement

Item	Quantity	Description
1.	-	APPROVAL DOCUMENTATION To be supplied before manufacture commences
2.	-	GENERAL ARRANGEMENT DRAWING Cross-sectioned to show all details necessary for repair and maintenance purposes.
3.	-	MATERIALS TEST CERTIFICATES a. Mechanical. b. Chemical analysis.
4.	-	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.	1 -	RECOMMEND SPARES QUOTATION a. Two years service. b. Commissioning only.
6.	1	INSTALLATION, OPERATING AND MAINTENANCE MANUALS To include calibration instructions where applicable.
7.	-	SOFTWARE a. Programming manual. b. Operating manual.
8.	-	PRESSURE VESSELS Calculation sheets, spark test certificates (for lined vessels),hydraulic test certificates.
9.	-	ELECTRICAL a. Schematic and circuit diagrams. b. Certificates of conformity (to include EMC Directive 89/336/EEC). c. Hazardous area certification.
10.	1 - 1	INSTRUMENTATION a. Certificates of conformity (to include EMC Directive 89/336/EEC). b. Calibration certificates. c. Hazardous area certification.
11.	-	SPECIAL REQUIREMENTS

IMPORTANT NOTICE:

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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.

P & I Design Ltd.

Instrument Specification

CLIENT:
Simon Storage
Tyne Terminal

REV	DATE	BY	CHKD	APPD
A	30.09.97	MS	DRR	DRR
B	13.10.97	PJP	DRR	DRR

CLIENT REF.
Fluorobenzene
P & I REF.
SI347005.SPC
SHT 1 OF 3

ITEM

Isolating Unit
(IS)

GENERAL

Tag Number	See Sheet 2
Service	See Sheet 2
Area Classification	Zone 1 IIB T4

UNIT

Type	Vegator I.S. Level Switch
Supply	240V ac
Number of Channels	1
Input	2 Wire from Vegaswing Ex
Output	c/o Volt Free Contacts
Hazardous Area Limits:	
Voltage Max/Min	TBA
Current Max/Min	TBA

HOUSING

Material	Plastic
Mounting	DIN Rail
Enclosure Class	IP 20
Electrical Classification:	
Load	EEx ia IIC T6
Unit	[EEx ia] IIC
Electrical Connection	Terminals

OPTIONS

**MANUFACTURERS
DATA**

Supplier	Vega
B Model Number	Vegator 636 Ex

DOCUMENTATION

See Attached Documentation Specification

P & I Design Ltd.

Instrument Specification

CLIENT:

Simon Storage
Tyne Terminal

REV	DATE	BY	CHKD	APPD
A	30.09.97	MS	DRR	DRR
B	13.10.97	PJP	DRR	DRR

CLIENT REF.

Fluorobenzene
P & I REF.
SI347005.SPC
SHT 2 OF 3

TAG No.	SERVICE	RANGE	COMMENTS
P107	Offloading Pump High Level	N/A	Maximum Fail Safe
P108	Knock-out Pot Vapour High Level	N/A	Maximum fail Safe

CLIENT:
Simon Storage
Tyne Terminal

REV	DATE	BY	CHKD	APPD
A	30.09.97	MS	DRR	DRR
B	13.10.97	PJP	DRR	DRR

CLIENT REF.
Fluorobenzene
P & I REF.
SI347005.SPC
SHT 3 OF 3

Documentation Requirement

<u>Item</u>	<u>Quantity</u>	<u>Description</u>
1.	-	APPROVAL DOCUMENTATION To be supplied before manufacture commences
2.	-	GENERAL ARRANGEMENT DRAWING Cross-sectioned to show all details necessary for repair and maintenance purposes.
3.	-	MATERIALS TEST CERTIFICATES a. Mechanical. b. Chemical analysis.
4.	-	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.	1 -	RECOMMEND SPARES QUOTATION a. Two years service. b. Commissioning only.
6.	1	INSTALLATION, OPERATING AND MAINTENANCE MANUALS To include calibration instructions where applicable.
7.	-	SOFTWARE a. Programming manual. b. Operating manual.
8.	-	PRESSURE VESSELS Calculation sheets, spark test certificates (for lined vessels),hydraulic test certificates.
9.	-	ELECTRICAL a. Schematic and circuit diagrams. b. Certificates of conformity (to include EMC Directive 89/336/EEC). c. Hazardous area certification.
10.	1 - 1	INSTRUMENTATION a. Certificates of conformity (to include EMC Directive 89/336/EEC). b. Calibration certificates. c. Hazardous area certification.
11.	-	SPECIAL REQUIREMENTS

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P & I Design Ltd.

Instrument Specification

CLIENT: Simon Storage Tyne Terminal	REV A B	DATE 24/09/97 30/05/14	BY MS MM	CHKD DRR PP	APPD DRR MM	CLIENT REF. Tank 24 Road Loading P & I REF. SI347006_SPC SHT 1 OF 2
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ITEM:	Batch Controller (Electronic)	
GENERAL	Tag Number	FM3
	Service	Tank 24 Road Loading
	Area Classification	Zone 1 IIB T4
CONTROLLER	Type	I.S. Two Stage Batch Controller
	INPUTS	
	Pulse / Frequency: No.	1
	Type	Multi-function (See Flowmeter spec. SI347015_SPC)
	Analogue: No.	None
	Type	
	Digital : No.	2
	Type	Remote Start / Stop
	OUTPUTS	
	Analogue: No.	None
	Type	
	Digital : No.	2
	Type	Passive, transistor output
	Communications	None
	Power Supply	24V DC via. I.S. barrier
	Case	Aluminium
	Enclosure Class	IP 65
	Connections	Terminals
	Mounting	Surface
	Electrical Class	Ex II 1 GD EExia IIB/IIC T4
	Certificate Reference	KEMA03ATEX1074X
CONFIGURATION	Front Panel	Keypad
	Remote Programmer	No
	PC software	No
DISPLAY	Type	LCD Preset Quantity, Batch Total Set to read in litres
OPTIONS		
MANUFACTURERS DATA	Supplier	Fluidwell
	Model Number	F130-P-AX-CX-EX-HM-OT-PD-TX-XI-ZX
DOCUMENTATION	See Attached Documentation Specification	

CLIENT:
Simon Storage
Tyne Terminal

REV	DATE	BY	CHKD	APPD
A	24/09/97	MS	DRR	DRR
B	30/05/14	MM	PP	MM

CLIENT REF.
Tank 24 Road Loading
P & I REF.
SI347006_SPC
SHT 2 OF 2

Documentation Requirement

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9.		ELECTRICAL a. Schematic and circuit diagrams. b. Certificates of conformity (to include EMC Directive 89/336/EEC). c. Hazardous area certification.
10.	1 1	INSTRUMENTATION a. Certificates of conformity (to include EMC Directive 89/336/EEC). b. Calibration certificates. c. Hazardous area certification.
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P & I Design Ltd.

Instrument Specification

CLIENT:
Simon Storage
Tyne Terminal

REV	DATE	BY	CHKD	APPD
A	30.09.97	MS	DRR	DRR

CLIENT REF.
Fluorobenzene
P & I REF.
SI347008.SPC
SHT 1 OF 2

ITEM: Electrical
Component

GENERAL Tag Number N/A
Service Fluorobenzene Gantry Audible Alarm
Area Classification Zone 1 IIB T4

UNIT Type Ex Sounder
Supply 24V dc
Case Aluminium Alloy
Connections M20 x 2
Mounting Bracket
Enclosure Class IP 67
Electrical Classification Ex ds IIC T6

OUTPUT Type 107 dB 11 Tones Selectable

OPTIONS

MANUFACTURERS DATA Supplier Radio Spares
Model Number 627-598

DOCUMENTATION See attached Documentation Specification

CLIENT:
Simon Storage
Tyne Terminal

REV DATE BY CHKD APPD
A 30.09.97 MS DRR DRR

CLIENT REF.
Fluorobenzene
P & I REF.
SI347008.SPC
SHT 2 OF 2

Documentation Requirement

Item	Quantity	Description
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Instrument Specification

CLIENT:
Simon Storage
Tyne Terminal

REV	DATE	BY	CHKD	APPD
A	30.09.97	MS	DRR	DRR

CLIENT REF.
Fluorobenzene
P & I REF.
SI347009.SPC
SHT 1 OF 3

ITEM:	Pneumatic Component	
GENERAL	Tag Number Service Area Classification	N/A Fluorobenzene Transfer Valve Manual Isolation Zone 1 IIB T4
UNIT	Type Supply Connections Mounting	Toggle Switch Operated Valve 80 psig 1/8" BSP Foot
OUTPUT	Type	3/2 Valve
OPTIONS		Foot Mounting
MANUFACTURERS DATA	Supplier Model Number	RGS H 123/16F
DOCUMENTATION	See attached Documentation Specification	

P & I Design Ltd.

Instrument Specification

CLIENT:
Simon Storage
Tyne Terminal

REV	DATE	BY	CHKD	APPD
A	30.09.97	MS	DRR	DRR

CLIENT REF.
Fluorobenzene
P & I REF.
SI347009.SPC
SHT 2 OF 3

ITEM:	Pneumatic Component	
GENERAL	Tag Number Service Area Classification	N/A Fluorobenzene Transfer Valve Manual Override Zone 1 IIB T4
UNIT	Type Supply Connections Mounting	Momentary Pushbutton Operated Valve 20 psig 1/8" BSP Foot
OUTPUT	Type	3/2 Valve
OPTIONS		Foot Mounting
MANUFACTURERS DATA	Supplier Model Number	RGS H 123/38F
DOCUMENTATION	See attached Documentation Specification	

CLIENT:
Simon Storage
Tyne Terminal

REV DATE BY CHKD APPD
A 30.09.97 MS DRR DRR

CLIENT REF.
Fluorobenzene
P & I REF.
SI347009.SPC
SHT 3 OF 3

Documentation Requirement

<u>Item</u>	<u>Quantity</u>	<u>Description</u>
1.	-	APPROVAL DOCUMENTATION To be supplied before manufacture commences
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5.	-	RECOMMEND SPARES QUOTATION a. Two years service. b. Commissioning only.
6.	-	INSTALLATION, OPERATING AND MAINTENANCE MANUALS To include calibration instructions where applicable.
7.	-	SOFTWARE a. Programming manual. b. Operating manual.
8.	-	PRESSURE VESSELS Calculation sheets, spark test certificates (for lined vessels),hydraulic test certificates.
9.	-	ELECTRICAL a. Schematic and circuit diagrams. b. Certificates of conformity (to include EMC Directive 89/336/EEC). c. Hazardous area certification.
10.	1	INSTRUMENTATION a. Certificates of conformity (to include EMC Directive 89/336/EEC). - b. Calibration certificates. - c. Hazardous area certification.
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P & I Design Ltd.

Instrument Specification

CLIENT:
Simon Storage
Tyne Terminal

REV	DATE	BY	CHKD	APPD
A	30.09.97	MS	DRR	DRR
B	13.10.97	PJP	DRR	DRR

CLIENT REF.
Fluorobenzene
P & I REF.
SI347010.SPC
SHT 1 OF 2

ITEM:	Pneumatic Component		
GENERAL	Tag Number	N/A	
	Service	Pneumatic Panel Supply	
	Area Classification	Zone 1 IIB T4	
UNIT	B	Type	Filter / Regulator
		Supply	80 psig
		Connections	¼" NPT
		Mounting	Surface via Bracket
OUTPUT		Type	0 - 3.5 Bar
OPTIONS			0 - 1.6 Bar Pressure Gauge
MANUFACTURERS DATA		Supplier	IMI Norgren Ltd
	B	Model Number	
		Regulator	B07-235-A3EG
		Gauge	18-013-010
		Bracket	18-001-053
DOCUMENTATION		See attached Documentation Specification	

CLIENT:
Simon Storage
Tyne Terminal

REV	DATE	BY	CHKD	APPD
A	30.09.97	MS	DRR	DRR
B	13.10.97	PJP	DRR	DRR

CLIENT REF.
Fluorobenzene
P & I REF.
SI347010.SPC
SHT 2 OF 2

Documentation Requirement

<u>Item</u>	<u>Quantity</u>	<u>Description</u>
1.	-	APPROVAL DOCUMENTATION To be supplied before manufacture commences
2.	-	GENERAL ARRANGEMENT DRAWING Cross-sectioned to show all details necessary for repair and maintenance purposes.
3.	-	MATERIALS TEST CERTIFICATES a. Mechanical. b. Chemical analysis.
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P & I Design Ltd.

Instrument Specification

CLIENT:
Simon Storage
Tyne Terminal

REV	DATE	BY	CHKD	APPD
A	30.09.97	MS	DRR	DRR

CLIENT REF.
Fluorobenzene
P & I REF.
SI347011.SPC
SHT 1 OF 3

ITEM

Isolating Unit
(IS)

GENERAL

Tag Number	See Sheet 2
Service	See Sheet 2
Area Classification	Zone 1 IIB T4

UNIT

Type	Solenoid Driver
Supply	24V dc
Number of Channels	1
Input	24V dc
Output	24V dc, 35mA
Hazardous Area Limits:	
Voltage Max/Min	28V / 0
Current Max/Min	35mA / 0

HOUSING

Material	Makrolon
Mounting	DIN Rail
Enclosure Class	General Purpose
Electrical Classification:	
Load	EEx ib IIC T4
Unit	[EEx ia] IIC
Electrical Connection	Screw Terminals

OPTIONS

**MANUFACTURERS
DATA**

Supplier	Pepperl & Fuchs
Model Number	KFD2-SD-Ex1.48

DOCUMENTATION

See Attached Documentation Specification

P & I Design Ltd.

Instrument Specification

CLIENT:
Simon Storage
Tyne Terminal

REV	DATE	BY	CHKD	APPD
A	30.09.97	MS	DRR	DRR

CLIENT REF.
Fluorobenzene
P & I REF.
SI347011.SPC
SHT 2 OF 3

TAG No.	SERVICE	RANGE	COMMENTS
XY001	Batch Controller Power Supply	N/A	
XY002	Batch Controller Power Supply	N/A	

CLIENT:
Simon Storage
Tyne Terminal

REV DATE BY CHKD APPD
A 30.09.97 MS DRR DRR

CLIENT REF.
Fluorobenzene
P & I REF.
SI347011.SPC
SHT 3 OF 3

Documentation Requirement

Item	Quantity	Description
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P & I Design Ltd.

Instrument Specification

CLIENT:
Simon Storage
Tyne Terminal

REV	DATE	BY	CHKD	APPD
A	30.09.97	MS	DRR	DRR
B	23.10.97	PJP	DRR	DRR

CLIENT REF.
Fluorobenzene
P & I REF.
SI347012.SPC
SHT 1 OF 2

ITEM

Isolating Unit
(IS)

GENERAL

Tag Number	XY004
Service	Batch Controller
Area Classification	Zone 1 IIB T4

UNIT

Type	Transformer Isolated
Supply	24V dc
Number of Channels	1
Input	Mechanical Volt Free Contact
Output	Volt Free Changeover Contact
Hazardous Area Limits:	
Voltage Max/Min	10.5V / 0
Current Max/Min	13mA / 0

HOUSING

Material	Makrolon
Mounting	DIN Rail
Enclosure Class	General Purpose
Electrical Classification:	
Load	EEx ib IIC T4
Unit	[EEx ia] IIC
Electrical Connection	Screw Terminals

OPTIONS

**MANUFACTURERS
DATA**

Supplier	Pepperl & Fuchs
B Model Number	KFD2-SR2-Ex1.W

DOCUMENTATION

See Attached Documentation Specification

CLIENT:
Simon Storage
Tyne Terminal

REV	DATE	BY	CHKD	APPD
A	30.09.97	MS	DRR	DRR
B	23.10.97	PJP	DRR	DRR

CLIENT REF.
Fluorobenzene
P & I REF.
SI347012.SPC
SHT 2 OF 2

Documentation Requirement

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Instrument Specification

CLIENT:
Simon Storage
Tyne Terminal

REV	DATE	BY	CHKD	APPD
A	30.09.97	MS	DRR	DRR

CLIENT REF.
Fluorobenzene
P & I REF.
SI347013.SPC
SHT 1 OF 3

ITEM

Isolating Unit
(IS)

GENERAL

Tag Number	See Sheet 2
Service	See Sheet 2
Area Classification	Zone 1 IIB T4

UNIT

Type	Reed Relay
Supply	None
Number of Channels	1
Input	24V dc
Output	2 Off Normally Open Volt Free Contacts
Hazardous Area Limits:	
Voltage Max/Min	N/A
Current Max/Min	500mA / 0

HOUSING

Material	Makrolon
Mounting	DIN Rail
Enclosure Class	IP 20
Electrical Classification:	
Load	EEx ib IIC T4
Unit	[EEx ia] IIC
Electrical Connection	Screw Terminals

OPTIONS

**MANUFACTURERS
DATA**

Supplier	Pepperl & Fuchs
Model Number	ZG40/Ex

DOCUMENTATION

See Attached Documentation Specification

P & I Design Ltd.

Instrument Specification

CLIENT:
Simon Storage
Tyne Terminal

REV DATE BY
A 30.09.97 MS

CHKD APPD
DRR DRR

CLIENT REF.
Fluorobenzene
P & I REF.
SI347013.SPC
SHT 2 OF 3

TAG No.	SERVICE	RANGE	COMMENTS
XY003	Fluorobenzene Batching	N/A	
XY004	Fluorobenzene Batching	N/A	FUTURE

CLIENT:
Simon Storage
Tyne Terminal

REV DATE BY CHKD APPD
A 30.09.97 MS DRR DRR

CLIENT REF.
Fluorobenzene
P & I REF.
SI347013.SPC
SHT 3 OF 3

Documentation Requirement

<u>Item</u>	<u>Quantity</u>	<u>Description</u>
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P & I Design Ltd.

Instrument Specification

CLIENT:
Simon Storage
Tyne Terminal

REV	DATE	BY	CHKD	APPD
A	30.09.97	MS	DRR	DRR

CLIENT REF.
Fluorobenzene
P & I REF.
SI347014.SPC
SHT 1 OF 2

ITEM: Electrical
Component

GENERAL Tag Number CP3
Service Fluorobenzene Gantry Control Unit
Area Classification Zone 1 IIB T4

UNIT Type Control Unit c/w Terminals, Indicator Lamps &
Switches
Supply 24V dc
Case EN Polyester
Connections 1 x M25 & 5 x M20 (Bottom)
Mounting Surface
Enclosure Class IP 65
Electrical Classification EEx de IIC T6

OUTPUT Type One Vertical Row of 38 SAK R Terminals.
See Drawing No. SI347025.
1 x Emergency Stop Pushbutton with 1 NO + 1 NC
Contact (GHG 418 8155 R1200)
3 x Momentary Pushbuttons with 1 NO + 1 NC
Contact (GHG 418 8115 R001)
1 x Control Switch in acc. with Circuit
Arrangement A. (GHG 418 8190 R6002)
1 x Yellow 24V dc light
3 x Red 24V dc lights
4 x Green 24V dc lights

OPTIONS Layout & Label Details **See Drawing No. SI347026.**

MANUFACTURERS DATA Supplier Parmley Graham Ltd
Model Number Ex 48 Control Unit with Built In Components.

DOCUMENTATION See attached Documentation Specification

CLIENT:
Simon Storage
Tyne Terminal

REV DATE BY CHKD APPD
A 30.09.97 MS DRR DRR

CLIENT REF.
Fluorobenzene
P & I REF.
SI347014.SPC
SHT 2 OF 2

Documentation Requirement

Item	Quantity	Description
1.	-	APPROVAL DOCUMENTATION To be supplied before manufacture commences
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9.	-	ELECTRICAL a. Schematic and circuit diagrams. 1 b. Certificates of conformity (to include EMC Directive 89/336/EEC). 1 c. Hazardous area certification.
10.	-	INSTRUMENTATION a. Certificates of conformity (to include EMC Directive 89/336/EEC). - b. Calibration certificates. - c. Hazardous area certification.
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CLIENT:

Simon Storage
Tyne Terminal

REV	DATE	BY	CHKD	APPD	CLIENT REF.
A	30.09.97	MS	DRR	DRR	
B	13.10.97	PJP	DRR	DRR	P & I REF.
C	16.10.97	PJP	DRR	DRR	SI347015_SPC
D	30.05.14	MM	PP	MM	SHT 1 OF 2

ITEM:

Turbine
Flowmeter

GENERAL

Tag Number FM3
Service Tank 24 Road Loading
Area Classification Zone 1 IIB T4
Line Size / Rating / Material 4" / ANSI 150 / 316 St.St.

**MEASURING
ELEMENT**

Material: Body 316 Stainless Steel
Rotor 431 Stainless Steel
Shaft Tungsten Carbide
Shaft Support 316 Stainless Steel
Bearings Tungsten Carbide

Connections: Size 3"
Rating ANSI 150 RF
Type Flanged

Meter: Casing Material Aluminium
Cable Entry 12m. potted cable
Enclosure Class
Power Supply Passive
Electrical Class Ex II 1 G EExia IIC T5
Certificate Reference Baseefa03ATEX0242
Indicator N/A

Pick Off Coil Output Sinusoidal mV output
Pickoffs 1
Accuracy ± 0.5% (Linearity)
Repeatability ± 0.1%
Nominal Flow Range 225 to 2250 litres/min

OPTIONS

None

**PROCESS
DATA**

Fluid Ammonia
Flow Normal 225 to 1250 litres/min
Temperature Maximum / Minimum 30°C / 5°C
Pressure Maximum / Minimum 6Barg / 0 Barg
Specific Gravity TBA
Viscosity TBA

**MANUFACTURERS
DATA**

Supplier Apollo Flow Measurement Ltd.
Model Number RNF-664462-B

DOCUMENTATION

See Attached Documentation Specification

FT#-TUA2.SPC

CLIENT:

Simon Storage
Tyne Terminal

REV	DATE	BY	CHKD	APPD	CLIENT REF.
A	30.09.97	MS	DRR	DRR	
B	13.10.97	PJP	DRR	DRR	P & I REF.
C	16.10.97	PJP	DRR	DRR	SI347015_SPC
D	30.05.14	MM	PP	MM	SHT 2 OF 2

Documentation Requirement

Item	Quantity	Description
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.	1 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.	1 1 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:

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###-FMB6.SPC

P & I Design Ltd.

Instrument Specification

CLIENT: Simon Storage Tyne Terminal	REV A B	DATE 30.09.97 13.10.97	BY MS PJP	CHKD DRR DRR	APPD DRR DRR	CLIENT REF. Fluorobenzene P & I REF. SI347016.SPC SHT 1 OF 2
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ITEM:	Flow Transmitter Differential Pressure (Electronic)	
GENERAL	Tag Number Service Area Classification	FM3 Fluorobenzene Off-loading Zone 1 IIB T4
MEASURING UNIT	Type Material: B Body Trim Connections: B Span Limits	Diaphragm Fill Fluid 316 St. St. Silicon 316 St. St. 316 St. St. Size ¼" Type NPT 0 to 2.5, 0 to 250 mBar
TRANSMISSION	Type Supply Output	Analogue I.S. 24V dc via P&F KFD2-SD-Ex1.48 4 - 20mA
HOUSING	Material Enclosure Class Electrical Classification Electrical Connection	Manufacturer Standard IP67 EEx'i' 20mm ET
OPTIONS	B	St.St. Mounting Bracket & St.St. Vent Valves
PROCESS DATA	Fluid Temperature Max./Min. Temperature Oper. Pressure Max./Min. Pressure Oper. B Measuring Range B Calibrated Range	Fluorobenzene 20°C 20°C 10 / 4 barg 6 barg 0 to 2.5, to 0 to 250 mBar TBA (for use with specification) SI347016
MANUFACTURERS DATA	B Supplier Model Number	Siemens 7MF4422-1DA02-1BB1-ZB11- A02A40
DOCUMENTATION	See Attached Documentation Specification	

CLIENT:
Simon Storage
Tyne Terminal

REV	DATE	BY	CHKD	APPD
A	30.09.97	MS	DRR	DRR
B	13.10.97	PJP	DRR	DRR

CLIENT REF.
Fluorobenzene
P & I REF.
SI347016.SPC
SHT 2 OF 2

Documentation Requirement

<u>Item</u>	<u>Quantity</u>	<u>Description</u>
1.	-	APPROVAL DOCUMENTATION To be supplied before manufacture commences
2.	-	GENERAL ARRANGEMENT DRAWING Cross-sectioned to show all details necessary for repair and maintenance purposes.
3.	-	MATERIALS TEST CERTIFICATES a. Mechanical. b. Chemical analysis.
4.	-	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.	-	RECOMMEND SPARES QUOTATION a. Two years service. b. Commissioning only.
6.	1	INSTALLATION, OPERATING AND MAINTENANCE MANUALS To include calibration instructions where applicable.
7.	-	SOFTWARE a. Programming manual. b. Operating manual.
8.	-	PRESSURE VESSELS Calculation sheets, spark test certificates (for lined vessels),hydraulic test certificates.
9.	-	ELECTRICAL a. Schematic and circuit diagrams. b. Certificates of conformity (to include EMC Directive 89/336/EEC). c. Hazardous area certification.
10.	1 1	INSTRUMENTATION a. Certificates of conformity (to include EMC Directive 89/336/EEC). b. Calibration certificates. c. Hazardous area certification.
11.	-	SPECIAL REQUIREMENTS

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P & I Design Ltd.

Instrument Specification

CLIENT:
Simon Storage
Tyne Terminal

REV	DATE	BY	CHKD	APPD
A	30.09.97	MS	DRR	DRR

CLIENT REF.
Fluorobenzene
P & I REF.
SI347017.SPC
SHT 1 OF 2

ITEM: Electrical
Component

GENERAL Tag Number FJB27
Service Fluorobenzene Batching Junction Box
Area Classification Zone 1 IIB T4

UNIT Type Sheet Steel Enclosure (2 gland plates)
Supply 24V dc
Case Sheet Steel Zinc Sprayed
Connections See below
Mounting Surface
Enclosure Class IP66
Electrical Classification EEx'i'

OUTPUT Type

OPTIONS Enclosure to be fitted with one vertical row of Blue SAK2.5 terminals. Screen Earth Bar to be Fitted with 20 off ZB4 Earth Clamps. Terminal content and arrangement as Drg. No. **SI347027 Rev A**
Enclosure to be drilled for the following gland entries.
6 x 20mm, 3 Plugged (Bottom)
1 x 25mm (Bottom)
1 x 32mm (Bottom)

MANUFACTURERS DATA Supplier J Hemy Systems
Model Number Klippon TB11

DOCUMENTATION See attached Documentation Specification

CLIENT:
Simon Storage
Tyne Terminal

REV DATE BY CHKD APPD
A 30.09.97 MS DRR DRR

CLIENT REF.
Fluorobenzene
P & I REF.
SI347017.SPC
SHT 2 OF 2

Documentation Requirement

Item	Quantity	Description
1.	-	APPROVAL DOCUMENTATION To be supplied before manufacture commences
2.	-	GENERAL ARRANGEMENT DRAWING Cross-sectioned to show all details necessary for repair and maintenance purposes.
3.	-	MATERIALS TEST CERTIFICATES a. Mechanical. b. Chemical analysis.
4.	-	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.	-	RECOMMEND SPARES QUOTATION a. Two years service. b. Commissioning only.
6.	-	INSTALLATION, OPERATING AND MAINTENANCE MANUALS To include calibration instructions where applicable.
7.	-	SOFTWARE a. Programming manual. b. Operating manual.
8.	-	PRESSURE VESSELS Calculation sheets, spark test certificates (for lined vessels),hydraulic test certificates.
9.	-	ELECTRICAL a. Schematic and circuit diagrams. 1 b. Certificates of conformity (to include EMC Directive 89/336/EEC). - c. Hazardous area certification.
10.	-	INSTRUMENTATION a. Certificates of conformity (to include EMC Directive 89/336/EEC). b. Calibration certificates. c. Hazardous area certification.
11.	-	SPECIAL REQUIREMENTS

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P & I Design Ltd.

Instrument Specification

CLIENT:
Simon Storage
Tyne Terminal

REV	DATE	BY	CHKD	APPD
A	30.09.97	MS	DRR	DRR
B	04.11.97	PJP	DRR	DRR

CLIENT REF.
Fluorobenzene
P & I REF.
SI347018.SPC
SHT 1 OF 2

ITEM: Electrical Component

GENERAL Tag Number BJB09
Service Road Loading Pump Junction Box
Area Classification Zone 1 IIB T4

UNIT Type Sheet Steel Enclosure (2 gland plates)
B Supply 24V DC
Case Sheet Steel Zinc Sprayed
Connections See below
Mounting Surface
Enclosure Class IP66
Electrical Classification EEx'e' II T6

OUTPUT Type

OPTIONS Enclosure to be fitted with one vertical row of SAK2.5 terminals.
Terminal content and arrangement as Drg. No. **SI347028 Rev A**
Enclosure to be drilled for the following gland entries.
2 x 25mm (Bottom)
2 x 20mm (Bottom)

MANUFACTURERS DATA Supplier J Hemy Systems
Model Number Klippon TB12EX

DOCUMENTATION See attached Documentation Specification

CLIENT:
Simon Storage
Tyne Terminal

REV	DATE	BY	CHKD	APPD
A	30.09.97	MS	DRR	DRR
B	04.11.97	PJP	DRR	DRR

CLIENT REF.
Fluorobenzene
P & I REF.
SI347018.SPC
SHT 2 OF 2

Documentation Requirement

<u>Item</u>	<u>Quantity</u>	<u>Description</u>
1.	-	APPROVAL DOCUMENTATION To be supplied before manufacture commences
2.	-	GENERAL ARRANGEMENT DRAWING Cross-sectioned to show all details necessary for repair and maintenance purposes.
3.	-	MATERIALS TEST CERTIFICATES a. Mechanical. b. Chemical analysis.
4.	-	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.	-	RECOMMEND SPARES QUOTATION a. Two years service. b. Commissioning only.
6.	-	INSTALLATION, OPERATING AND MAINTENANCE MANUALS To include calibration instructions where applicable.
7.	-	SOFTWARE a. Programming manual. b. Operating manual.
8.	-	PRESSURE VESSELS Calculation sheets, spark test certificates (for lined vessels),hydraulic test certificates.
9.	-	ELECTRICAL a. Schematic and circuit diagrams. 1 b. Certificates of conformity (to include EMC Directive 89/336/EEC). 1 c. Hazardous area certification.
10.	-	INSTRUMENTATION a. Certificates of conformity (to include EMC Directive 89/336/EEC). b. Calibration certificates. c. Hazardous area certification.
11.	-	SPECIAL REQUIREMENTS

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P & I Design Ltd.

Instrument Specification

CLIENT: Simon Storage Tyne Terminal	REV A B	DATE 30.09.97 13.10.97	BY MS PJP	CHKD DRR DRR	APPD DRR DRR	CLIENT REF. Fluorobenzene P & I REF. SI347020.SPC SHT 1 OF 3
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ITEM: Temperature Switch

GENERAL Tag Number See Sheet 2
Service See Sheet 2
Area Classification Zone 1 IIB T4

DETECTOR ELEMENT Type Filled System
Material : Diaphragm Manufacturers Standard
Wetted Parts 316 Stainless Steel

B Process Connection 1" ANSI 150lb
Mounting Horizontal

SWITCH Type Microswitch
Form SPCO
Rating 5A
Action Contacts Open on Rising Temperature
Set Point 25°C
Adjustable Range 20°C / 70°C
Switching Differential 6°C to 9°C with Pocket

HOUSING Material Die Cast Aluminium
Enclosure Class Weatherproof
Electrical Classification EExd IIB + H2 T6
Electrical Connection M20 Conduit Thread to BS3643

OPTIONS B Thermowell

PROCESS DATA Fluid Fluorobenzene
Temperature Maximum 20°C
Temperature Minimum 20°C
Pressure Maximum 10 barg
Pressure Minimum 4 barg

MANUFACTURERS DATA B Supplier Pyropress
Model Number TF171A3B/200MT/SA1XA

DOCUMENTATION See Attached Documentation Specification

P & I Design Ltd.

Instrument Specification

CLIENT:
Simon Storage
Tyne Terminal

REV	DATE	BY	CHKD	APPD
A	30.09.97	MS	DRR	DRR
B	13.10.97	PJP	DRR	DRR

CLIENT REF.
Fluorobenzene
P & I REF.
SI347020.SPC
SHT 2 OF 3

TAG No.	SERVICE	RANGE	COMMENTS
TP88	J88 Road Loading Pump Temperature Switch	20 / 70°C	Max. Temp. 150°C
TP89	J89 OffLoading Pump Temperature Switch	20 / 70°C	Max. Temp. 150°C

CLIENT:
Simon Storage
Tyne Terminal

REV	DATE	BY	CHKD	APPD
A	30.09.97	MS	DRR	DRR
B	13.10.97	PJP	DRR	DRR

CLIENT REF.
Fluorobenzene
P & I REF.
SI347020.SPC
SHT 3 OF 3

Documentation Requirement

<u>Item</u>	<u>Quantity</u>	<u>Description</u>
1.	-	APPROVAL DOCUMENTATION To be supplied before manufacture commences
2.	-	GENERAL ARRANGEMENT DRAWING Cross-sectioned to show all details necessary for repair and maintenance purposes.
3.	-	MATERIALS TEST CERTIFICATES a. Mechanical. b. Chemical analysis.
4.	-	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.	-	RECOMMEND SPARES QUOTATION a. Two years service. b. Commissioning only.
6.	1	INSTALLATION, OPERATING AND MAINTENANCE MANUALS To include calibration instructions where applicable.
7.	-	SOFTWARE a. Programming manual. b. Operating manual.
8.	-	PRESSURE VESSELS Calculation sheets, spark test certificates (for lined vessels),hydraulic test certificates.
9.	-	ELECTRICAL a. Schematic and circuit diagrams. b. Certificates of conformity (to include EMC Directive 89/336/EEC). c. Hazardous area certification.
10.	1 - 1	INSTRUMENTATION a. Certificates of conformity (to include EMC Directive 89/336/EEC). b. Calibration certificates. c. Hazardous area certification.
11.	-	SPECIAL REQUIREMENTS

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P & I Design Ltd.

Valve Specification

CLIENT: Simon Storage Tyne Terminal	REV	DATE	BY	CHKD	APPD	CLIENT REF. Tank 24 Road Loading
	A	19.06.14	MM	DSR	MM	P & I REF.
	B	24.06.14	MM	DSR	MM	SI347021_SPC
	C	25.06.14	MM	DSR	MM	SHT 1 OF 2

ITEM	Control Valve (Rotary Ball Valve)	
GENERAL	Valve Tag Number Service Line Size /Rating/Material	Tank 24 Road Loading 3" / ANSI 150 / 316 Stainless Steel
BODY	Type Bore Connections Size Type Rating Materials Body Ball Stem Seats Thrust Seal Gland Packing Body Seal	Floating Ball Full Bore 3" Flanged ANSI B16.5 150Rf A351 CF8M Stainless Steel 316 Stainless Steel 316 Stainless Steel PTFE PTFE / Graphoil PTFE / Graphoil PTFE / Graphoil
ACTUATOR	Model & Size Type Action :Open / Close Fail Position	TBA Pneumatic Quarter Turn, Single Acting Air to Open Closed
POSITIONER	Model & Size Type Input Action Air Supply	PMV P5 Pneumatic 3 – 15psig Linear 80psig
OPTIONS		
PROCESS DATA	Fluid Type Flowrate Maximum Valve Pressure Drop Inlet Pressure Max. / Min. Temperature Max. / Min. Viscosity Max. / Min. Calculated C _v Max. Valve Rated C _v Max.	Ammonia Liquor Liquid 60m ³ /h 0.5bar 10 /5 barg 40 / 5°C
MANUFACTURERS DATA	Supplier Model Number :	John Clark Valves Valve : Dafram 150TC/TM Actuator : TBA Positioner PMV
DOCUMENTATION	See Attached Documentation Specification	

CV#-BVA2.SPC

CLIENT: Simon Storage Tyne Terminal	REV	DATE	BY	CHKD	APPD	CLIENT REF. Tank 24 Road Loading P & I REF. SI347021_SPC SHT 2 OF 2
	A	19.06.14	MM	DSR	MM	
	B	24.06.14	MM	DSR	MM	
	C	25.06.14	MM	DSR	MM	

Documentation Requirement

Item	Quantity	Description
1.	n/a	APPROVAL DOCUMENTATION To be supplied before manufacture commences
2.	n/a	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.	1	RECOMMEND SPARES QUOTATION a. Two years service. b. Commissioning only.
6.	1 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.	1 1 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


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###-FMB6.SPC

P & I Design Ltd

Project Ref : SI347001.CAL
Cable Ref : FS88/J88 7.5kW Pump

Date : Wed, 08/10/97 12:33:08
Revision : A 

Project Information

Supply Voltage : 415/240V 3 Phase 50Hz
Max Voltdrop : 16.63 Volts Phase Fault Current : 16 kA At 0.25 P.F
Cable Type : Multi Core XLPE.SWA.PVC Cu Table 4E4
Installed Method : Single layer on cable tray Touching '11'
Length of Run : 100 Mtrs
Load Type : DOL motor, three phase
Design Current : 14.47 A At 0.80 P.F
Protective Device : BS Devices BS 88 Fuse gG (General) HRC

Calculation Results Summary

Cable Size : 4.00mm² No. of Cores : 3 No cables in parallel
Cable Rating : 44.00 A
Max Length : 138.00 m
VoltDrop : 12.03 V (at P.F 0.80)
: With 1 parallel CPC, size 2.50mm²
Max Zs : 1.41 Ohms
Device Rating : 40 A
EF Disc Time : 2.72 S
Max Disc Time : 5.00 S

CALCULATED IN ACCORDANCE WITH IEE 16th EDITION REGULATIONS

Software by Amtech Computer Systems Ltd

P & I Design Ltd

Project Ref : SI347001.CAL
Cable Ref : FS88/J88 7.5kW Pump

Date : Wed, 08/10/97 12:33:08
Revision : A *JK*

Project Information

Supply Voltage : 415/240V 3 Phase 50Hz
Max Voltdrop : 16.63 Volts 4.00 %
PSCC at Source : 16.000 kA At 0.25 P.F

Cable : Multi Core XLPE.SWA.PVC Cu Table 4E4
Installed Method : Single layer on cable tray Touching '11'
Length of Run : 100 Mtrs

Load Type : DOL motor, three phase
Design Current : 14.47 A At 0.80 P.F
Protective Device : BS Devices BS 88 Fuse gG (General) HRC

Calculation Results

Cable Size : 3 c 4.00 mm² No cables in parallel

VoltDrop : 12.0301 V (at P.F 0.80)

CPC Used

(equivalent) armour 6.76 mm² (equivalent) cond/trunk 0.00 mm²

With 1 parallel CPC, size 2.50mm²

Ca 1.00	Cg 1.00	Max Zs 1.409 Ohms	Max Length (V.D) 138.00 m
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Design Current 14.47 A	Device Rating 40.00 A	Min Cable Rating 15.00 A	Actual Rating 44.00
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R1 0.7376000 Ohms	R2 0.518054 Ohms	Ze 0.015000 Ohms	Zs 1.259488 Ohms
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Earth Fault Current 191 A	Disc Time 2.7230s	Max Disc Time 5.0s	Max PSCC 16000 A
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Minimum CPC using Adiabatic 2.20 mm ² (Cable Equivalent)	Minimum CPC using 54G 4.00 mm ² (Cable Equivalent)
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PSCC Load end min = 280 A	max = 516 A	Disconnection time 0.40s	Maximum allowable time: 4.2s
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CALCULATED IN ACCORDANCE WITH IEE 16th EDITION REGULATIONS

P & I Design Ltd

Project Ref : SI347002.CAL
Cable Ref : FS89/J89 7.5kW Pump

Date : Wed, 08/10/97 12:34:24
Revision : A 

Project Information

Supply Voltage : 415/240V 3 Phase 50Hz
Max Voltdrop : 16.63 Volts Phase Fault Current : 16 kA At 0.25 P.F
Cable Type : Multi Core XLPE.SWA.PVC Cu Table 4E4
Installed Method : Single layer on cable tray Touching '11'
Length of Run : 200 Mtrs
Load Type : DOL motor, three phase
Design Current : 14.47 A At 0.80 P.F
Protective Device : BS Devices BS 88 Fuse gG (General) HRC

Calculation Results Summary


Cable Size : 6.00mm² No. of Cores : 3 No cables in parallel
Cable Rating : 56.00 A
Max Length : 209.00 m
VoltDrop : 15.84 V (at P.F 0.80)
: With 1 parallel CPC, size 10.00mm²
Max Zs : 1.41 Ohms
Device Rating : 40 A
EF Disc Time : 4.53 S
Max Disc Time : 5.00 S

CALCULATED IN ACCORDANCE WITH IEE 16th EDITION REGULATIONS

Software by Amtech Computer Systems Ltd

P & I Design Ltd

Project Ref : SI347002.CAL
Cable Ref : FS89/J89 7.5kW Pump

Date : Wed, 08/10/97 12:34:24
Revision : A 

Project Information

Supply Voltage : 415/240V 3 Phase 50Hz
Max Voltdrop : 16.63 Volts 4.00 %
PSCC at Source : 16.000 kA At 0.25 P.F

Cable : Multi Core XLPE.SWA.PVC Cu Table 4E4
Installed Method : Single layer on cable tray Touching '11'
Length of Run : 200 Mtrs

Load Type : DOL motor, three phase
Design Current : 14.47 A At 0.80 P.F
Protective Device : BS Devices BS 88 Fuse gG (General) HRC

Calculation Results

Cable Size : 3 c 6.00 mm² No cables in parallel

VoltDrop : 15.8397 V (at P.F 0.80)

CPC Used

(equivalent) armour 7.40 mm² (equivalent) cond/trunk 0.00 mm²

With 1 parallel CPC, size 10.00mm²

Ca 1.00	Cg 1.00	Max Zs 1.409 Ohms	Max Length (V.D) 209.00 m
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Design Current 14.47 A	Device Rating 40.00 A	Min Cable Rating 15.00 A	Actual Rating 56.00
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R1 0.9856000 Ohms	R2 0.396666 Ohms	Ze 0.015000 Ohms	Zs 1.386093 Ohms
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Earth Fault Current 173 A	Disc Time 4.5346s	Max Disc Time 5.0s	Max PSCC 16000 A
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Minimum CPC using Adiabatic 2.58 mm ² (Cable Equivalent)	Minimum CPC using 54G 6.00 mm ² (Cable Equivalent)
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PSCC Load end min = 210 A	max = 387 A	Disconnection time 1.64s	Maximum allowable time: 16.7s
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CALCULATED IN ACCORDANCE WITH IEE 16th EDITION REGULATIONS

CLIENT:

SIMON STORAGE

TYNE TERMINAL

REV

A

DATE

25-07-97

BY

MS

CHKD

DRR

APPD

DRR

CLIENT REF.
FLUOROBENZENE

P & I REF.
SI347003-CAL

SHT 1 OF 1

TITLE: 24V DC POWER SUPPLY CALCULATION

BASIS

THIS CALCULATION IS TO DEFINE THE POWER SUPPLY REQUIREMENTS AND FUSE RATINGS FOR THE FLUOROBENZENE GANTRY/TANK 24 SYSTEM.

CURRENT CONSUMPTION

<u>DEVICE</u>	<u>CURRENT</u>	<u>QTY</u>	<u>DIVERSITY</u>	<u>TOTAL</u>
PILZ RELAY	0.07A	1	1/1	0.07A
RGS EPA 100	0.1A	1	1/1	0.1A
LIGHTS	0.1A	8	6/8	0.6A
RELAYS	0.04A	20	20/20	0.8A
ISOLATION BARRIER	0.04A	1	1/1	0.04A
REED RELAY BARRIER	0.01A	1	1/1	0.01A
POWER SUPPLY BARRIER	0.03A	2	2/2	0.06A
VEGA LEVEL SWITCHES	0.01A	2	2/2	0.02A
HORN	0.3A	1	1/1	0.3A
<u>TOTAL</u>				<u>2A</u>

POWER SUPPLY SELECTED :- 5A

FUSE PROTECTION

<u>24V FUSE No.</u>	<u>MAX. CONSUMPTION</u>	<u>SELECTED RATING</u>
1	0.27A	0.5A
2	0.36A	0.5A
3	0.04A	0.1A
4	0.04A	0.1A
5	0.35A	0.5A
6	1.26A	2A
7	0.06A	0.5A

<u>240V FUSE No.</u>	<u>MAX. CONSUMPTION</u>	<u>SELECTED RATING</u>
1	0.01A	0.5A
2	0.01A	0.5A

Contents

1	INTRODUCTION	4
2	SCOPE.....	4
3	CALCULATION DATA & METHOD	5
3.1	Switch Amplifier	5
3.2	Capacitive Sensor	6
3.3	Inductive Sensor	7
3.4	Cabling	8

Appendix I

16115CAL002A - Intrinsically Safe Calculation spreadsheet (inductive sensor)

16115CAL003A - Intrinsically Safe Calculation spreadsheet (capacitive sensor)

ATEX certificate: PTB 00 ATEX 2048 X. Pepperl & Fuchs, Inductive sensor.

ATEX certificate: TÜV 03 ATEX 2003 X. Pepperl & Fuchs, Capacitive sensor.

ATEX certificate: BASEEFA 06 ATEX 0092. Pepperl & Fuchs, Switch amplifier.



REVISION HISTORY

Revision	A	
Description	Original Issue	
By	D. Hill	D Hill
Checked	M. Morgan	M Morgan
Approved	M. Morgan	M Morgan
Revision		
Description		
By		
Checked		
Approved		



1 INTRODUCTION

This calculation has been produced in accordance with the requirements of BS EN 60079.

This calculation has been produced on the basis of all new cabling being installed and thus utilising BS 5308 standard instrument cable.

2 SCOPE

This calculation applies to two sensors, both connected to junction box FJB27, which receives power from a switch amplifier isolator, ensuring the loops are intrinsically safe. These sensors together make a high-level detection system for road tanker filling. An inductive sensor detects that the filling arm has been correctly inserted onto the road tanker and a capacitive sensor detects when the high level in the road tanker has been reached.



3 CALCULATION DATA & METHOD

P&I Design Ltd. utilise an in-house template spreadsheet for performing the verification calculation. See Appendix 1.

The following data has been collected from the client, manufacturers' datasheets and ATEX certificates.

3.1 Switch Amplifier

Manufacturer: Pepperl+Fuchs

Model: KCD2-SR-Ex2

Certification: ExII 1G EEx ia IIC

Certificate No.: BASEEFA 06 ATEX 0092

The data collected from the ATEX certificate for use in 16115CAL002 and 16115CAL003 has been highlighted below.

<u>Hazardous Area Terminals 1 w.r.t. 2 (Channel 1)</u>			
<u>Or</u>			
<u>Hazardous Area Terminals 3 w.r.t. 4 (Channel 2 – KCD2-SR-Ex2 model only)</u>			
U_o	=	10.5V	U_i = 12V
I_o	=	17.1mA	
P_o	=	45mW	
GROUP	CAPACITANCE (μ F)	INDUCTANCE (mH)	OR L/R RATIO (μ H/ohm)
IIC	2.41	121.5	801
IIB	16.8	486.3	1,628
IIA	75.0	972.7	1,628
I	73.1	1,000	1,628

Figure 1: Data from ATEX Certificate BASEEFA 06 ATEX 0092. Yellow highlighting shows data used.



3.2

Capacitive Sensor

Manufacturer: Pepperl+Fuchs
 Model: CJ4-12GK-N
 Certification: ExII 1G EEx ia IIC T6
 Certificate No.: TÜV 03 ATEX 2003 X

Supplement 2 to the ATEX Certificate confirms that this model of sensor falls into Category 1.

This sensor cannot be classified as Type 1 from the ATEX Certificate as the power supplied by the isolator (45mW) is higher than the input power for Type 1 (34mW). Type 2 satisfies input voltage, current and power considerations while giving a very conservative ambient temperature limit of 49°C to achieve T6.

The data collected from the ATEX Certificate for use in 16115CAL002 and 16115CAL003 has been highlighted below:

		Type 1 $U_i = 16\text{ V}$ $I_i = 25\text{ mA}$ $P_i = 34\text{ mW}$			Type 2 $U_i = 16\text{ V}$ $I_i = 25\text{ mA}$ $P_i = 64\text{ mW}$			Type 3 $U_i = 16\text{ V}$ $I_i = 52\text{ mA}$ $P_i = 169\text{ mW}$			Type 4 $U_i = 16\text{ V}$ $I_i = 76\text{ mA}$ $P_i = 242\text{ mW}$		
		Maximum permissible ambient temperature in °C when used in temperature class											
Type	C/ nF	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1
CBN2-F46-N...	45	56	68	78	50	62	72	29	41	51	15	27	37
CCN2-F46A-N...	45	56	68	78	50	62	72	29	41	51	15	27	37
CBN5-F46-N...	45	56	68	78	50	62	72	29	41	51	15	27	37
CCN5-F46A-N...	45	56	68	78	50	62	72	29	41	51	15	27	37
CBN10-F46-N...	45	56	68	78	50	62	72	29	41	51	15	27	37
CCN10-F46A-N...	45	56	68	78	50	62	72	29	41	51	15	27	37
CCB10-30GM...-N...	155	57	69	96	53	65	88	37	49	61	25	37	43
CJ 1-12GK-N...	60	56	68	96	49	61	89	28	40	68	13	25	53
CJ 2-18GK-N...	60	56	68	96	49	61	89	28	40	68	13	25	53
CJ 4-12GK-N...	60	56	68	96	49	61	89	28	40	68	13	25	53
CJ 6-18GK-N...	60	56	68	96	49	61	89	28	40	68	13	25	53
CJ 15-40-N...	145	57	69	97	52	64	92	36	48	76	25	37	61
CJ 40-FP-N...	150	57	69	97	52	64	92	36	48	76	25	37	61

Table 1: A Table from ATEX Certificate TÜV 03 ATEX 2003 X. Yellow Highlighting shows data used.

The data collected from the sensor’s datasheet for use in 16115CAL002 and 16115CAL003 is shown below:

Effective internal inductivity C_i ≤ 60 nF ; a cable length of 10 m is considered.
 Effective internal inductance L_i negligibly small
 A cable length of 10 m is considered.

Figure 2: Selected data from CJ4-12GK-N datasheet.



3.3 Inductive Sensor

Manufacturer: Pepperl+Fuchs
 Model: NCB15-30GM40-N0-V1
 Certification: ExII 1G EEx ia IIC T6
 Certificate No.: PTB 00 ATEX 2048 X

Supplement 6 to the ATEX Certificate confirms that this model of sensor falls into Category 1.

This sensor cannot be classified as Type 1 from the ATEX Certificate as the power supplied by the isolator (45mW) is higher than the input power for Type 1 (34mW). Type 2 satisfies input voltage, current and power considerations as well as giving a very conservative ambient temperature limit of 52°C to achieve T6

The data collected from the ATEX certificates for use in 16115CAL002 and 16115CAL003 has been highlighted below.

type 1	type 2	type 3	type 4
$U_i = 16 \text{ V}$	$U_i = 16 \text{ V}$	$U_i = 16 \text{ V}$	$U_i = 16 \text{ V}$
$I_i = 25 \text{ mA}$	$I_i = 25 \text{ mA}$	$I_i = 52 \text{ mA}$	$I_i = 76 \text{ mA}$
$P_i = 34 \text{ mW}$	$P_i = 64 \text{ mW}$	$P_i = 169 \text{ mW}$	$P_i = 242 \text{ mW}$

Type			Type 1					Type 2					Type 3					Type 4				
	Ci/	Li/	T6	T5	T4	T3	T2-T1	T6	T5	T4	T3	T2-T1	T6	T5	T4	T3	T2-T1	T6	T5	T4	T3	T2-T1
	nF	μH																				
NCB1,5-...M...NO...	90	100	57	69	97	97	97	52	64	92	92	92	34	46	74	74	74	22	34	62	62	62
NCB2-12GM...-NO...	90	100	59	71	99	99	99	56	68	96	96	96	45	57	81	81	81	37	49	63	63	63
NCB4-12GM...-NO...	120	50	57	69	97	97	97	52	64	92	92	92	34	46	74	74	74	22	34	52	52	52
NCN4-12GM...-NO...	95	100	59	71	99	99	99	56	68	96	96	96	45	57	81	81	81	37	49	63	63	63
NCB5-18GM...-NO...	95	100	59	71	99	99	99	56	68	96	96	96	45	57	81	81	81	37	49	63	63	63
NCB8-18GM...-NO...	120	50	57	69	97	97	97	52	64	92	92	92	34	46	74	74	74	22	34	52	52	52
NCN8-18GM...-NO...	95	100	59	71	99	99	99	56	68	96	96	96	45	57	81	81	81	37	49	63	63	63
NCB10-30GM...-NO...	105	100	59	71	99	99	99	56	68	96	96	96	45	57	81	81	81	37	49	63	63	63
NCB15-30GM...-NO...	120	150	57	69	97	97	97	52	64	92	92	92	34	46	74	74	74	22	34	52	52	52
NCN15-30GM...-NO...	110	100	59	71	99	99	99	56	68	96	96	96	45	57	81	81	81	37	49	63	63	63

Figure 3: Data from Supplement 6 to the ATEX Certificate PTB 00 ATEX 2048 X. Yellow highlighting shows data used.



3.4 Cabling

The following cable descriptions, obtained from SI347100.SCH and SI347001_DWG were used to select the cable’s electrical data:

- A 10-pair individually screened cable with an area of 1.5mm², connecting the isolator and the junction box.
- A 2-pair collectively screened cable with an area of 1.5mm², connecting the junction box and the sensor.

The standard approach to performing the intrinsically safe circuit calculation is to use cable data from BS 5308 based on the number of cable pairs, the type of screening and the conductor size. The data has been summarised below:

Conductor Size	L/R Ratio (maximum)	Maximum mutual capacitance			Resistance
		Cables without screens	Cables with only collective screens (except one pair and two pair)	One pair and two pair cables collectively screened and all cables with individually screened pairs	
0.5 mm ²	25 μH/Ω	75 pF/m	75 pF/m	115 pF/m	13.7 Ω/km
1.0 mm ²	25 μH/Ω	75 pF/m	75 pF/m	115 pF/m	18.4 Ω/km
1.5 mm ²	40 μH/Ω	85 pF/m	85 pF/m	115 pF/m	12.3 Ω/km

Table 2: A Summary Table from BS 5308. Yellow highlighting shows data used.

Note that:

- The same data is suitable for both cables.
- The inductance value used in 16115CAL002 and 16115CAL003 is the product of the L/R Ratio and the Resistance.



Appendix I

16115CAL002A - Intrinsically Safe Calculation spreadsheet (inductive sensor)

16115CAL003A - Intrinsically Safe Calculation spreadsheet (capacitive sensor)

ATEX certificate: PTB 00 ATEX 2048 X. Pepperl & Fuchs, Inductive sensor.

ATEX certificate: TÜV 03 ATEX 2003 X. Pepperl & Fuchs, Capacitive sensor.

ATEX certificate: BASEEFA 06 ATEX 0092. Pepperl & Fuchs, Switch amplifier.





**INTRINSICALLY SAFE
CIRCUIT CALCULATION**

**CAPACITIVE SENSOR
AND SWITCH AMPLIFIER ISOLATOR**

Customer:	INTER TERMINALS LTD				
Plant:	TYNE TERMINAL	A	DJH	MM	MM
Project :	16115	Rev	BY	Check	App
Calculation N° :	16115CAL002	Sheet :	1	of	1
					02.02.17
					Date

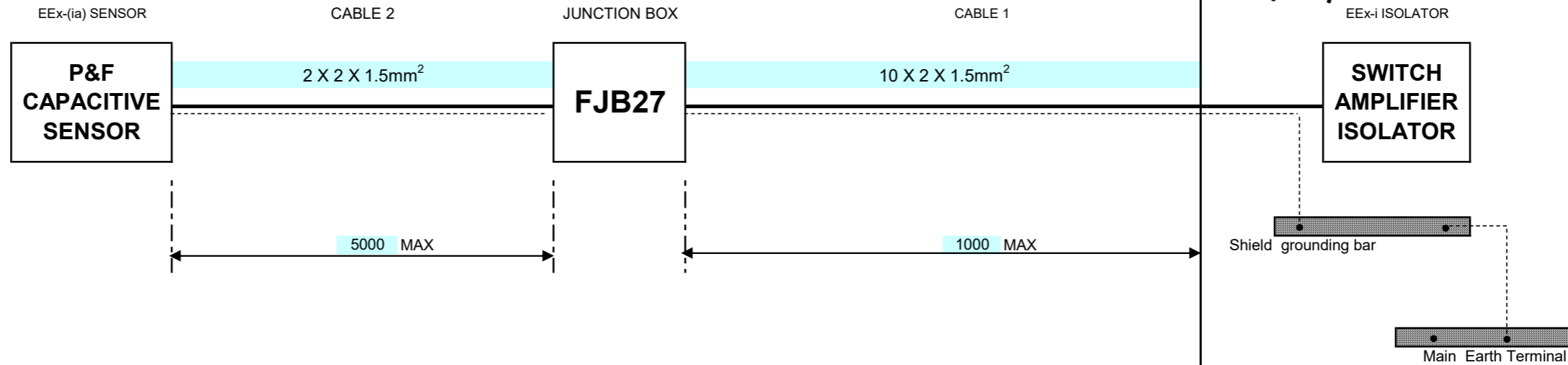
Loop Sheet No.

SI347001_DWG_REVD

HAZARDOUS AREA

SAFE AREA

Zone		Gas Group	Temperature Class
0	1	IIB	T4
Process	Electronics		



	Cable 2	Cable 1	Cable 1 + Cable 2	
Supply by	Inter Terminals			Inter Terminals
Specification		BS5308 Part 1 Type 2	BS5308 Part 1 Type 2	
Manufacturer	Pepperl+Fuchs			Pepperl+Fuchs
Model	CJ4-12GK-N		CP2/FJB27	KCD2-SR-Ex2
Description	Capacitive sensor	Multiple twisted pairs - SWA armoured	Multiple twisted pairs - SWA armoured	Switch Amplifier
Certification	Ex II 1 G EEx ia IIC T6			Ex II (1) G D [EEx ia] IIC
Certificate No.	TUV 03 ATEX 2003 X	Cable Calculations: Leq = (Cable mH/km x 2 x Cable Length in m /1000) + Field Instrument mH Ce _q = (Cable μF/km x Cable Length in m /1000) + Field Instrument Mf		BASEEFA 06 ATEX 0092
Voltage	U _i : 16.0 V	Cc ₂ : 0.115 μF/km => 0.5750 μF	Cc ₁ : 0.115 μF/km => 0.1150 μF	Cc _t : 0.6900 μF
I current	I _i : 25 mA	Lc ₂ : 2 x 0.4920 mH/km => 4.9200 mH	Lc ₁ : 2 x 0.4920 mH/km => 0.9840 mH	Lc _t : 5.9040 mH
Power	P _i : 0.06 W	Lc ₂ /Rc ₂ : 0.040 mH/Ω	Lc ₁ /Rc ₁ : 0.040 mH/Ω	Lc _t /Rc _t :
Capacitance	C _i : 0.0600 μF	Rc ₂ : 2 x 12.30 Ω/km => 123.00 Ω	Rc ₁ : 2 x 12.30 Ω/km => 24.600 Ω	Rc _t : 147.600 Ω
Inductance	L _i : 0.0000 mH			
L/R				
Resistance	R _i : Ω			R _o : Ω

Verification Checks	Verification Calculations	Final calculation result
Plant Zone Process ≥ Inst. Zone Process	0 > 0	OK
Plant Zone Elect. ≥ Inst. Zone Elect.	1 > 0	OK
Plant Gas Group ≤ Inst. Gas Group	IIB ≤ IIC	OK
Plant Temp Class ≤ Inst. Temp Class	T4 ≤ T6	OK
U _o ≤ U _i	10.5 V ≤ 16.0 V	OK
I _o ≤ I _i	17.1 mA ≤ 25 mA	OK
P _o ≤ P _i	0.045 W ≤ 0.06 W	OK
Co ≥ (Ci+Cct) Ce _q	2.4100 μF ≥ 0.75000 μF	OK
Lo ≥ (Li+Lct) Le _q	121.5 mH ≥ 5.90400 mH	OK
Lo/Ro ≥ Lct/Rct		OK
THIS VERIFICATION IS NOT NECESSARY AS THE OTHER RELATIONSHIPS (CAPACITANCE, INDUCTANCE AND RESISTANCE) ARE VERIFIED		VERIFIED



**INTRINSICALLY SAFE
CIRCUIT CALCULATION**

**INDUCTIVE SENSOR
AND SWITCH AMPLIFIER ISOLATOR**

Customer:	INTER TERMINALS LTD				
Plant:	TYNE TERMINAL	A	DJH	MM	MM
Project :	16115	Rev	BY	Check	App
Calculation N° :	16115CAL003	Sheet :	1	of	1
					02.02.17
					Date

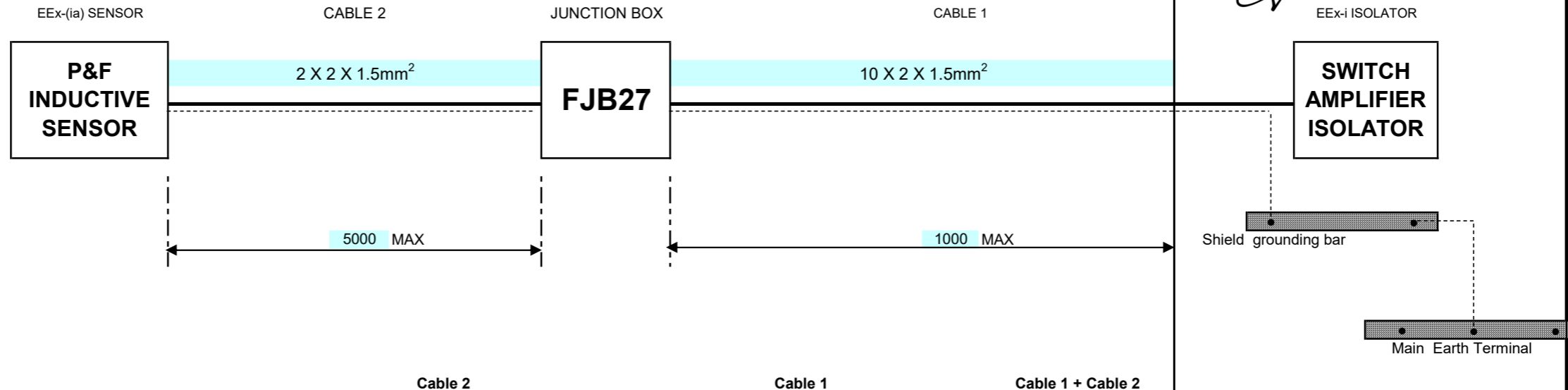
Loop Sheet No.

SI347001_DWG_REVD

HAZARDOUS AREA

SAFE AREA

Zone		Gas Group	Temperature Class
0	1	IIB	T4
Process	Electronics		



Supply by	Inter Terminals				Inter Terminals
Specification		BS5308 Part 1 Type 2	BS5308 Part 1 Type 2		
Manufacturer	Pepperl+Fuchs				Pepperl+Fuchs
Model	NCB15-30GM40-N0-V1				KCD2-SR-Ex2
Description	Inductive sensor	Multiple twisted pairs - SWA armoured	Multiple twisted pairs - SWA armoured		Switch Amplifier
Certification	Ex II 1 G EEx ia IIC T6				Ex II (1) G D [EEx ia] IIC
Certificate No.	PTB 00 ATEX 2048 X	Cable Calculations:			BASEEFA 06 ATEX 0092
Voltage	Ui: 16.0 V	Leq = (Cable mH/km x 2 x Cable Length in m /1000) + Field Instrument mH			Uo: 10.5 V
I current	Ii: 25 mA	CeQ = (Cable µF/km x Cable Length in m /1000) + Field Instrument Mf			Io: 17 mA
Power	Pi: 0.06 W				Po: 0.045 W
Capacitance	Ci: 0.0900 µF	Cc2: 0.120 µF/km => 0.6000 µF	Cc1: 0.12 µF/km => 0.1200 µF	Cct: 0.7200 µF	Co: 2.4100 µF
Inductance	Li: 0.1000 mH	Lc2: 2 x 0.4920 mH/km => 4.9200 mH	Lc1: 2 x 0.4920 mH/km => 0.9840 mH	Lct: 5.9040 mH	Lo: 121.5 mH
L/R		Lc2/Rc2: 0.040 mH/Ω	Lc1/Rc1: 0.040 mH/Ω	Lct/Rct:	
Resistance	Ri: Ω	Rc2: 2 x 12.30 Ω/km => 123.00 Ω	Rc1: 2 x 12.30 Ω/km => 24.600 Ω	Rct: 147.600 Ω	Ro: Ω

Verification Checks	Verification Calculations	Final calculation result
Plant Zone Process ≥ Inst. Zone Process	0 > 0	OK
Plant Zone Elect. ≥ Inst. Zone Elect.	1 > 0	OK
Plant Gas Group ≤ Inst. Gas Group	IIB ≤ IIC	OK
Plant Temp Class ≤ Inst. Temp Class	T4 ≤ T6	OK
Uo ≤ Ui	10.5 V ≤ 16.0 V	OK
Io ≤ Ii	17.1 mA ≤ 25 mA	OK
Po ≤ Pi	0.045 W ≤ 0.06 W	OK
Co ≥ (Ci+Cct) Ceq	2.4100 µF ≥ 0.81000 µF	OK
Lo ≥ (Li+Lct) Leq	121.5 mH ≥ 6.00400 mH	OK
Lo/Ro ≥ Lct/Rct		OK
THIS VERIFICATION IS NOT NECESSARY AS THE OTHER RELATIONSHIPS (CAPACITANCE, INDUCTANCE AND RESISTANCE) ARE VERIFIED		
		VERIFIED



(1) **EC-TYPE-EXAMINATION CERTIFICATE**
(Translation)

(2) Equipment and Protective Systems Intended for Use in
Potentially Explosive Atmospheres - **Directive 94/9/EC**



(3) EC-type-examination Certificate Number:

PTB 00 ATEX 2048 X

(4) Equipment: Cylindrical inductive sensors, types NC... and NJ...

(5) Manufacturer: Pepperl + Fuchs GmbH

(6) Address: D-68307 Mannheim

(7) This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in the confidential report PTB Ex 00-29206.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 50014:1997

EN 50020:1994

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-type-examination Certificate relates only to the design and construction of the specified equipment in accordance with Directive 94/9/EC. Further requirements of this Directive apply to the manufacture and supply of this equipment.

(12) The marking of the equipment shall include the following:

II 2 G EEx ia IIC T6

Zertifizierungsstelle Explosionsschutz
By order:

Braunschweig, September 26, 2000

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor



(13)

SCHEDULE

(14)

EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2048 X

(15)

Description of equipment

The cylindrical inductive sensors, types NC... and NJ...are used to convert displacements into electrical signals.

The cylindrical inductive sensors may be operated with intrinsically safe circuits certified for categories and explosion groups [EEx ia] IIC or IIB resp. [EEx ib] IIC or IIB. The category as well as the explosion group of the intrinsically safe cylindrical inductive sensors depends on the connected supplying intrinsically safe circuit.

Electrical data

Evaluation and

supply circuit..... type of protection Intrinsic Safety EEx ia IIC/IIB
resp. EEx ib IIC/IIB

only for connection to certified intrinsically safe circuits
maximum values:

type 1	type 2	type 3	type 4
$U_i = 16 \text{ V}$	$U_i = 16 \text{ V}$	$U_i = 16 \text{ V}$	$U_i = 16 \text{ V}$
$I_i = 25 \text{ mA}$	$I_i = 25 \text{ mA}$	$I_i = 52 \text{ mA}$	$I_i = 76 \text{ mA}$
$P_i = 34 \text{ mW}$	$P_i = 64 \text{ mW}$	$P_i = 169 \text{ mW}$	$P_i = 242 \text{ mW}$

The assignment of the type of the connected circuit to the maximum permissible ambient temperature and the temperature class as well as the effective internal reactances for the individual types of cylindrical inductive sensors is shown in the following table:

types	C _i [nF]	L _i [µH]	type 1			type 2			type 3			type 4		
			maximum permissible ambient temperature in °C for application in temperature class											
			T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1
NCB1,5...M...N0...	90	100	74	89	100	69	84	100	51	66	85	39	54	67
NCB2-12GK...-N0...	90	100	73	88	100	69	84	100	51	66	80	39	54	61
NCB2-12GM...-N0...	90	100	76	91	100	73	88	100	62	77	81	54	63	63
NCN4-12GK...-N0...	95	100	73	88	100	69	84	100	51	66	80	39	54	61
NCN4-12GM...-N0...	95	100	76	91	100	73	88	100	62	77	81	54	63	63
NCB5-18GK...-N0...	95	100	73	88	100	69	84	100	51	66	80	39	54	61
NCB5-18GM...-N0...	95	100	76	91	100	73	88	100	62	77	81	54	63	63
NCN8-18GK...-N0...	95	100	73	88	100	69	84	100	51	66	80	39	54	61
NCN8-18GM...-N0...	95	100	76	91	100	73	88	100	62	77	81	54	63	63
NCB10-30GK...-N0...	105	100	73	88	100	69	84	100	51	66	80	39	54	61
NCB10-30GM...-N0...	105	100	76	91	100	73	88	100	62	77	81	54	63	63
NCN15-30GK...-N0...	110	100	73	88	100	69	84	100	51	66	80	39	54	61
NCN15-30GM...-N0...	110	100	76	91	100	73	88	100	62	77	81	54	63	63
NJ 0,2-10GM-N...	20	50	73	88	100	68	83	100	49	64	67	36	42	42
NJ 0,8-4,5-N...	30	50	73	88	100	68	83	100	49	64	67	36	42	42
NJ 0,8-5GM-N...	30	50	73	88	100	68	83	100	49	64	67	36	42	42
NJ 1,5-6,5...-N...	30	50	73	88	100	68	83	100	49	64	67	36	42	42
NJ 1,5-10GM-N-Y...	20	50	73	88	100	68	83	100	49	64	67	36	42	42
NJ 1,5-8GM-N...	30	50	73	88	100	68	83	100	49	64	67	36	42	42
NJ 1,5-8-N...	20	50	73	88	100	68	83	100	49	64	67	36	42	42
NJ 1,5-18GM-N-D...	50	60	76	91	100	73	88	100	62	77	81	54	63	63
NJ 2-11-N...	45	50	73	88	100	66	81	100	45	60	89	30	45	74
NJ 2-11-N-G...	30	50	76	91	100	73	88	100	62	77	81	54	63	63
NJ 2-12GK-N...	45	50	73	88	100	69	84	100	51	66	80	39	54	61
NJ 2-12GM-N...	30	50	76	91	100	73	88	100	62	77	81	54	63	63
NJ 2-14GM-N...	30	50	76	91	100	73	88	100	62	77	81	54	63	63
NJ 2,5-14GM-N...	30	50	76	91	100	73	88	100	62	77	81	54	63	63
NJ 4-12GK-N...	45	50	73	88	100	69	84	100	51	66	80	39	54	61
NJ 4-14GK-N...	45	50	73	88	100	69	84	100	51	66	80	39	54	61
NJ 4-12GM-N...	45	50	73	88	100	68	83	100	49	64	67	36	42	42
NJ 4-30GM-N-200...	70	100	73	88	100	66	81	100	45	60	89	30	45	74
NJ 5-10-11-N...	70	100	73	88	100	66	81	100	45	60	78	30	45	57
NJ 5-11-N...	45	50	72	87	100	65	80	100	42	57	82	26	41	63
NJ 5-18GK-N...	70	50	73	88	100	69	84	100	51	66	80	39	54	61
NJ 5-18GM-N...	70	50	76	91	100	73	88	100	62	77	81	54	63	63
NJ 6-22-N...	130	100	73	88	100	69	84	100	51	66	80	39	54	61
NJ 8-18GK-N...	70	50	73	88	100	69	84	100	51	66	80	39	54	61

types	C _i [nF]	L _i [μH]	type 1			type 2			type 3			type 4		
			maximum permissible ambient temperature in °C for application in temperature class											
			T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1
NJ 8-18GM-N...	70	50	76	91	100	73	88	100	62	77	81	54	63	63
NJ 10-22-N...	130	100	73	88	100	69	84	100	51	66	80	39	54	61
NJ 10-30GK...-N...	140	100	73	88	100	69	84	100	51	66	80	39	54	61
NJ 10-30GM-N...	140	100	76	91	100	73	88	100	62	77	81	54	63	63
NJ 15-30GK...-N...	140	100	73	88	100	69	84	100	51	66	80	39	54	61
NJ 15-30GM-N...	140	100	76	91	100	73	88	100	62	77	81	54	63	63
NJ 25-50-N...	150	140	73	88	100	69	84	100	51	66	80	39	54	61
NJ 20-40-N...	140	140	73	88	100	69	84	100	51	66	80	39	54	61

(16) Test report PTB Ex 00-29206

(17) Special conditions for safe use

- For the application within a temperature range of -60 °C to -20 °C the cylindrical inductive sensors, types NC... and NJ... must be protected against damage due to impact by mounting into an additional housing.
- The connection facilities of the cylindrical inductive sensors, types NC... and NJ... shall be installed as such that at least a degree of protection of IP20 according to IEC-publication 60529:1989 is met.
- The assignment of the type of the connected circuit to the maximum permissible ambient temperature and the temperature class as well as the effective internal reactances for the individual types of cylindrical inductive sensors is shown in the table given under item (15) of this EC-type-examination certificate.
- Inadmissible electrostatic charge of parts of the metal housing has to be avoided for the following types of cylindrical inductive sensors. Dangerous electrostatic charges of parts of the metal housing can be avoided by grounding of these parts whereas very small parts of the metal housing (e.g. screws) don't need to be grounded:

NCB1,5...M...N0...
NCB2-12GM...-N0...
NCN4-12GM...-N0...
NCB5-18GM...-N0...
NCN8-18GM...-N0...

NJ 1,5-6,5...-N...
NJ 1,5-10GM-N-Y...
NJ 1,5-8GM-N...
NJ 1,5-8-N...
NJ 1,5-18GM-N-D...

NJ 4-30GM-N-200...
NJ 5-11-N-545...
NJ 5-11-N-G...
NJ 5-18GM-N...
NJ 6-22-N-G...

NCB10-30GM..-N0...
NCN15-30GM...-N0...
NJ 0,2-10GM-N...
NJ 0,8-4,5-N...
NJ 0,8-5GM-N...

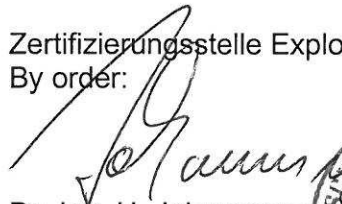
NJ 2-11-N-G...
NJ 2-12GM-N...
NJ 2-14GM-N...
NJ 2,5-14GM-N...
NJ 4-12GM-N...

NJ 8-18GM-N...
NJ 10-22-N-G...
NJ 10-30GM-N...

(18) Essential health and safety requirements

Met by the standards mentioned above

Zertifizierungsstelle Explosionsschutz
By order:


Dr.-Ing. U. Johannsmeyer
Regierungsdirektor



Braunschweig, September 26, 2000

1. SUPPLEMENT

according to Directive 94/9/EC Annex III.6

to EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2048 X

(Translation)

Equipment: Cylindrical inductive sensors, types NC... and NJ...

Marking:  II 2 G EEx ia IIC T6

Manufacturer: Pepperl + Fuchs GmbH

Address: Königsberger Allee 87
68307 Mannheim; Germany

Description of supplements and modifications

The cylindrical inductive sensors of type series NC... and NJ... , listed as follows, may in future also be used in hazardous areas requiring apparatus of category 1.

The modifications exclusively concern the "Electrical data" (modified maximum permissible ambient temperatures for use as category-1-apparatus, reduction of the intrinsically safe evaluation and supply circuit to category ia) as well as the marking of the following types of cylindrical inductive sensors.

NCB1,5...M...N0...	NCN15-30GM...-N0...	NJ 2-12GM-N...
NCB2-12GM...-N0...	NJ 0,8-5GM-N...	NJ 4-12GM-N...
NCN4-12GM...-N0...	NJ 1,5-6,5...-N...	NJ 5-18GM-N...
NCB5-18GM...-N0...	NJ 1,5-8GM-N...	NJ 8-18GM-N...
NCN8-18GM...-N0...	NJ 2-11-N...	NJ 10-30GM-N...
NCB10-30GM..-N0...	NJ 2-11-N-G...	NJ 15-30GM-N...

In future the marking of the above-listed sensors for application as category-1-apparatus will be:

 II 1 G EEx ia IIC T6

The "Special conditions" are also valid for use as category-1-apparatus without changes.

1. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2048 X

Electrical data

Evaluation and supply circuit type of protection Intrinsic Safety EEx ia IIC/IIB
for connection to certified intrinsically safe circuits only
Maximum values:

type 1	type 2	type 3	type 4
$U_i = 16 \text{ V}$	$U_i = 16 \text{ V}$	$U_i = 16 \text{ V}$	$U_i = 16 \text{ V}$
$I_i = 25 \text{ mA}$	$I_i = 25 \text{ mA}$	$I_i = 52 \text{ mA}$	$I_i = 76 \text{ mA}$
$P_i = 34 \text{ mW}$	$P_i = 64 \text{ mW}$	$P_i = 169 \text{ mW}$	$P_i = 242 \text{ mW}$

The assignment of the type of the connected circuit to the maximum permissible ambient temperature for use as category-1-apparatus and the temperature class as well as the effective internal reactances for the individual types of cylindrical inductive sensors is shown in the following table:

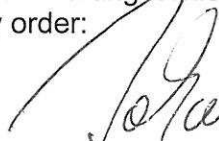
types	C_i [nF]	L_i [μH]	type 1			type 2			type 3			type 4		
			maximum permissible ambient temperature in °C for use in temperature class											
			T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1
NCB1,5...M...N0...	90	100	57	69	97	52	64	92	34	46	74	22	34	62
NCB2-12GM...-N0...	90	100	59	71	99	56	68	96	45	57	81	37	49	63
NCN4-12GM...-N0...	95	100	59	71	99	56	68	96	45	57	81	37	49	63
NCB5-18GM...-N0...	95	100	59	71	99	56	68	96	45	57	81	37	49	63
NCN8-18GM...-N0...	95	100	59	71	99	56	68	96	45	57	81	37	49	63
NCB10-30GM...-N0...	105	100	59	71	99	56	68	96	45	57	81	37	49	63
NCN15-30GM...-N0...	110	100	59	71	99	56	68	96	45	57	81	37	49	63
NJ 0,8-5GM-N...	30	50	56	68	96	51	63	91	32	44	67	19	31	41
NJ 1,5-6,5...-N...	30	50	56	68	96	51	63	91	32	44	67	19	31	41
NJ 1,5-10GM-N-Y...	30	50	56	68	96	51	63	91	32	44	67	19	31	41
NJ 2-11-N...	45	50	55	67	95	49	61	89	28	40	68	13	25	53
NJ 2-11-N-G...	30	50	59	71	99	56	68	96	45	57	81	37	49	63
NJ 2-12GM-N...	30	50	59	71	99	56	68	96	45	57	81	37	49	63
NJ 4-12GM-N...	45	50	56	68	96	51	63	91	32	44	67	19	31	41
NJ 5-18GM-N...	70	50	59	71	99	56	68	96	45	57	81	37	49	63
NJ 8-18GM-N...	70	50	59	71	99	56	68	96	45	57	81	37	49	63
NJ 10-30GM-N...	140	100	59	71	99	56	68	96	45	57	81	37	49	63
NJ 15-30GM-N...	140	100	59	71	99	56	68	96	45	57	81	37	49	63

1. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2048 X

Test report: PTB Ex 02-22170

Zertifizierungsstelle Explosionsschutz

By order:



Dr.-Ing. U. Johannsmeyer
Regierungsdirektor



Braunschweig, August 08, 2002

2. SUPPLEMENT

according to Directive 94/9/EC Annex III.6

to EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2048 X (Translation)

Equipment: Cylindrical inductive sensors, types NC... and NJ...

Marking:  II 1 G EEx ia IIC T6

Manufacturer: Pepperl + Fuchs GmbH

Address: Königsberger Allee 87
68307 Mannheim; Germany

Description of supplements and modifications

The cylindrical inductive sensors of type series NC... and NJ... may in future also be manufactured and operated according to the test documents listed in the test report PTB Ex 04-23445.

The modifications concern the extension of the type series NJ (new types and further types for application as category-1-apparatus), the depiction of the basic construction of the cylindrical inductive sensor, type NJ 4-30GM-N-200... with separate enclosures for oscillator and amplifier, the internal construction (further examples of circuit diagrams, new types of LED's), the extension of point 4 of the "Special conditions" for type NJ 15-30GM-N... as well as further alternatives for fixing the marking.

The EC-type examination certificate is extended for the following types of cylindrical inductive sensors:

NJ 5-18GK-N-150...
NJ 8-18GK-N-150...
NJ 15-30GK-N-150...

The application conditions as category-1-apparatus are newly determined by this 2nd supplement for the following types of cylindrical inductive sensors:

NJ 1,5-10GM-N-Y...	NJ 5-18GK-N-150...
NJ 1,5-8GM-N...	NJ 8-18GK-N...
NJ 1,5-18GM-N-D...	NJ 8-18GK-N-150...
NJ 4-30GM-N-200...	NJ 15-30GK-N...
NJ 5-18GK-N...	NJ 15-30GK-N-150...

2. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2048 X

For a better comprehensibility the “Electrical data” as well the tables showing the relationship between maximum permissible ambient temperatures, temperature classes, electrical data as well as equipment categories for all types of cylindrical inductive sensors are tabulated below:

Furthermore the altered “Special conditions” are listed.

Electrical data

Evaluation and supply circuit..... type of protection Intrinsic Safety EEx ia IIC/IIB
resp. EEx ib IIC/IIB
for connection to certified intrinsically safe circuits only
Maximum values:

type 1	type 2	type 3	type 4
$U_i = 16 \text{ V}$	$U_i = 16 \text{ V}$	$U_i = 16 \text{ V}$	$U_i = 16 \text{ V}$
$I_i = 25 \text{ mA}$	$I_i = 25 \text{ mA}$	$I_i = 52 \text{ mA}$	$I_i = 76 \text{ mA}$
$P_i = 34 \text{ mW}$	$P_i = 64 \text{ mW}$	$P_i = 169 \text{ mW}$	$P_i = 242 \text{ mW}$

With the application as category-1-apparatus it is to be considered that the evaluation and supply circuit has to comply with type of protection Intrinsic Safety EEx ia IIC/IIB.

For relationship between type of connected circuit, maximum permissible ambient temperature for use as category-1-apparatus resp. as category-2-apparatus and temperature class as well as the effective internal reactances for the individual types of cylindrical inductive sensors reference is made to the following tables:

2. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2048 X

Table 1: Application as category-1-apparatus

type	type 1						type 2						type 3						type 4									
	Ci/ nF	Li/ µH	T6	T5	T4	T3	T2- T1	T6	T5	T4	T3	T2- T1	T6	T5	T4	T3	T2- T1	T6	T5	T4	T3	T2- T1	T6	T5	T4	T3	T2- T1	
			90	100	57	69	97	97	97	52	64	92	92	92	34	46	74	74	74	34	46	74	74	74	22	34	62	62
NCB1,5-...M...NO...																												
NCB2-12GM-...-NO...																												
NCN4-12GM-...-NO...																												
NCB5-18GM-...-NO...																												
NCN8-18GM-...-NO...																												
NCB10-30GM-...-NO...																												
NCN15-30GM-...-NO...																												
NJ 0,8-5GM-N...	30	50	56	68	96	96	96	51	63	91	91	91	32	44	67	67	67	19	31	41	41	41	37	49	63	63	63	
NJ 1,5-6,5-N...	30	50	56	68	96	96	96	51	63	91	91	91	32	44	67	67	67	19	31	41	41	41	37	49	63	63	63	
NJ 1,5-8GM-N...	30	50	56	68	96	96	96	51	63	91	91	91	32	44	67	67	67	19	31	41	41	41	37	49	63	63	63	
NJ 1,5-10GM-N-Y...	20	50	56	68	96	96	96	51	63	91	91	91	32	44	67	67	67	19	31	41	41	41	37	49	63	63	63	
NJ 1,5-18GM-N-D...	50	60	59	71	99	99	99	56	68	96	96	96	45	57	81	81	81	37	49	63	63	63	37	49	63	63	63	
NJ 2-11-N...	45	50	55	67	95	95	95	49	61	89	89	89	28	40	68	68	68	13	25	53	53	53	13	25	53	53	53	
NJ 2-11-N-G...	30	50	59	71	99	99	99	56	68	96	96	96	45	57	81	81	81	37	49	63	63	63	37	49	63	63	63	
NJ 2-12GM-N...	30	50	59	71	99	99	99	56	68	96	96	96	45	57	81	81	81	37	49	63	63	63	37	49	63	63	63	
NJ 4-30GM-N-200... (oscillator)			56	68	96	148	192	49	61	89	141	186	28	40	68	120	164	13	25	53	105	149	13	25	53	105	149	
NJ 4-30GM-N-200... (amplifier)	70	100	56	68	96	96	96	49	61	89	89	89	28	40	68	68	68	13	25	53	53	53	13	25	53	53	53	
NJ 4-12GM-N...	45	50	56	68	96	96	96	51	63	91	91	91	32	44	67	67	67	19	31	41	41	41	19	31	41	41	41	
NJ 5-18GM-N...	70	50	59	71	99	99	99	56	68	96	96	96	45	57	81	81	81	37	49	63	63	63	37	49	63	63	63	
NJ 5-18GK-N...	70	50	57	69	97	97	97	52	64	92	92	92	34	46	74	74	74	22	34	61	61	61	22	34	61	61	61	
NJ 5-18GK-N-150...	70	50	57	69	97	149	150	52	64	92	144	150	34	46	74	126	150	22	34	61	114	136	22	34	61	114	136	
NJ 8-18GK-N...	70	50	57	69	97	97	97	52	64	92	92	92	34	46	74	74	74	22	34	61	61	61	22	34	61	61	61	
NJ 8-18GK-N-150...	70	50	57	69	97	149	150	52	64	92	144	150	34	46	74	126	150	22	34	61	114	136	22	34	61	114	136	
NJ 8-18GM-N...	70	50	59	71	99	99	99	56	68	96	96	96	45	57	81	81	81	37	49	63	63	63	37	49	63	63	63	
NJ 10-30GM-N...	140	100	59	71	99	99	99	56	68	96	96	96	45	57	81	81	81	37	49	63	63	63	37	49	63	63	63	
NJ 15-30GK-N...	140	100	57	69	97	97	97	52	64	92	92	92	34	46	74	74	74	22	34	61	61	61	22	34	61	61	61	
NJ 15-30GK-N-150...	140	100	57	69	97	149	150	52	64	92	144	150	34	46	74	126	150	22	34	61	114	136	22	34	61	114	136	
NJ 15-30GM-N...	140	100	59	71	99	99	99	56	68	96	96	96	45	57	81	81	81	37	49	63	63	63	37	49	63	63	63	

2. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2048 X

Table 2: Application as category-2-apparatus

type	type 1						type 2						type 3						type 4								
	Ci/ nF	Li/ µH	T6	T5	T4	T3	T2- T1	T6	T5	T4	T3	T2- T1	T6	T5	T4	T3	T2- T1	T6	T5	T4	T3	T2- T1	T6	T5	T4	T3	T2- T1
NCB1,5...M...NO...	90	100	74	89	100	100	100	69	84	100	100	100	51	66	85	85	85	39	54	67	67	67	39	54	67	67	67
NCB2-12GK...NO...	90	100	73	88	100	100	100	69	84	100	100	100	51	66	80	80	80	39	54	61	61	61	39	54	61	61	61
NCB2-12GM...NO...	90	100	76	91	100	100	100	73	88	100	100	100	62	77	81	81	81	54	63	63	63	63	54	63	63	63	63
NCN4-12GK...NO...	95	100	73	88	100	100	100	69	84	100	100	100	51	66	80	80	80	39	54	61	61	61	39	54	61	61	61
NCN4-12GM...NO...	95	100	76	91	100	100	100	73	88	100	100	100	62	77	81	81	81	54	63	63	63	63	54	63	63	63	63
NCB5-18GK...NO...	95	100	73	88	100	100	100	69	84	100	100	100	51	66	80	80	80	39	54	61	61	61	39	54	61	61	61
NCB5-18GM...NO...	95	100	76	91	100	100	100	73	88	100	100	100	62	77	81	81	81	54	63	63	63	63	54	63	63	63	63
NCN8-18GK...NO...	95	100	73	88	100	100	100	69	84	100	100	100	51	66	80	80	80	39	54	61	61	61	39	54	61	61	61
NCN8-18GM...NO...	95	100	76	91	100	100	100	73	88	100	100	100	62	77	81	81	81	54	63	63	63	63	54	63	63	63	63
NCB10-30GK...NO...	105	100	73	88	100	100	100	69	84	100	100	100	51	66	80	80	80	39	54	61	61	61	39	54	61	61	61
NCB10-30GM...NO...	105	100	76	91	100	100	100	73	88	100	100	100	62	77	81	81	81	54	63	63	63	63	54	63	63	63	63
NCN15-30GK...NO...	110	100	73	88	100	100	100	69	84	100	100	100	51	66	80	80	80	39	54	61	61	61	39	54	61	61	61
NCN15-30GM...NO...	110	100	76	91	100	100	100	73	88	100	100	100	62	77	81	81	81	54	63	63	63	63	54	63	63	63	63
NJ 0,2-10GM-N...	20	50	73	88	100	100	100	68	83	100	100	100	49	64	67	67	67	36	42	42	42	42	36	42	42	42	42
NJ 0,8-4,5-N...	30	50	73	88	100	100	100	68	83	100	100	100	49	64	67	67	67	36	42	42	42	42	36	42	42	42	42
NJ 0,8-5GM-N...	30	50	73	88	100	100	100	68	83	100	100	100	49	64	67	67	67	36	42	42	42	42	36	42	42	42	42
NJ 1,5-6,5-N...	30	50	73	88	100	100	100	68	83	100	100	100	49	64	67	67	67	36	42	42	42	42	36	42	42	42	42
NJ 1,5-10GM-N-Y...	20	50	73	88	100	100	100	68	83	100	100	100	49	64	67	67	67	36	42	42	42	42	36	42	42	42	42
NJ 1,5-8GM-N...	30	50	73	88	100	100	100	68	83	100	100	100	49	64	67	67	67	36	42	42	42	42	36	42	42	42	42
NJ 1,5-8-N...	20	50	73	88	100	100	100	68	83	100	100	100	49	64	67	67	67	36	42	42	42	42	36	42	42	42	42
NJ 1,5-18GM-N-D...	50	60	76	91	100	100	100	73	88	100	100	100	62	77	81	81	81	54	63	63	63	63	54	63	63	63	63
NJ 2-11-N...	45	50	73	88	100	100	100	66	81	100	100	100	45	60	89	89	89	30	45	74	74	74	30	45	74	74	74
NJ 2-11-N-G...	30	50	76	91	100	100	100	73	88	100	100	100	62	77	81	81	81	54	63	63	63	63	54	63	63	63	63
NJ 2-12GK-N...	45	50	73	88	100	100	100	69	84	100	100	100	51	66	80	80	80	39	54	61	61	61	39	54	61	61	61
NJ 2-12GM-N...	30	50	76	91	100	100	100	73	88	100	100	100	62	77	81	81	81	54	63	63	63	63	54	63	63	63	63
NJ 2-14GM-N...	30	50	76	91	100	100	100	73	88	100	100	100	62	77	81	81	81	54	63	63	63	63	54	63	63	63	63
NJ 2,5-14GM-N...	30	50	76	91	100	100	100	73	88	100	100	100	62	77	81	81	81	54	63	63	63	63	54	63	63	63	63
NJ 4-12GK-N...	45	50	73	88	100	100	100	69	84	100	100	100	51	66	80	80	80	39	54	61	61	61	39	54	61	61	61
NJ 4-14GK-N...	45	50	73	88	100	100	100	69	84	100	100	100	51	66	80	80	80	39	54	61	61	61	39	54	61	61	61
NJ 4-12GM-N...	45	50	73	88	100	100	100	68	83	100	100	100	49	64	67	67	67	36	42	42	42	42	36	42	42	42	42

2. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2048 X

Continuation Table 2: Application as category-2-apparatus

type	type 1						type 2						type 3						type 4								
	Ci/	Li/	T6	T5	T4	T3	T2-T1	T6	T5	T4	T3	T2-T1	T6	T5	T4	T3	T2-T1	T6	T5	T4	T3	T2-T1	T6	T5	T4	T3	T2-T1
NJ 4-30GM-N-200... (oscillator)	70	100	73	88	123	188	192	66	81	116	181	186	45	60	95	160	164	30	45	80	145	149	30	45	80	145	149
NJ 4-30GM-N-200... (amplifier)	70	100	73	88	100	100	100	66	81	100	100	100	45	60	89	89	89	30	45	74	74	74	30	45	74	74	74
NJ 5-10-11-N...	45	50	72	87	100	100	100	65	80	100	100	100	42	57	82	82	82	26	41	63	63	63	26	41	63	63	63
NJ 5-11-N...	70	50	73	88	100	100	100	69	84	100	100	100	51	66	80	80	80	39	54	61	61	61	39	54	61	61	61
NJ 5-18GK-N...	70	50	73	88	124	150	150	69	84	119	150	150	51	66	101	150	150	39	54	89	136	136	39	54	89	136	136
NJ 5-18GM-N...	70	50	76	91	100	100	100	73	88	100	100	100	62	77	81	81	81	54	63	63	63	63	54	63	63	63	63
NJ 6-22-N...	130	100	73	88	100	100	100	69	84	100	100	100	51	66	80	80	80	39	54	61	61	61	39	54	61	61	61
NJ 8-18GK-N...	70	50	73	88	100	100	100	69	84	100	100	100	51	66	80	80	80	39	54	61	61	61	39	54	61	61	61
NJ 8-18GK-N-150...	70	50	73	88	124	150	150	69	84	119	150	150	51	66	101	150	150	39	54	89	136	136	39	54	89	136	136
NJ 8-18GM-N...	70	50	76	91	100	100	100	73	88	100	100	100	62	77	81	81	81	54	63	63	63	63	54	63	63	63	63
NJ 10-22-N...	130	100	73	88	100	100	100	69	84	100	100	100	51	66	80	80	80	39	54	61	61	61	39	54	61	61	61
NJ 10-30GK...-N...	140	100	73	88	100	100	100	69	84	100	100	100	51	66	80	80	80	39	54	61	61	61	39	54	61	61	61
NJ 10-30GM-N...	140	100	76	91	100	100	100	73	88	100	100	100	62	77	81	81	81	54	63	63	63	63	54	63	63	63	63
NJ 15-30GK...-N...	140	100	73	88	100	100	100	69	84	100	100	100	51	66	80	80	80	39	54	61	61	61	39	54	61	61	61
NJ 15-30GK-N-150...	140	100	73	88	124	150	150	69	84	119	150	150	51	66	101	150	150	39	54	89	136	136	39	54	89	136	136
NJ 15-30GM-N...	140	100	76	91	100	100	100	73	88	100	100	100	62	77	81	81	81	54	63	63	63	63	54	63	63	63	63
NJ 25-50-N...	150	140	73	88	100	100	100	69	84	100	100	100	51	66	80	80	80	39	54	61	61	61	39	54	61	61	61
NJ 20-40-N...	140	140	73	88	100	100	100	69	84	100	100	100	51	66	80	80	80	39	54	61	61	61	39	54	61	61	61

2. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2048 X

Special conditions

1. When the cylindrical inductive sensors , types NC... and NJ... are used in a temperature range between -60°C and -20 °C, they shall be protected against impact stress by installation into an additional housing.
2. The connection facilities of the cylindrical inductive sensors , types NC... and NJ... shall be installed as such that the degree of protection IP 20 according to IEC-Publikation 60529:1989 is met as a minimum.
3. For relationship between type of connected circuit, maximum permissible ambient temperature and temperature class as well as the effective internal reactances for the individual types of cylindrical inductive sensors reference is made to tables 1 & 2 of this 2nd supplement to EC-type certificate PTB 00 ATEX 2048 X.
4. Inadmissible electrostatic charge of parts of the metal housing shall be avoided with the following types of cylindrical inductive sensors. Dangerous electrostatic charge of parts of the metal housing can be avoided by grounding these parts. Very small parts of the metal housing (e.g. screws) do not need to be grounded.

NCB1,5...M...N0...	NJ 1,5-6,5...-N...	NJ 4-30GM-N-200...
NCB2-12GM...-N0...	NJ 1,5-10GM-N-Y...	NJ 5-11-N-545...
NCN4-12GM...-N0...	NJ 1,5-8GM-N...	NJ 5-11-N-G...
NCB5-18GM...-N0...	NJ 1,5-8-N...	NJ 5-18GM-N...
NCN8-18GM...-N0...	NJ 1,5-18GM-N-D...	NJ 6-22-N-G...
NCB10-30GM...-N0...	NJ 2-11-N-G...	NJ 8-18GM-N...
NCN15-30GM...-N0...	NJ 2-12GM-N...	NJ 10-22-N-G...
NJ 0,2-10GM-N...	NJ 2-14GM-N...	NJ 10-30GM-N...
NJ 0,8-4,5-N...	NJ 2,5-14GM-N...	NJ 15-30GM-N...
NJ 0,8-5GM-N...	NJ 4-12GM-N...	

Test report: PTB Ex 04-23445

Zertifizierungsstelle Explosionsschutz
By order:

Braunschweig, July 12, 2004


Dr.-Ing. U. Gerlach
Regierungsrat



3. SUPPLEMENT

according to Directive 94/9/EC Annex III.6

to EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2048 X (Translation)

Equipment: Cylindrical inductive sensors, types NC... and NJ...

Marking:  II 1 G EEx ia IIC T6

Manufacturer: Pepperl + Fuchs GmbH

Address: Königsberger Allee 87, 68307 Mannheim, Germany

Description of supplements and modifications

In the future the cylindrical inductive sensors of type series NC... and NJ... may also be manufactured and operated according to the test documents listed in the test report PTB Ex 05-25204.

The modifications concern the extension of the type series NC... (new types for application as category-1-apparatus or as category-2-apparatus respectively), the internal construction (further examples of circuit diagrams, new types of LED's and cast resin) as well as the extension of clause 4 of the "Special Conditions" for the new types of type series NC... .

The EC-type examination certificate is extended for the following types of cylindrical inductive sensors:

NCB4-12GM...-N0...

NCB8-18GM...-N0...

NCB15-30GM...-N0...

The "Electrical Data" listed below apply for these types.

All other specifications apply also for this 3rd supplement without changes.

3. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2048 X

Electrical data

Evaluation and supply circuit..... type of protection Intrinsic Safety EEx ia IIC/IIB
or EEx ib IIC/IIB
only for connection to certified intrinsically safe circuits
Maximum values:

type 1	type 2	type 3	type 4
$U_i = 16 \text{ V}$	$U_i = 16 \text{ V}$	$U_i = 16 \text{ V}$	$U_i = 16 \text{ V}$
$I_i = 25 \text{ mA}$	$I_i = 25 \text{ mA}$	$I_i = 52 \text{ mA}$	$I_i = 76 \text{ mA}$
$P_i = 34 \text{ mW}$	$P_i = 64 \text{ mW}$	$P_i = 169 \text{ mW}$	$P_i = 242 \text{ mW}$

With the application as category-1-apparatus it is to be considered that the evaluation and supply circuit has to comply with type of protection Intrinsic Safety EEx ia IIC/IIB.

For relationship between type of connected circuit, maximum permissible ambient temperature for use as category-1-apparatus resp. as category-2-apparatus and temperature class as well as the effective internal reactances for the individual types of cylindrical inductive sensors, reference is made to the following tables:

3. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2048 X

Table 1: Application as category 1-equipment

type	type 1						type 2						type 3						type 4								
	Ci/ nF	Li/ µH	T6	T5	T4	T3	T2- T1	T6	T5	T4	T3	T2- T1	T6	T5	T4	T3	T2- T1	T6	T5	T4	T3	T2- T1	T6	T5	T4	T3	T2- T1
NCB4-12GM...-N0...	120	50	57	69	97	97	97	52	64	92	92	92	34	46	74	74	74	22	34	52	52	52	22	34	52	52	52
NCB8-18GM...-N0...	120	50	57	69	97	97	97	52	64	92	92	92	34	46	74	74	74	22	34	52	52	52	22	34	52	52	52
NCB15-30GM...-N0...	120	150	57	69	97	97	97	52	64	92	92	92	34	46	74	74	74	22	34	52	52	52	22	34	52	52	52

Table 2: Application as category 2-equipment

type	type 1						type 2						type 3						type 4								
	Ci/ nF	Li/ µH	T6	T5	T4	T3	T2- T1	T6	T5	T4	T3	T2- T1	T6	T5	T4	T3	T2- T1	T6	T5	T4	T3	T2- T1	T6	T5	T4	T3	T2- T1
NCB4-12GM...-N0...	120	50	74	89	100	100	100	69	84	100	100	100	51	66	74	74	74	39	52	52	52	39	52	52	52	52	52
NCB8-18GM...-N0...	120	50	74	89	100	100	100	69	84	100	100	100	51	66	74	74	74	39	52	52	52	39	52	52	52	52	52
NCB15-30GM...-N0...	120	150	74	89	100	100	100	69	84	100	100	100	51	66	74	74	74	39	52	52	52	39	52	52	52	52	52

3. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2048 X

Special conditions

1. When the cylindrical inductive sensors , types NC... and NJ... are used in a temperature range between -60 °C and -20 °C, they shall be protected against impact stress by installation into an additional housing.
2. The connection facilities of the cylindrical inductive sensors , types NC... and NJ... shall be installed as such that the degree of protection IP 20 according to IEC-Publikation 60529:1989 is met as a minimum.
3. For relationship between type of connected circuit, maximum permissible ambient temperature and temperature class as well as the effective internal reactances for the individual types of cylindrical inductive sensors reference is made to tables 1 & 2 of the 2nd supplement and – for the new types – to tables 1 & 2 of this 3rd supplement to EC-type certificate PTB 00 ATEX 2048 X.
4. Inadmissible electrostatic charge of parts of the metal housing shall be avoided for the following types of cylindrical inductive sensors. Dangerous electrostatic charge of parts of the metal housing can be avoided by grounding these parts. Very small parts of the metal housing (e.g. screws) do not need to be grounded.

NCB1,5...M...N0...	NJ 0,8-4,5-N...	NJ 4-12GM-N...
NCB2-12GM...-N0...	NJ 0,8-5GM-N...	NJ 4-30GM-N-200...
NCB4-12GM...-N0...	NJ 1,5-6,5...-N...	NJ 5-11-N-545...
NCB5-18GM...-N0...	NJ 1,5-10GM-N-Y...	NJ 5-11-N-G...
NCB8-18GM...-N0...	NJ 1,5-8GM-N...	NJ 5-18GM-N...
NCB10-30GM...-N0...	NJ 1,5-8-N...	NJ 6-22-N-G...
NCB15-30GM...-N0...	NJ 1,5-18GM-N-D...	NJ 8-18GM-N...
NCN4-12GM...-N0...	NJ 2-11-N-G...	NJ 10-22-N-G...
NCN8-18GM...-N0...	NJ 2-12GM-N...	NJ 10-30GM-N...
NCN15-30GM...-N0...	NJ 2-14GM-N...	NJ 15-30GM-N...
NJ 0,2-10GM-N...	NJ 2,5-14GM-N...	

Test report: PTB Ex 05-25204

Zertifizierungsstelle Explosionsschutz
By order:

Dr.-Ing. U. Johannsmeyer
Direktor und Professor



Braunschweig, October 7, 2005


4. SUPPLEMENT

according to Directive 94/9/EC Annex III.6

to EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2048 X

(Translation)

Equipment: Cylindrical inductive sensors, types NC... and NJ...

Marking:  II 1 G EEx ia IIC T6


Manufacturer: Pepperl + Fuchs GmbH

Address: Lilienthalstraße 200
68307 Mannheim, Germany

Description of supplements and modifications

In the future the cylindrical inductive sensors of types NC... and NJ... may also be manufactured and operated according to the test documents listed in the assessment and test report.

The modifications concern the application of an alternative casting compound and a different enclosure material as well as additional types of LEDs. Furthermore the test specification is adapted to the current state of the standards which causes an alteration of the marking.

The marking will read in future:  II 1 G Ex ia IIC T6

The "Special Conditions" and all further specifications of the EC-type examination certificate including supplements Nos. 1 through 3 apply without changes also to this 4th supplement.

Applied standards

EN 60079-0:2006

EN 60079-11:2007

EN 60079-26:2007

Assessment and test report: PTB Ex 11-20105

Zertifizierungssektor Explosionsschutz

Braunschweig, May 2, 2011

On behalf of PTB:


Dr.-Ing. U. Johannsmeyer
Direktor und Professor



Sheet 1/1

5. SUPPLEMENT

according to Directive 94/9/EC Annex III.6

to EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2048 X (Translation)

Equipment: Cylindrical inductive sensors, types NC... and NJ...

Marking:  **II 1 G Ex ia IIC T6**

Manufacturer: Pepperl+Fuchs GmbH

Address: Lilienthalstraße 200, 68307 Mannheim, Germany

Description of supplements and modifications

In the future the cylindrical inductive sensors, types NC... and NJ... may also be manufactured and operated as described in the test documents listed in the test report PTB Ex 15-24245. The modifications concern the consideration of the current state of the applied standards and – resulting from this – the marking of the cylindrical inductive sensors, types NC... and NJ..., the “special conditions” as well as the internal construction (inclusion of further alternative casting resin materials).

In the future the marking will read:

 **II 1 G Ex ia IIC T6...T1 Ga or II 2 G Ex ia IIC T6...T1 Gb**

In principle the „electrical data“ apply without changes as specified in the previous four supplements to EC-type examination certificate PTB 00 ATEX 2048 X, they are, however, presented in updated and summarized form for improved clarity.

All other specifications apply without changes.

5. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2048 X

The cylindrical inductive sensors of types NC... and NJ...are used to convert displacements into electrical signals.

The cylindrical inductive sensors may be operated with intrinsically safe circuits certified for protection levels and explosion groups [Ex ia] IIC or IIB resp. [Ex ib] IIC or IIB. The protection level as well as the explosion group of the intrinsically safe cylindrical inductive sensors depend on the connected supplying intrinsically safe circuit.

Electrical data

Evaluation and

supply circuit..... type of protection Intrinsic Safety Ex ia IIC/IIB
 or Ex ib IIC/IIB
 only for connection to certified intrinsically safe circuits
 Maximum values:

type 1	type 2	type 3	type 4
$U_i = 16 \text{ V}$	$U_i = 16 \text{ V}$	$U_i = 16 \text{ V}$	$U_i = 16 \text{ V}$
$I_i = 25 \text{ mA}$	$I_i = 25 \text{ mA}$	$I_i = 52 \text{ mA}$	$I_i = 76 \text{ mA}$
$P_i = 34 \text{ mW}$	$P_i = 64 \text{ mW}$	$P_i = 169 \text{ mW}$	$P_i = 242 \text{ mW}$

For relationship between type of the connected circuit, maximum permissible ambient temperature for the application as category 1- or category 2-equipment and temperature class as well as the effective internal reactances for the individual types of cylindrical inductive sensors, reference is made in the following tables:

ZSEx10101e b

5. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2048 X

Table 1: Application as category 1-equipment

Type	Type 1						Type 2						Type 3						Type 4									
	Ci/ nF	Li/ µH	T2- T1	T3	T4	T5	T6	T2- T1	T3	T4	T5	T6	T2- T1	T3	T4	T5	T6	T2- T1	T3	T4	T5	T6	T2- T1	T3	T4	T5	T6	
			90	100	57	69	71	99	97	97	97	97	97	52	56	64	92	92	92	92	92	92	92	34	46	74	74	74
NCB1,5-...M...N0...	90	100	57	69	71	99	97	97	97	97	52	56	64	92	92	92	92	92	92	92	92	34	46	74	74	74	74	74
NCB2-12GM...-N0...	90	100	59	71	99	99	99	99	99	99	56	68	96	96	96	96	96	96	96	96	96	45	57	81	81	81	81	81
NCB4-12GM...-N0...	120	50	57	69	97	97	97	97	97	97	52	64	92	92	92	92	92	92	92	92	92	34	46	74	74	74	74	74
NCN4-12GM...-N0...	95	100	59	71	99	99	99	99	99	99	56	68	96	96	96	96	96	96	96	96	96	45	57	81	81	81	81	81
NCB5-18GM...-N0...	95	100	59	71	99	99	99	99	99	99	56	68	96	96	96	96	96	96	96	96	96	45	57	81	81	81	81	81
NCB8-18GM...-N0...	120	50	57	69	97	97	97	97	97	97	52	64	92	92	92	92	92	92	92	92	92	34	46	74	74	74	74	74
NCN8-18GM...-N0...	95	100	59	71	99	99	99	99	99	99	56	68	96	96	96	96	96	96	96	96	96	45	57	81	81	81	81	81
NCB10-30GM...-N0...	105	100	59	71	99	99	99	99	99	99	56	68	96	96	96	96	96	96	96	96	96	45	57	81	81	81	81	81
NCB15-30GM...-N0...	120	150	57	69	97	97	97	97	97	97	52	64	92	92	92	92	92	92	92	92	92	34	46	74	74	74	74	74
NCN15-30GM...-N0...	110	100	59	71	99	99	99	99	99	99	56	68	96	96	96	96	96	96	96	96	96	45	57	81	81	81	81	81
NJ 0,8-5GM-N...	30	50	56	68	96	96	96	96	96	96	51	63	91	91	91	91	91	91	91	91	91	32	44	67	67	67	67	67
NJ 1,5-6,5...-N...	30	50	56	68	96	96	96	96	96	96	51	63	91	91	91	91	91	91	91	91	91	32	44	67	67	67	67	67
NJ 1,5-8GM-N...	30	50	56	68	96	96	96	96	96	96	51	63	91	91	91	91	91	91	91	91	91	32	44	67	67	67	67	67
NJ 1,5-10GM-N-Y...	20	50	56	68	96	96	96	96	96	96	51	63	91	91	91	91	91	91	91	91	91	32	44	67	67	67	67	67
NJ 1,5-18GM-N-D...	50	60	59	71	99	99	99	99	99	99	56	68	96	96	96	96	96	96	96	96	96	45	57	81	81	81	81	81
NJ 2-11-N...	45	50	55	67	95	95	95	95	95	95	49	61	89	89	89	89	89	89	89	89	89	28	40	68	68	68	68	68
NJ 2-11-N-G...	30	50	59	71	99	99	99	99	99	99	56	68	96	96	96	96	96	96	96	96	96	45	57	81	81	81	81	81
NJ 2-12GM-N...	30	50	59	71	99	99	99	99	99	99	56	68	96	96	96	96	96	96	96	96	96	45	57	81	81	81	81	81
NJ 4-30GM-N-200... (Oscillator assembly)	70	100	56	68	96	96	96	96	96	96	49	61	89	89	89	89	89	89	89	89	89	28	40	68	68	68	68	68
NJ 4-30GM-N-200... (Amplifier assembly)	70	100	56	68	96	96	96	96	96	96	49	61	89	89	89	89	89	89	89	89	89	28	40	68	68	68	68	68
NJ 4-12GM-N...	45	50	56	68	96	96	96	96	96	96	51	63	91	91	91	91	91	91	91	91	91	32	44	67	67	67	67	67
NJ 5-18GM-N...	70	50	59	71	99	99	99	99	99	99	56	68	96	96	96	96	96	96	96	96	96	45	57	81	81	81	81	81
NJ 5-18GK-N...	70	50	57	69	97	97	97	97	97	97	52	64	92	92	92	92	92	92	92	92	92	34	46	74	74	74	74	74
NJ 5-18GK-N-150...	70	50	57	69	97	149	150	150	150	150	52	64	92	144	150	150	150	150	150	150	150	34	46	74	126	150	22	34
NJ 8-18GK-N...	70	50	57	69	97	97	97	97	97	97	52	64	92	92	92	92	92	92	92	92	92	34	46	74	74	74	74	74
NJ 8-18GK-N-150...	70	50	57	69	97	149	150	150	150	150	52	64	92	144	150	150	150	150	150	150	150	34	46	74	126	150	22	34
NJ 8-18GM-N...	70	50	59	71	99	99	99	99	99	99	56	68	96	96	96	96	96	96	96	96	96	45	57	81	81	81	81	81
NJ 10-30GM-N...	140	100	59	71	99	99	99	99	99	99	56	68	96	96	96	96	96	96	96	96	96	45	57	81	81	81	81	81
NJ 15-30GK-N...	140	100	57	69	97	97	97	97	97	97	52	64	92	92	92	92	92	92	92	92	92	34	46	74	74	74	74	74
NJ 15-30GK-N-150...	140	100	57	69	97	149	150	150	150	150	52	64	92	144	150	150	150	150	150	150	150	34	46	74	126	150	22	34
NJ 15-30GM-N...	140	100	59	71	99	99	99	99	99	99	56	68	96	96	96	96	96	96	96	96	96	45	57	81	81	81	81	81

5. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2048 X

Table 2: Application as category 2-equipment

Type	Type 1						Type 2						Type 3						Type 4								
	Ci/ nF	Li/ µH	T6	T5	T4	T3	T2-T1	T6	T5	T4	T3	T2-T1	T6	T5	T4	T3	T2-T1	T6	T5	T4	T3	T2-T1	T6	T5	T4	T3	T2-T1
			90	100	74	89	100	100	100	69	84	100	100	100	69	84	100	100	100	51	66	85	85	39	54	67	67
NCB1,5..M..NO...	90	100	74	89	100	100	100	69	84	100	100	100	51	66	85	85	39	54	67	67	67	67	67	67	67	67	67
NCB2-12GK...-NO...	90	100	73	88	100	100	100	69	84	100	100	100	51	66	80	80	39	54	61	61	61	61	61	61	61	61	61
NCB2-12GM...-NO...	90	100	76	91	100	100	100	73	88	100	100	100	62	77	81	81	54	63	63	63	63	63	63	63	63	63	63
NCB4-12GM...-NO...	120	50	74	89	100	100	100	69	84	100	100	100	51	66	74	74	39	52	52	52	52	52	52	52	52	52	52
NCN4-12GK...-NO...	95	100	73	88	100	100	100	69	84	100	100	100	51	66	80	80	39	54	61	61	61	61	61	61	61	61	61
NCN4-12GM...-NO...	95	100	76	91	100	100	100	73	88	100	100	100	62	77	81	81	54	63	63	63	63	63	63	63	63	63	63
NCB5-18GK...-NO...	95	100	73	88	100	100	100	69	84	100	100	100	51	66	80	80	39	54	61	61	61	61	61	61	61	61	61
NCB5-18GM...-NO...	95	100	76	91	100	100	100	73	88	100	100	100	62	77	81	81	54	63	63	63	63	63	63	63	63	63	63
NCB8-18GM...-NO...	120	50	74	89	100	100	100	69	84	100	100	100	51	66	74	74	39	52	52	52	52	52	52	52	52	52	52
NCN8-18GK...-NO...	95	100	73	88	100	100	100	69	84	100	100	100	51	66	80	80	39	54	61	61	61	61	61	61	61	61	61
NCN8-18GM...-NO...	95	100	76	91	100	100	100	73	88	100	100	100	62	77	81	81	54	63	63	63	63	63	63	63	63	63	63
NCB10-30GK...-NO...	105	100	73	88	100	100	100	69	84	100	100	100	51	66	80	80	39	54	61	61	61	61	61	61	61	61	61
NCB10-30GM...-NO...	105	100	76	91	100	100	100	73	88	100	100	100	62	77	81	81	54	63	63	63	63	63	63	63	63	63	63
NCB15-30GM...-NO...	120	150	74	89	100	100	100	69	84	100	100	100	51	66	74	74	39	52	52	52	52	52	52	52	52	52	52
NCN15-30GK...-NO...	110	100	73	88	100	100	100	69	84	100	100	100	51	66	80	80	39	54	61	61	61	61	61	61	61	61	61
NCN15-30GM...-NO...	110	100	76	91	100	100	100	73	88	100	100	100	62	77	81	81	54	63	63	63	63	63	63	63	63	63	63
NJ 0,2-10GM-N...	20	50	73	88	100	100	100	68	83	100	100	100	49	64	67	67	36	42	42	42	42	42	42	42	42	42	42
NJ 0,8-4,5-N...	30	50	73	88	100	100	100	68	83	100	100	100	49	64	67	67	36	42	42	42	42	42	42	42	42	42	42
NJ 0,8-5GM-N...	30	50	73	88	100	100	100	68	83	100	100	100	49	64	67	67	36	42	42	42	42	42	42	42	42	42	42
NJ 1,5-6,5...-N...	30	50	73	88	100	100	100	68	83	100	100	100	49	64	67	67	36	42	42	42	42	42	42	42	42	42	42
NJ 1,5-10GM-N-Y...	20	50	73	88	100	100	100	68	83	100	100	100	49	64	67	67	36	42	42	42	42	42	42	42	42	42	42
NJ 1,5-8GM-N...	30	50	73	88	100	100	100	68	83	100	100	100	49	64	67	67	36	42	42	42	42	42	42	42	42	42	42
NJ 1,5-8-N...	20	50	73	88	100	100	100	68	83	100	100	100	49	64	67	67	36	42	42	42	42	42	42	42	42	42	42
NJ 1,5-18GM-N-D...	50	60	76	91	100	100	100	73	88	100	100	100	62	77	81	81	54	63	63	63	63	63	63	63	63	63	63
NJ 2-11-N...	45	50	73	88	100	100	100	66	81	100	100	100	45	60	89	89	30	45	74	74	74	74	74	74	74	74	74
NJ 2-11-N-G...	30	50	76	91	100	100	100	73	88	100	100	100	62	77	81	81	54	63	63	63	63	63	63	63	63	63	63
NJ 2-12GK-N...	45	50	73	88	100	100	100	69	84	100	100	100	51	66	80	80	39	54	61	61	61	61	61	61	61	61	61
NJ 2-12GM-N...	30	50	76	91	100	100	100	73	88	100	100	100	62	77	81	81	54	63	63	63	63	63	63	63	63	63	63
NJ 2-14GM-N...	30	50	76	91	100	100	100	73	88	100	100	100	62	77	81	81	54	63	63	63	63	63	63	63	63	63	63
NJ 2,5-14GM-N...	30	50	76	91	100	100	100	73	88	100	100	100	62	77	81	81	54	63	63	63	63	63	63	63	63	63	63
NJ 4-12GK-N...	45	50	73	88	100	100	100	69	84	100	100	100	51	66	80	80	39	54	61	61	61	61	61	61	61	61	61
NJ 4-14GK-N...	45	50	73	88	100	100	100	69	84	100	100	100	51	66	80	80	39	54	61	61	61	61	61	61	61	61	61
NJ 4-12GM-N...	45	50	73	88	100	100	100	68	83	100	100	100	49	64	67	67	36	42	42	42	42	42	42	42	42	42	42

5. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2048 X

Continuation Table 2: Application as category 2-equipment

Type	Ci/	Li/	Type 1						Type 2						Type 3						Type 4						
			T6	T5	T4	T3	T2-T1	T6	T5	T4	T3	T2-T1	T6	T5	T4	T3	T2-T1	T6	T5	T4	T3	T2-T1	T6	T5	T4	T3	T2-T1
NJ 4-30GM-N-200... (Oscillator assembly)	70	100	73	88	123	188	192	66	81	116	181	186	45	60	95	160	164	30	45	80	145	149	30	45	74	74	74
NJ 4-30GM-N-200... (Amplifier assembly)	70	100	73	88	100	100	100	66	81	100	100	100	66	81	100	100	100	45	60	89	89	89	30	45	74	74	74
NJ 5-10-11-N...	70	100	73	88	100	100	100	66	81	100	100	100	66	81	100	100	100	45	60	78	78	78	30	45	57	57	57
NJ 5-11-N...	45	50	72	87	100	100	100	65	80	100	100	100	42	57	82	82	82	26	41	63	63	63	26	41	63	63	63
NJ 5-18GK-N...	70	50	73	88	100	100	100	69	84	100	100	100	51	66	80	80	80	39	54	61	61	61	39	54	61	61	61
NJ 5-18GK-N-150...	70	50	73	88	124	150	150	69	84	119	150	150	51	66	101	150	150	39	54	89	136	136	39	54	89	136	136
NJ 5-18GM-N...	70	50	76	91	100	100	100	73	88	100	100	100	62	77	81	81	81	54	63	63	63	63	54	63	63	63	63
NJ 6-22-N...	130	100	73	88	100	100	100	69	84	100	100	100	51	66	80	80	80	39	54	61	61	61	39	54	61	61	61
NJ 8-18GK-N...	70	50	73	88	100	100	100	69	84	100	100	100	51	66	80	80	80	39	54	61	61	61	39	54	61	61	61
NJ 8-18GK-N-150...	70	50	73	88	124	150	150	69	84	119	150	150	51	66	101	150	150	39	54	89	136	136	39	54	89	136	136
NJ 8-18GM-N...	70	50	76	91	100	100	100	73	88	100	100	100	62	77	81	81	81	54	63	63	63	63	54	63	63	63	63
NJ 10-22-N...	130	100	73	88	100	100	100	69	84	100	100	100	51	66	80	80	80	39	54	61	61	61	39	54	61	61	61
NJ 10-30GK...-N...	140	100	73	88	100	100	100	69	84	100	100	100	51	66	80	80	80	39	54	61	61	61	39	54	61	61	61
NJ 10-30GM-N...	140	100	76	91	100	100	100	73	88	100	100	100	62	77	81	81	81	54	63	63	63	63	54	63	63	63	63
NJ 15-30GK...-N...	140	100	73	88	100	100	100	69	84	100	100	100	51	66	80	80	80	39	54	61	61	61	39	54	61	61	61
NJ 15-30GK-N-150...	140	100	73	88	124	150	150	69	84	119	150	150	51	66	101	150	150	39	54	89	136	136	39	54	89	136	136
NJ 15-30GM-N...	140	100	76	91	100	100	100	73	88	100	100	100	62	77	81	81	81	54	63	63	63	63	54	63	63	63	63
NJ 25-50-N...	150	140	73	88	100	100	100	69	84	100	100	100	51	66	80	80	80	39	54	61	61	61	39	54	61	61	61
NJ 20-40-N...	140	140	73	88	100	100	100	69	84	100	100	100	51	66	80	80	80	39	54	61	61	61	39	54	61	61	61

5. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2048 X

Special conditions for safe use

1. For the application within a temperature range of -60 °C to -20 °C the cylindrical inductive sensors of types NC... and NJ... shall be protected against damage due to impact by mounting into an additional housing.
2. The connection facilities of the cylindrical inductive sensors of types NC... and NJ... shall be installed as such that a minimum degree of protection of IP20 in accordance with EN 60529 is met.
3. For relationship between type of the connected circuit, maximum permissible ambient temperature and temperature class as well as the effective internal reactances for the individual types of cylindrical inductive sensors, reference is made to tables 1 and 2 given in the 5. supplement to EC-type-examination certificate PTB 00 ATEX 2048 X.
4. Inadmissible electrostatic charge of parts of the metal housing has to be avoided for the following types of cylindrical inductive sensors. Dangerous electrostatic charge of parts of the metal housing can be avoided by grounding these parts whereas very small parts of the metal housing (e.g. screws) do not need to be grounded:

NCB1,5...M...N0...	NJ 0,8-4,5-N...	NJ 4-12GM-N...
NCB2-12GM...-N0...	NJ 0,8-5GM-N...	NJ 4-30GM-N-200...
NCB4-12GM...-N0...	NJ 1,5-6,5...-N...	NJ 5-11-N-545...
NCB5-18GM...-N0...	NJ 1,5-10GM-N-Y...	NJ 5-11-N-G...
NCB8-18GM...-N0...	NJ 1,5-8GM-N...	NJ 5-18GM-N...
NCB10-30GM...-N0...	NJ 1,5-8-N...	NJ 6-22-N-G...
NCB15-30GM...-N0...	NJ 1,5-18GM-N-D...	NJ 8-18GM-N...
NCN4-12GM...-N0...	NJ 2-11-N-G...	NJ 10-22-N-G...
NCN8-18GM...-N0...	NJ 2-12GM-N...	NJ 10-30GM-N...
NCN15-30GM...-N0...	NJ 2-14GM-N...	NJ 15-30GM-N...
NJ 0,2-10GM-N...	NJ 2,5-14GM-N...	

5. When the following types of cylindrical inductive sensors are applied corresponding to the explosion groups and equipment categories tabulated below, inadmissible electrostatic charge of the plastic enclosures has to be avoided and the equipment shall be labelled with an appropriate warning note.

Type	Application as category-1 equipment	Application as category-2 equipment
NCB10-30GM...-N0...	IIC	-
NCN15-30GM...-N0...	IIC	-
NJ 10-30GM-N...	IIC	-
NJ 15-30GM-N...	IIC	-
NJ 4-30GM-N-200...	IIC	-
NJ 5-18GK-N...	IIC	-
NJ 8-18GK-N...	IIC	-

5. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2048 X

NJ 15-30GK-N...	IIC	-
NJ 5-18GK-N-150...	IIC	-
NJ 8-18GK-N-150...	IIC	-
NJ 15-30GK-N-150...	IIC	-
NCB15-30GM...-N0...	IIC	-
NJ 20-40-N...	not permitted	IIC
NJ 25-50-N...	not permitted	IIC

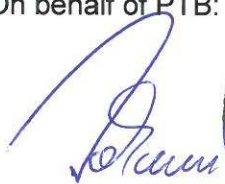
Applied standards

EN 60079-0:2012, EN 60079-11:2012, EN 60079-26:2007

Test report: PTB Ex 15-24245

Konformitätsbewertungsstelle, Sektor Explosionsschutz
On behalf of PTB:

Braunschweig, April 27, 2015





Dr.-Ing. U. Johannsmeyer
Direktor und Professor

6. SUPPLEMENT

according to Directive 94/9/EC Annex III.6

to EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2048 X (Translation)

Equipment: Cylindrical inductive sensors, types NC... and NJ...

Marking:  **II 1 G Ex ia IIC T6...T1 Ga or II 2 G Ex ia IIC T6...T1 Gb**

Manufacturer: Pepperl+Fuchs GmbH

Address: Lilienthalstraße 200
68307 Mannheim, Germany


Description of supplements and modifications

In the future the cylindrical inductive sensors, types NC... and NJ... may also be manufactured and operated as described in the test documents listed in the test report PTB Ex 15-25162

The modifications concern the application of the new state of the standard EN 60079-0, the extension of the EC-type examination certificate by type of protection Ex ia IIIC for the cylindrical inductive sensors, types NC... and NJ... as well as the application of further casting resin systems intended for casting the cylindrical inductive sensors.

Resulting from this – the marking, the “Electrical Data” as well as the “Special Conditions” for the cylindrical inductive sensors, types NC... and NJ... change.

In the future the marking will read:

 **II 1 G Ex ia IIC T6... T1 Ga or II 2 G Ex ia IIC T6...T1 Gb**
resp.

 **II 1 D Ex ia IIIC T135°C Da or II 2 D Ex ib IIIC T135°C Db**

6. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2048 X

Electrical data

Evaluation and supply circuit.....

only for connection to certified intrinsically safe circuits

Ex ia IIC/IIB for EPL Ga

or

Ex ia IIIC for EPL Da

or

Ex ia IIC/IIB or Ex ib IIC/IIB for EPL Gb

or

Ex ia IIIC or Ex ib IIIC for EPL Db

Maximum values:

type 1	type 2	type 3	type 4
$U_i = 16 \text{ V}$	$U_i = 16 \text{ V}$	$U_i = 16 \text{ V}$	$U_i = 16 \text{ V}$
$I_i = 25 \text{ mA}$	$I_i = 25 \text{ mA}$	$I_i = 52 \text{ mA}$	$I_i = 76 \text{ mA}$
$P_i = 34 \text{ mW}$	$P_i = 64 \text{ mW}$	$P_i = 169 \text{ mW}$	$P_i = 242 \text{ mW}$

Table 1

ZSEx10101e b

6. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2048 X

Continuation Table 3: Application as EPL-Gb equipment

Type	Type 1						Type 2						Type 3						Type 4								
	C _i [nF]	L _i [µH]	T6	T5	T4	T3	T2-T1	T6	T5	T4	T3	T2-T1	T6	T5	T4	T3	T2-T1	T6	T5	T4	T3	T2-T1	T6	T5	T4	T3	T2-T1
NJ 4-30GM-N-200... (oscillator unit)	70	100	73	88	123	188	192	66	81	116	181	186	45	60	95	160	164	30	45	80	145	149	30	45	80	145	149
NJ 4-30GM-N-200... (amplifier unit)	70	100	73	88	100	100	100	66	81	100	100	100	45	60	89	89	89	30	45	74	74	74	30	45	74	74	74
NJ 5-10-11-N...	70	100	73	88	100	100	100	66	81	100	100	100	45	60	78	78	78	30	45	57	57	57	30	45	57	57	57
NJ 5-11-N...	45	50	72	87	100	100	100	65	80	100	100	100	42	57	82	82	82	26	41	63	63	63	26	41	63	63	63
NJ 5-18GK-N...	70	50	73	88	100	100	100	69	84	100	100	100	51	66	80	80	80	39	54	61	61	61	39	54	61	61	61
NJ 5-18GK-N-150...	70	50	73	88	124	150	150	69	84	119	150	150	51	66	101	150	150	39	54	89	136	136	39	54	89	136	136
NJ 5-18GM-N...	70	50	76	91	100	100	100	73	88	100	100	100	62	77	81	81	81	54	63	63	63	63	54	63	63	63	63
NJ 6-22-N...	130	100	73	88	100	100	100	69	84	100	100	100	51	66	80	80	80	39	54	61	61	61	39	54	61	61	61
NJ 8-18GK-N...	70	50	73	88	100	100	100	69	84	100	100	100	51	66	80	80	80	39	54	61	61	61	39	54	61	61	61
NJ 8-18GK-N-150...	70	50	73	88	124	150	150	69	84	119	150	150	51	66	101	150	150	39	54	89	136	136	39	54	89	136	136
NJ 8-18GM-N...	70	50	76	91	100	100	100	73	88	100	100	100	62	77	81	81	81	54	63	63	63	63	54	63	63	63	63
NJ 10-22-N...	130	100	73	88	100	100	100	69	84	100	100	100	51	66	80	80	80	39	54	61	61	61	39	54	61	61	61
NJ 10-30GK-N...	140	100	73	88	100	100	100	69	84	100	100	100	51	66	80	80	80	39	54	61	61	61	39	54	61	61	61
NJ 10-30GM-N...	140	100	76	91	100	100	100	73	88	100	100	100	62	77	81	81	81	54	63	63	63	63	54	63	63	63	63
NJ 15-30GK-N...	140	100	73	88	100	100	100	69	84	100	100	100	51	66	80	80	80	39	54	61	61	61	39	54	61	61	61
NJ 15-30GK-N-150...	140	100	73	88	124	150	150	69	84	119	150	150	51	66	101	150	150	39	54	89	136	136	39	54	89	136	136
NJ 15-30GM-N...	140	100	76	91	100	100	100	73	88	100	100	100	62	77	81	81	81	54	63	63	63	63	54	63	63	63	63
NJ 25-50-N...	150	140	73	88	100	100	100	69	84	100	100	100	51	66	80	80	80	39	54	61	61	61	39	54	61	61	61
NJ 20-40-N...	140	140	73	88	100	100	100	69	84	100	100	100	51	66	80	80	80	39	54	61	61	61	39	54	61	61	61

Table 3

6. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2048 X

For relationship between type of connected circuit, maximum ambient temperature for the application as EPL-Da or Db equipment as well as the effective internal reactances for the individual types of cylindrical inductive sensors, reference is made to the following table 4:

Types	C _i [nF]	L _i [μH]	Type 1	Type 2	Type 3	Type 4
			Maximum permissible ambient temperature in °C			
NCB1,5...M...N0...	90	100	100	100	85	67
NCB2-12GK...-N0...	90	100	100	100	80	61
NCB2-12GM...-N0...	90	100	100	100	81	63
NCB4-12GM...-N0...	120	50	100	100	85	67
NCN4-12GK...-N0...	95	100	100	100	80	61
NCN4-12GM...-N0...	95	100	100	100	81	63
NCB5-18GK...-N0...	95	100	100	100	80	61
NCB5-18GM...-N0...	95	100	100	100	81	63
NCB8-18GM...-N0...	120	50	100	100	85	67
NCN8-18GK...-N0...	95	100	100	100	80	61
NCN8-18GM...-N0...	95	100	100	100	81	63
NCB10-30GK...-N0...	105	100	100	100	80	61
NCB10-30GM...-N0...	105	100	100	100	81	63
NCB15-30GM...-N0...	120	150	100	100	85	67
NCN15-30GK...-N0...	110	100	100	100	80	61
NCN15-30GM...-N0...	110	100	100	100	81	63
NJ 0,2-10GM-N...	20	50	100	100	67	41
NJ 0,8-4,5-N...	30	50	100	100	67	41
NJ 0,8-5GM-N...	30	50	100	100	67	41
NJ 1,5-6,5...-N...	30	50	100	100	67	41
NJ 1,5-10GM-N-Y...	20	50	100	100	67	41
NJ 1,5-8GM-N...	30	50	100	100	67	41
NJ 1,5-8-N...	20	50	100	100	67	41
NJ 1,5-18GM-N-D...	50	60	100	100	81	63
NJ 2-11-N...	45	50	100	100	89	74
NJ 2-11-N-G...	30	50	100	100	81	63
NJ 2-12GK-N...	45	50	100	100	80	61
NJ 2-12GM-N...	30	50	100	100	81	63
NJ 2-14GM-N...	30	50	100	100	81	63
NJ 2,5-14GM-N...	30	50	100	100	81	63
NJ 4-12GK-N...	45	50	100	100	80	61
NJ 4-14GK-N...	45	50	100	100	80	61
NJ 4-12GM-N...	45	50	100	100	67	41
NJ 4-30GM-N-200... (oscillator unit)	70	100	100	100	95	80
NJ 4-30GM-N-200... (amplifier unit)	70	100	100	100	89	74
NJ 5-10-11-N...	70	100	100	100	78	57
NJ 5-11-N...	45	50	100	100	82	63
NJ 5-18GK-N...	70	50	100	100	80	61
NJ 5-18GK-N-150...	70	50	100	100	100	89
NJ 5-18GM-N...	70	50	100	100	81	63
NJ 6-22-N...	130	100	100	100	80	61
NJ 8-18GK-N...	70	50	100	100	80	61
NJ 8-18GK-N-150...	70	50	100	100	100	89
NJ 8-18GM-N...	70	50	100	100	81	63
NJ 10-22-N...	130	100	100	100	80	61

6. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2048 X

NJ 10-30GK...-N...	140	100	100	100	80	61
NJ 10-30GM-N...	140	100	100	100	81	63
NJ 15-30GK...-N...	140	100	100	100	80	61
NJ 15-30GK-N-150...	140	100	100	100	100	89
NJ 15-30GM-N...	140	100	100	100	81	63
NJ 25-50-N...	150	140	100	100	80	61
NJ 20-40-N...	140	140	100	100	80	61

Table 4

Special conditions for safe use

- For the application within a temperature range of -60 °C to -20 °C the cylindrical inductive sensors of types NC... and NJ... shall be protected against damage due to impact by mounting into an additional housing.
- The connection facilities of the cylindrical inductive sensors of types NC... and NJ... shall be installed as such that a minimum degree of protection of IP20 in accordance with EN 60529 is met.
- For relationship between type of the connected circuit, maximum permissible ambient temperature and temperature class as well as the effective internal reactances for the individual types of cylindrical inductive sensors, reference is made to tables 2 and 3 given in this 6. supplement to EC-type-examination certificate PTB 00 ATEX 2048 X.
- Inadmissible electrostatic charge of parts of the metal housing has to be avoided for the following types of cylindrical inductive sensors. Dangerous electrostatic charge of parts of the metal housing can be avoided by grounding these parts whereas very small parts of the metal housing (e.g. screws) do not need to be grounded:

NCB1,5...M...N0...	NJ 0,8-4,5-N...	NJ 4-12GM-N...
NCB2-12GM...-N0...	NJ 0,8-5GM-N...	NJ 4-30GM-N-200...
NCB4-12GM...-N0...	NJ 1,5-6,5...-N...	NJ 5-11-N-545...
NCB5-18GM...-N0...	NJ 1,5-10GM-N-Y...	NJ 5-11-N-G...
NCB8-18GM...-N0...	NJ 1,5-8GM-N...	NJ 5-18GM-N...
NCB10-30GM...-N0...	NJ 1,5-8-N...	NJ 6-22-N-G...
NCB15-30GM...-N0...	NJ 1,5-18GM-N-D...	NJ 8-18GM-N...
NCN4-12GM...-N0...	NJ 2-11-N-G...	NJ 10-22-N-G...
NCN8-18GM...-N0...	NJ 2-12GM-N...	NJ 10-30GM-N...
NCN15-30GM...-N0...	NJ 2-14GM-N...	NJ 15-30GM-N...
NJ 0,2-10GM-N...	NJ 2,5-14GM-N...	

- Inadmissible electrostatic charge of the plastic enclosures shall be avoided for the application of the following cylindrical inductive sensors according to the explosion groups and equipment categories specified in the following Table 5. When the respective types of cylindrical inductive sensors are applied in potentially explosive gas atmospheres a corresponding warning note shall be affixed on the sensors or near the sensors respectively. When the sensors are applied in potentially explosive dust atmospheres the corresponding notes given in the operating instructions manual shall be considered.

6. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2048 X

Type	Group II (1 G)	Group II (2 G)	Group III (1D or 2D)
NCB10-30GM...-N0...	IIC	-	III
NCN15-30GM...-N0...	IIC	-	III
NJ 10-30GM-N...	IIC	-	III
NJ 15-30GM-N...	IIC	-	III
NJ 4-30GM-N-200...	IIC	-	-
NJ 5-18GK-N...	IIC	-	III
NJ 8-18GK-N...	IIC	-	-
NJ 15-30GK-N...	IIC	-	III
NJ 5-18GK-N-150...	IIC	-	-
NJ 8-18GK-N-150...	IIC	-	-
NJ 15-30GK-N-150...	IIC	-	III
NCB15-30GM...-N0...	IIC	-	III
NJ 20-40-N...	not permitted	IIC	III
NJ 25-50-N...	not permitted	IIC	III
NCB5-18GK...-N0...	not permitted	-	III
NCB10-30GK...-N0...	not permitted	-	III
NCN8-18GK...-N0...	not permitted	-	III
NCN15-30GK...-N0...	not permitted	-	III
NJ 10-22-N...	not permitted	-	III
NJ 10-30GK...-N...	not permitted	-	III
NJ 15-30GK...-N...	not permitted	-	III

Applied standards

EN 60079-0: 2012 + A11:2013, EN 60079-11: 2012

Test report: PTB Ex 15-25162

Konformitätsbewertungsstelle Sektor Explosionsschutz
On behalf of PTB:

Braunschweig, January 15, 2016

Dr.-Ing. U. Johannsmeier
Direktor und Professor





Translation

(1) **EC TYPE-EXAMINATION CERTIFICATE**

(2) Equipment or protective system intended for use in potentially explosive atmospheres - **Directive 94/9/EC**



(3) EC-Type Examination Certificate Number

TÜV 03 ATEX 2003 X

(4) Equipment: Capacitive sensors types CBN*, CCB*, CCN* und CJ*

(5) Manufacturer: Pepperl + Fuchs GmbH

(6) Address: Königsberger Allee 87, D-68307 Mannheim

(7) This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

(8) The TÜV NORD CERT GmbH & Co. KG, TÜV CERT-Certification Body, notified body number N° 0032 in accordance with Article 9 of the Council Directive of the EC of March 23, 1994 (94/9/EC), certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in the confidential report N° 03 YEX 550064.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 50 014: 1997 + A1 + A2

EN 50 020: 1994

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-type examination certificate relates only to the design, examination and tests of the specified equipment in accordance to the Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

(12) The marking of the equipment or protective system must include the following:

 **II 2 G EEx ia IIC T6**

TÜV NORD CERT GmbH & Co. KG
TÜV CERT-Certification Body
Am TÜV 1
D-30519 Hannover
Tel.: 0511 986-1470
Fax: 0511 986-2555

Hanover, 2003-01-28

Head of the
Certification Body



TÜV NORD CERT



16) Test documents are listed in the test report No.: 03 YEX 550064.

(17) Special conditions for safe use

1. The sensors are not marked with the permissible ambient temperature range in dependence on the temperature class and on the type of the intrinsically safe supply. The designation has to be taken from the table above or from the operating instructions.
2. In the case of the use of the sensors at ambient temperatures from -60°C to -20°C the sensors have to be protected against mechanical damages by appropriated measures.
3. The sensor of the type CJ 40-FP-N... has to be protected against dangerous electrostatic charging when used in apparatus group IIC (information plate at the sensor)
4. The metallic housing parts of the type listed below have to be protected against non-permissible electrostatic charging e.g. by earthen of the metallic housing parts:
 - CCB10-30GM...-N1...,
 - Sensors with the additional marking in the type code of: ...P3-... and ...P4-...

(18) Essential Health and Safety Requirements

no additional ones



Translation

1. SUPPLEMENT to

EC TYPE-EXAMINATION CERTIFICATE No. TÜV 03 ATEX 2003 X

of the company: Pepperl + Fuchs GmbH
Königsberger Allee 87
D-68307 Mannheim

In the future, the capacitive sensors of the types CBN2-F46-N..., CBN5-F46-N..., CCN5-F46A-N..., CCN2-F46A-N..., CBN10-F46-N..., CCN10-F46A-N..., CCB10-30GM...-N..., CJ 1-12GK-N..., CJ 2-18GK-N..., CJ 4-12GK-N..., CJ 6-18GK-N..., CJ 15-40-N... und CJ 40-FP-N... may also be manufactured and operated according to the documents listed in the test report.

The amendments concern the internal design and the conformation of the suitability for the operation in areas that require apparatus of category 1 which requires modified electrical data, marking and supplementary special conditions for safe use, as well.

In the future, the marking of the apparatus reads as follows: **II 1 G EEx ia IIC T6**

Electrical data

Sensor circuit in type of protection Intrinsic Safety EEx ia IIC/IIB

In case of applications that require apparatus of category 1, the permissible maximum ambient temperature in dependence on the temperature class, the type of intrinsically supply, the effective internal capacitance per sensor type, as well, has to be taken from the following table:

Type	C/ nF	Maximum permissible ambient temperature in °C when used in temperature class											
		Type 1 U _i = 16 V I _i = 25 mA P _i = 34 mW			Type 2 U _i = 16 V I _i = 25 mA P _i = 64 mW			Type 3 U _i = 16 V I _i = 52 mA P _i = 169 mW			Type 4 U _i = 16 V I _i = 76 mA P _i = 242 mW		
		T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1
CBN2-F46-N...	45	56	68	78	50	62	72	29	41	51	15	27	37
CCN2-F46A-N...	45	56	68	78	50	62	72	29	41	51	15	27	37
CBN5-F46-N...	45	56	68	78	50	62	72	29	41	51	15	27	37
CCN5-F46A-N...	45	56	68	78	50	62	72	29	41	51	15	27	37
CBN10-F46-N...	45	56	68	78	50	62	72	29	41	51	15	27	37
CCN10-F46A-N...	45	56	68	78	50	62	72	29	41	51	15	27	37
CCB10-30GM...-N...	155	57	69	96	53	65	88	37	49	61	25	37	43
CJ 1-12GK-N...	60	56	68	96	49	61	89	28	40	68	13	25	53
CJ 2-18GK-N...	60	56	68	96	49	61	89	28	40	68	13	25	53
CJ 4-12GK-N...	60	56	68	96	49	61	89	28	40	68	13	25	53
CJ 6-18GK-N...	60	56	68	96	49	61	89	28	40	68	13	25	53
CJ 15-40-N...	145	57	69	97	52	64	92	36	48	76	25	37	61
CJ 40-FP-N...	150	57	69	97	52	64	92	36	48	76	25	37	61



1. Supplement to EC Type-Examination Certificate No. TÜV 03 ATEX 2003 X

The effective internal inductance is negligibly small.
The stated values of effective internal capacitance C_i and inductance L_i consider already a connection cable of a length of 10 m.

In case of applications that require apparatus of category 2 the table of the EC type examination certificate must be used.

Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 50014:1997+A1+A2 EN 50020:2002 EN 1127-1:1997 EN 50284:1999

(16) Test documents are listed in the test report N° 04 YEX 551179.

(17) Special conditions for safe use

1. The sensors are not marked with the permissible ambient temperature range in dependence on the temperature class and the type of the intrinsically safe supply. The designation has to be taken from the table above or from the operating instructions.
2. In the case of the use of the sensors at ambient temperatures from -60°C to -20°C the sensors have to be protected against mechanical damages by appropriated measures.

Avoidance of critical electrostatic charges

3. Cylindrical metallic housing parts of the type listed below have to be protected against non-permissible electrostatic charging e.g. by earthen of the metallic housing parts:
 - CCB10-30GM...-N1...,
 - Sensors with the additional marking in the type code of: ...P3-... and ...P4-...

4. The sensor type CJ 40-FP-N... has to be protected against dangerous electrostatic charging when used as category 1 apparatus and as category 2 apparatus in gases of group IIC (information plate at the sensor)

Only for category 1 applications

5. Sensors of the types CBN2-F46-N..., CCB10-30GM...-N..., CCN2-F46A-N..., CJ 1-12GK-N..., CBN5-F46-N..., CJ 2-18GK-N..., CCN5-F46A-N..., CJ 4-12GK-N..., CBN10-F46-N..., CJ 6-18GK-N..., CCN10-F46A-N..., CJ 15-40-N... have to be protected against hazardous electrostatic charging (information plate at the sensor).
6. Electrostatic charging of connection cables: Specification starting from which cable length and cable type the connection cable has to be protected against hazardous electrostatic charging has to be taken from the operation instructions of the corresponding sensor type.



- (18) Essential Health and Safety Requirements
no additional ones

TÜV NORD CERT GmbH & Co. KG
TÜV CERT-Certification Body
Am TÜV 1
D-30519 Hannover
Tel.: 0511 986-1470
Fax: 0511 986-2555

Hanover, 2004-06-30

A handwritten signature in black ink, appearing to read 'G. H. W. S. H. L.' or similar, written in a cursive style.

Head of the
Certification Body

Translation

2. SUPPLEMENT

to Certificate No. TÜV 03 ATEX 2003 X

Equipment: Capacitive sensors of the types CBN*, CCB*, CCN* and CJ*

Manufacturer: Pepperl + Fuchs GmbH

Address: Lilienthalstrasse 200
68307 Mannheim
Germany

Order number: 8000438840

Date of issue: 2015-04-01

Amendments:

The basic safety concept of the device remains unchanged. The supplement concerns changes of the device including the assessment on the standards shown below.

The Capacitive sensors of the types CBN*, CCB*, CCN* and CJ* may also be manufactured according to the test documents listed in the test report 15 203 147956.

The electrical data as well as all other data remain unchanged and are still valid for this supplement.

The equipment incl. of this supplement meets the requirements of these standards:

EN 60079-0:2012

EN 60079-11:2012

EN 60079-26:2007

The marking is as follows:

 **II 1 G Ex ia IIC T6...T1 Ga resp.**
II 2 G Ex ia IIC T6...T1 Gb

(16) The test documents are listed in the test report No. 15 203 147956.

(17) Special conditions for safe use

The special conditions for safe use changes as follows:

1. The sensors are not marked with the permissible ambient temperature range in dependence on the temperature class and the type of the intrinsically safe supply. The designation has to be taken from the table above or from the operating instructions.
2. In the case of the use of the sensors at ambient temperatures from -60°C to -20°C the sensors have to be protected against mechanical damages by appropriated measures.

2. Supplement to Certificate No. TÜV 03 ATEX 2003 X

3. The metallic housing parts of the sensor types listed below shall be protected against non-permissible electrostatic charging e.g. by earthen of the metallic housing parts.

Typen:

- CCB10-30GM...-N1...,

- Sensors with the additional marking in the type code of: ...P3-... and ...P4-...

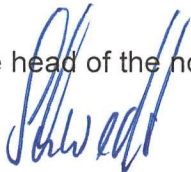
4. The sensor types CBN2-F46-N..., CCN2-F46A-N..., CBN5-F46-N..., CCN5-F46A-N..., CBN10-F46-N..., CCN10-F46A-N..., CCB10-30GM...-N..., CJ1-12GK-N..., CJ2-18GK-N..., CJ4-12GK-N..., CJ6-18GK-N..., CJ15-40-N..., shall be protected against hazardous electrostatic charging when used as category 1 apparatus in gases of group IIC (information plate at the sensor and information inside the user manual).
5. The sensor type CJ40-FP-N... shall be protected against hazardous electrostatic charging when used as category 1 apparatus in gases of group IIC or IIB or IIA (information plate at the sensor and information inside the user manual).
6. The sensor types CJ40-FP-N... and CJ15-40-N... shall be protected against dangerous electrostatic charging when used as category 2 apparatus in gases of group IIC (information plate at the sensor).
7. For the sensors CJ40-FP-N-P3... and CJ40-FP-N-P4... for use in Group II, category 1, the material composition limits of metallic parts of enclosures (e.g. aluminium, magnesium, titanium and zirconium) are exceeded. The suitability of the equipment must be determined for the particular application, for example, to avoid an ignition hazard due to impact or friction.

(18) Essential Health and Safety Requirements

No additional ones

TÜV NORD CERT GmbH, Langemarckstraße 20, 45141 Essen, notified by the central office of the countries for safety engineering (ZLS), Ident. Nr. 0044, legal successor of the TÜV NORD CERT GmbH & Co. KG Ident. Nr. 0032

The head of the notified body



Schwedt

Hanover office, Am TÜV 1, 30519 Hanover, Tel.: +49 (0) 511 986-1455, Fax: +49 (0) 511 986-1590



1 **EC - TYPE EXAMINATION CERTIFICATE**

2 **Equipment or Protective System Intended for use in Potentially Explosive Atmospheres
Directive 94/9/EC**

3 EC - Type Examination Certificate Number: **Baseefa06ATEX0092**

4 Equipment or Protective System: **Type KCD2-SR-Ex*.* Switch Amplifier**

5 Manufacturer: **Pepperl + Fuchs GmbH**

6 Address: **Königsberger Allee 87, 68307 Mannheim, Germany**

7 This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8 Baseefa (2001) Ltd., Notified Body number 1180, in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential Report No. **05(C)0856/1**

9 Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 60079-0: 2004 EN 50020: 2002 EN 60079-26: 2004 IEC 61241-0: 2004 EN 61241-11: 2005

except in respect of those requirements listed at item 18 of the Schedule.

10 If the sign "X" is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.

11 This EC - TYPE EXAMINATION CERTIFICATE relates only to the design and construction of the specified equipment or protective system. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.

12 The marking of the equipment or protective system shall include the following :

 **II (I) GD** [Ex ia] **II C** $-20^{\circ}\text{C} \leq T_a \leq +60^{\circ}\text{C}$
[Ex iaD]

 **I (M1)** [Ex ia] **I**

This certificate may only be reproduced in its entirety, without any change, schedule included.

Baseefa Customer Reference No. **0808**

Project File No. **05/0856**

This certificate is granted subject to the general terms and conditions of Baseefa (2001) Ltd. It does not necessarily indicate that the equipment may be used in particular industries or circumstances.

R S SINCLAIR

DIRECTOR

On behalf of

Baseefa (2001) Ltd.

Baseefa
Rockhead Business Park, Staden Lane,
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Baseefa is a trading name of Baseefa (2001) Ltd
Registered in England No. 4305578 at the above address



13

Schedule

14

Certificate Number Baseefa06ATEX0092

15 Description of Equipment or Protective System

The Type KCD2-SR-Ex*.* Switch Amplifiers are designed to transfer digital signals from the hazardous area to unspecified apparatus located in the non-hazardous area. The voltage and current passed to the hazardous area are limited to intrinsically safe levels and have linear characteristics. Up to two hazardous area channels fitted are galvanically isolated from the non-hazardous area circuit using transformers.

The Type KCD2-SR-Ex*.* Switch Amplifier comprise a number of electronic components, including isolating transformers, fuses, zener diodes and resistors all mounted on a single printed circuit board and housed in a plastic enclosure with polarised plug-in terminals for hazardous and non-hazardous area connections. The non-hazardous area connections are via relay contacts with configuration switches allowing the setting of the direction of operation and lead monitoring. LED indication is provided for power-on and channel status.

There are three models of the Type KCD2-SR-Ex*.* Switch Amplifier, the Type KCD2-SR-Ex2 Two Channel Switch Amplifier, the Type KCD2-SR-Ex1 Single Channel Amplifier and Type KCD2-SR-Ex1.LB Single Channel Switch Amplifier. The Types KCD2-SR-Ex1 & KCD2-SR-Ex1.LB are depopulated versions of the Type KCD2-SR-Ex2 with only one hazardous area channel.

Input/Output Parameters

Non-Hazardous Area Terminals 5 to 8, 9 & 10 and Power Rail Connections PR1 & PR2

$U_m = 253V$ r.m.s.

The circuit connected to non-hazardous area terminals 9 & 10 or Power Rail Connections PR1 & PR2 is designed to operate from a d.c. supply voltage up to 30V.

Non-hazardous area terminals 5 & 6 (Channel 1) and 7 & 8 (Channel 2) are connected to relay contacts which can switch up to 253V r.m.s & 2A r.m.s.

Power Rail Connections PR4 (Fault Bus)

$U_m = 40V$ d.c.

The circuit connected to Power Rail Connection PR4 is designed to operate from a d.c. supply voltage up to 30V.

Hazardous Area Terminals 1 w.r.t. 2 (Channel 1)

Or

Hazardous Area Terminals 3 w.r.t. 4 (Channel 2 – KCD2-SR-Ex2 model only)

$U_o = 10.5V$ $U_i = 12V$
 $I_o = 17.1mA$
 $P_o = 45mW$
 $C_i = 0$
 $L_i = 0$

The capacitance and either the inductance or inductance to resistance ratio (L/R) of the load connected to output terminals of either channel must not exceed the following values:



GROUP	CAPACITANCE (μF)	INDUCTANCE (mH)	OR L/R RATIO ($\mu\text{H}/\text{ohm}$)
IIC	2.41	121.5	801
IIB	16.8	486.3	1,628
IIA	75.0	972.7	1,628
I	73.1	1,000	1,628

Note: The above load parameters apply where:

1. The external circuit contains no combined lumped inductance L_i and capacitance C_i greater than 1% of the above values
- Or 2. The inductance and capacitance are distributed as in a cable.
- Or 3. The external circuit contains either only lumped inductance or lumped capacitance in combination with a cable.

In all other situations e.g. the external circuit contains combined lumped inductance or lumped capacitance, up to 50% of each of the L and C values is allowed.

16 Report Number

05(C)0856/1

17 Special Conditions for Safe Use

None

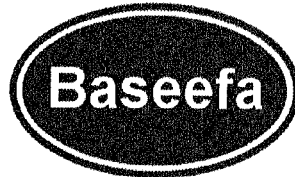
18 Essential Health and Safety Requirements

All relevant Essential Health and Safety Requirements are covered by the standards listed at item 9.

19 Drawings and Documents

Number	Sheet	Issue	Date	Description
16-533BS	1	Original	2006-May-15	Summary – KCD2-SR-Ex*.*
16-533BS-00	1 to 8	Original	2006-Apr-25	Description – KCD2-SR-Ex*.*
16-533BS-01	1 & 2	Original	2006-Apr-25	Schematic – KCD2-SR-Ex2 K-System Slimline
16-533BS-01	3 & 4	Original	2006-Apr-25	Schematic – KCD2-SR-Ex1.* K-System Slimline
16-533BS-02	1	Original	2005-Dec-05	Relevant Components – KCD2-SR-Ex*.* / HiC282*
16-533BS-03	1 of 5	Original	2005-Sep-30	Assembly drawing wired top side – KCD2-SR-Ex1.* / KCD2-SR-Ex2
16-533BS-03	2 of 5	Original	2005-Sep-30	Assembly drawing SMD top side – KCD2-SR-Ex2
16-533BS-03	3 of 5	Original	2005-Sep-30	Assembly drawing SMD bottom side – KCD2-SR-Ex2
16-533BS-03	4 of 5	Original	2005-Sep-30	Assembly Drawing SMD top side – KCD2-SR-Ex1.*
16-533BS-03	5 of 5	Original	2005-Sep-30	Assembly Drawing SMD bottom side – KCD2-SR-Ex1.*
16-533-04	1 & 2	Original	2005-Dec-05	Housing – KCD2
16-533BS-05	1 to 4	Original	2005-Sep-30	PCB Layout – KCD2-SR-Ex1 (-Ex2).(LB)
16-533BS-06	1 to 4	Original	2005-Dec-05	Transformer – KCD2-SR-Ex*.* / HiC282*
16-533BS-09	1 & 2	Original	2006-Apr-25	Instructions – KCD2-SR-Ex*.*
16-533BS-10	1 to 3	Original	2006-May-08	Type Label – KCD2-SR-Ex*.*

The above drawings are associated and held with IECEx Certificate No. IECEx BAS 06.0025



1 **SUPPLEMENTARY EC - TYPE EXAMINATION CERTIFICATE**

2 **Equipment or Protective System Intended for use in Potentially Explosive Atmospheres
Directive 94/9/EC**

- 3 Supplementary EC - Type Examination Certificate Number: **Baseefa06ATEX0092/1**
- 4 Equipment or Protective System: **Type KCD2-SR-Ex*. * Switch Amplifier**
- 5 Manufacturer: **Pepperl + Fuchs GmbH**
- 6 Address: **Königsberger Allee 87, 68307 Mannheim, Germany**
- 7 This supplementary certificate extends EC – Type Examination Certificate No. Baseefa06ATEX0092 to apply to equipment or protective systems designed and constructed in accordance with the specification set out in the Schedule of the said certificate but having any variations specified in the Schedule attached to this certificate and the documents therein referred to.

This supplementary certificate shall be held with the original certificate.

This certificate may only be reproduced in its entirety, without any change, schedule included.

Baseefa Customer Reference No. **0808**

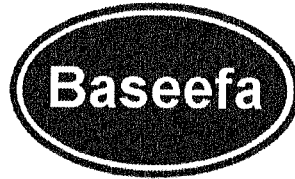
Project File No. **06/0971**

This certificate is granted subject to the general terms and conditions of Baseefa (2001) Ltd. It does not necessarily indicate that the equipment may be used in particular industries or circumstances.

Baseefa

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Baseefa is a trading name of Baseefa (2001) Ltd
Registered in England No. 4305578 at the above address

R S SINCLAIR
DIRECTOR
On behalf of
Baseefa (2001) Ltd.



13

Schedule

14

Certificate Number Baseefa06ATEX0092/1

15 **Description of the variation to the Equipment or Protective System**

Variation 1.1

To permit a minor change to the transformer design not affecting the original assessment.

16 **Report Number**

None.

17 **Special Conditions for Safe Use**

None

18 **Essential Health and Safety Requirements**

Compliance with the Essential Health and Safety Requirements is not affected by this variation.

19 **Drawings and Documents**

Number	Sheet	Issue	Date	Description
16-533BS A	1	A	2006-Nov-15	Summary – KCD2-SR-Ex**
16-533BS-00A	1 to 8	A	2006-Nov-15	Description – KCD2-SR-Ex**
16-533BS-06A	1 to 4	A	2006-Nov-15	Transformer – KCD2-SR-Ex** / HiC282*

The above drawings are associated and held with IECEx Certificate No. IECEx BAS 06.0025/1

Signature Certificate



Document Reference: UNBX2YIDD2RBXI5M37P8JX



Martin Morgan

Party ID: YTATZRJ5G2L7MVT9YB2EJM

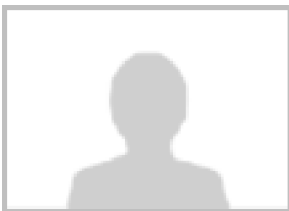
IP Address: 81.134.150.98

VERIFIED EMAIL: mm@pidesign.co.uk

Electronic Signature:

Multi-Factor
Digital Fingerprint Checksum

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Dan Hill

Party ID: VT5H45I2S2NNKFUXUCWM23

IP Address: 81.134.150.98

VERIFIED EMAIL: djh@pidesign.co.uk

Electronic Signature:

Multi-Factor
Digital Fingerprint Checksum

9b1d87721047d00ef66b9f7f4bc3ff56f53d45cb



Timestamp

2017-02-08 07:42:39 -0800

2017-02-08 07:42:39 -0800

2017-02-08 07:40:32 -0800

2017-02-08 07:28:05 -0800

2017-02-08 07:27:09 -0800

2017-02-08 07:26:55 -0800

Audit

All parties have signed document. Signed copies sent to: P I Design Ltd, Martin Morgan, and Dan Hill.

Document signed by Martin Morgan (mm@pidesign.co.uk) with drawn signature. - 81.134.150.98

Document viewed by Martin Morgan (mm@pidesign.co.uk). - 81.134.150.98

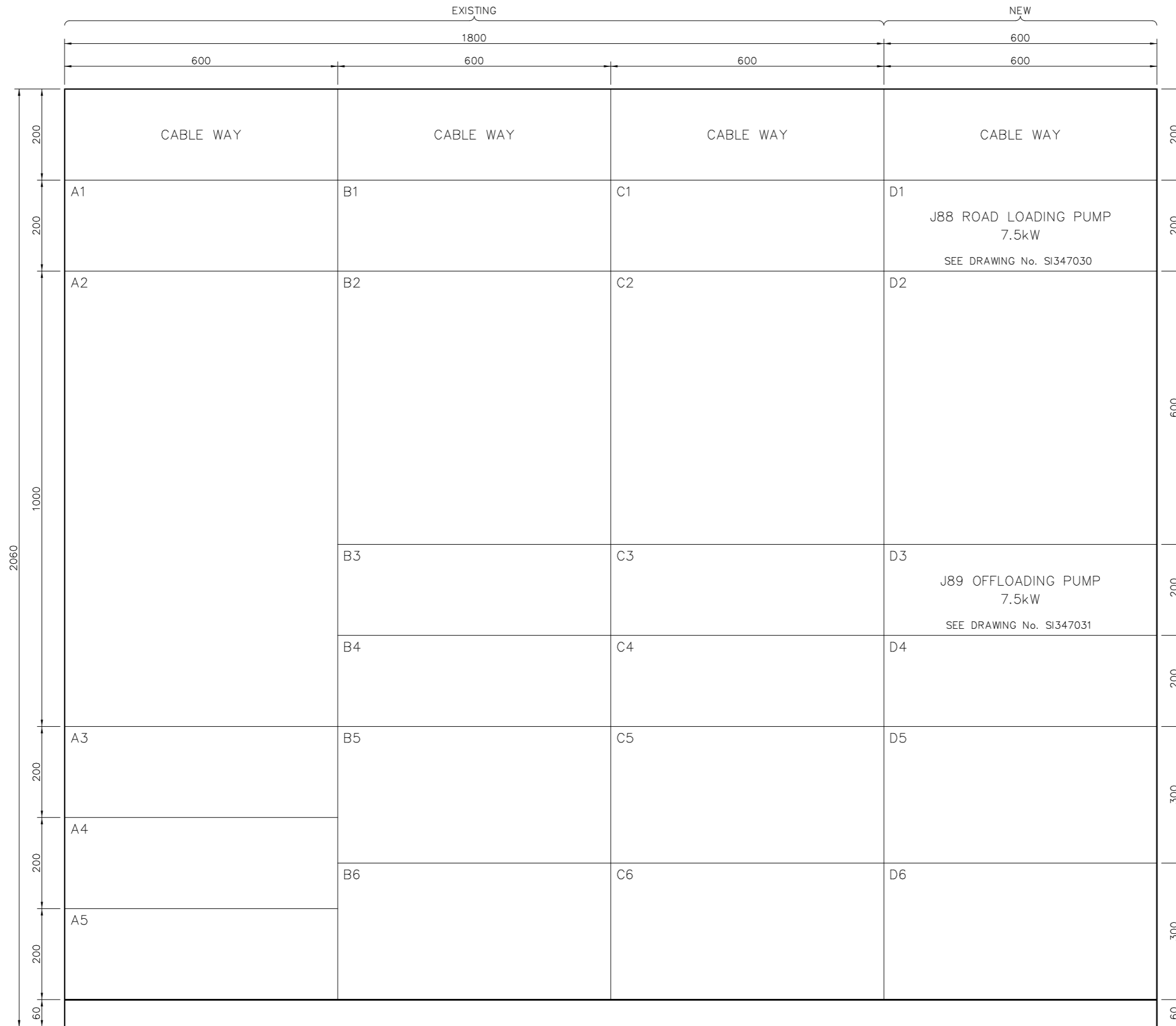
Document signed by Dan Hill (djh@pidesign.co.uk) with drawn signature. - 81.134.150.98

Document viewed by Dan Hill (djh@pidesign.co.uk). - 81.134.150.98

Document created by P I Design Ltd (signature@pidesign.co.uk). - 81.134.150.98



This signature page provides a record of the online activity executing this contract.


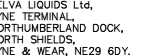



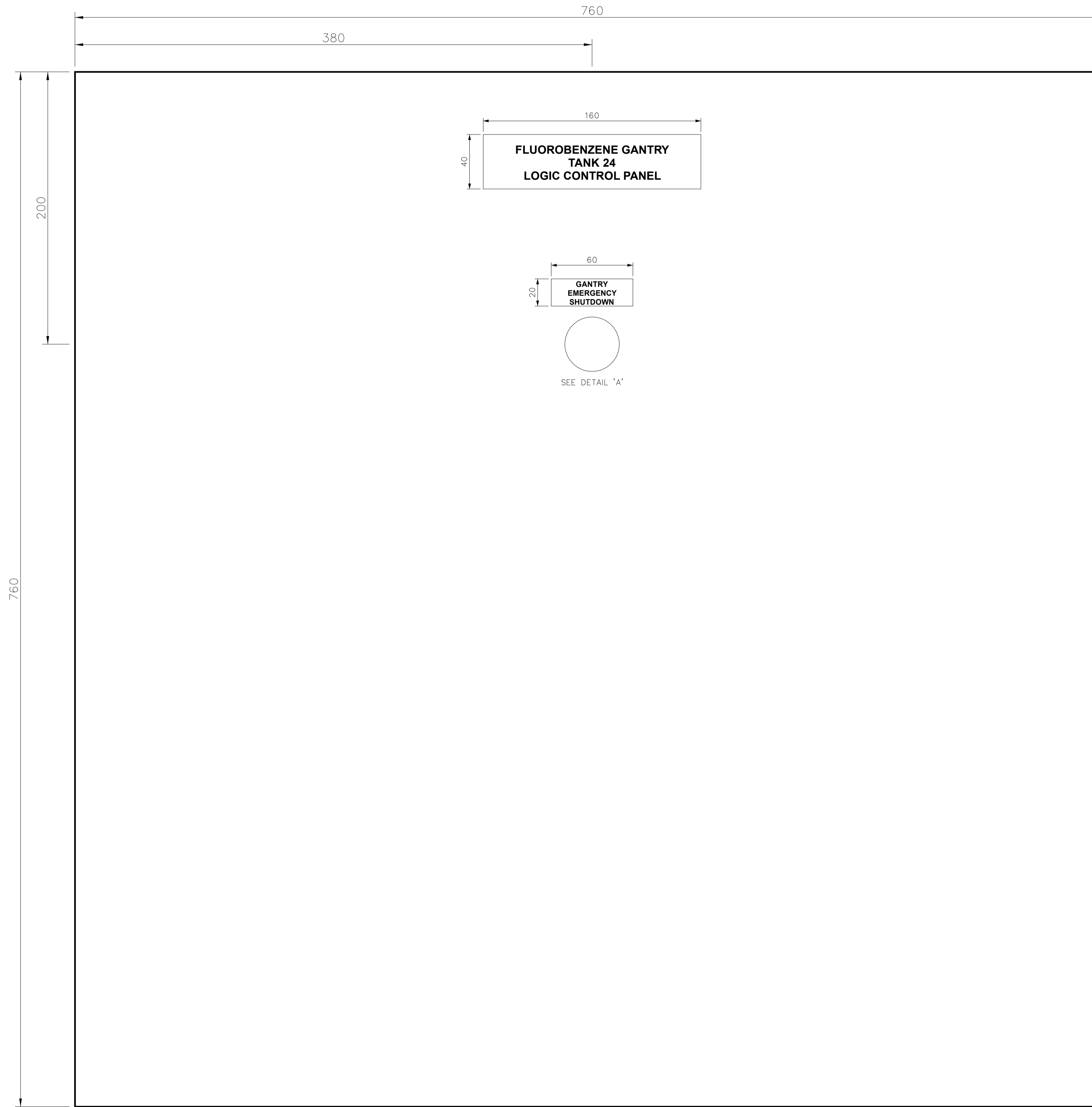
NOTES:
1. ALL DIMENSIONS IN mm UNLESS OTHERWISE STATED.

SCALE 1:5
WHEN PRINTED TO FULL A1
SIZE ONLY

REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION
A	24/09/97	M.S.	M.S.	D.R.R	D.R.R	ORIGINAL ISSUE

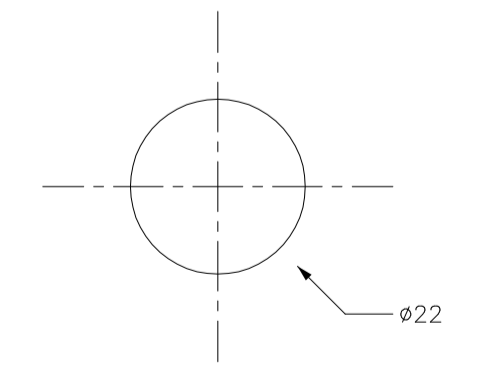
PLANT	SIMON STORAGE - TYNE TERMINAL	
TITLE	FLUOROBENZENE SYSTEM TANK 24 M.C.C. COMPARTMENT DETAILS	
DATE	24/09/97	
CLIENT DRG. No.	P&I DRG No. SI347003	



RITTAL AE 1077

CUT OUT DETAILS
DETAIL 'A' (SCALE 1:1)



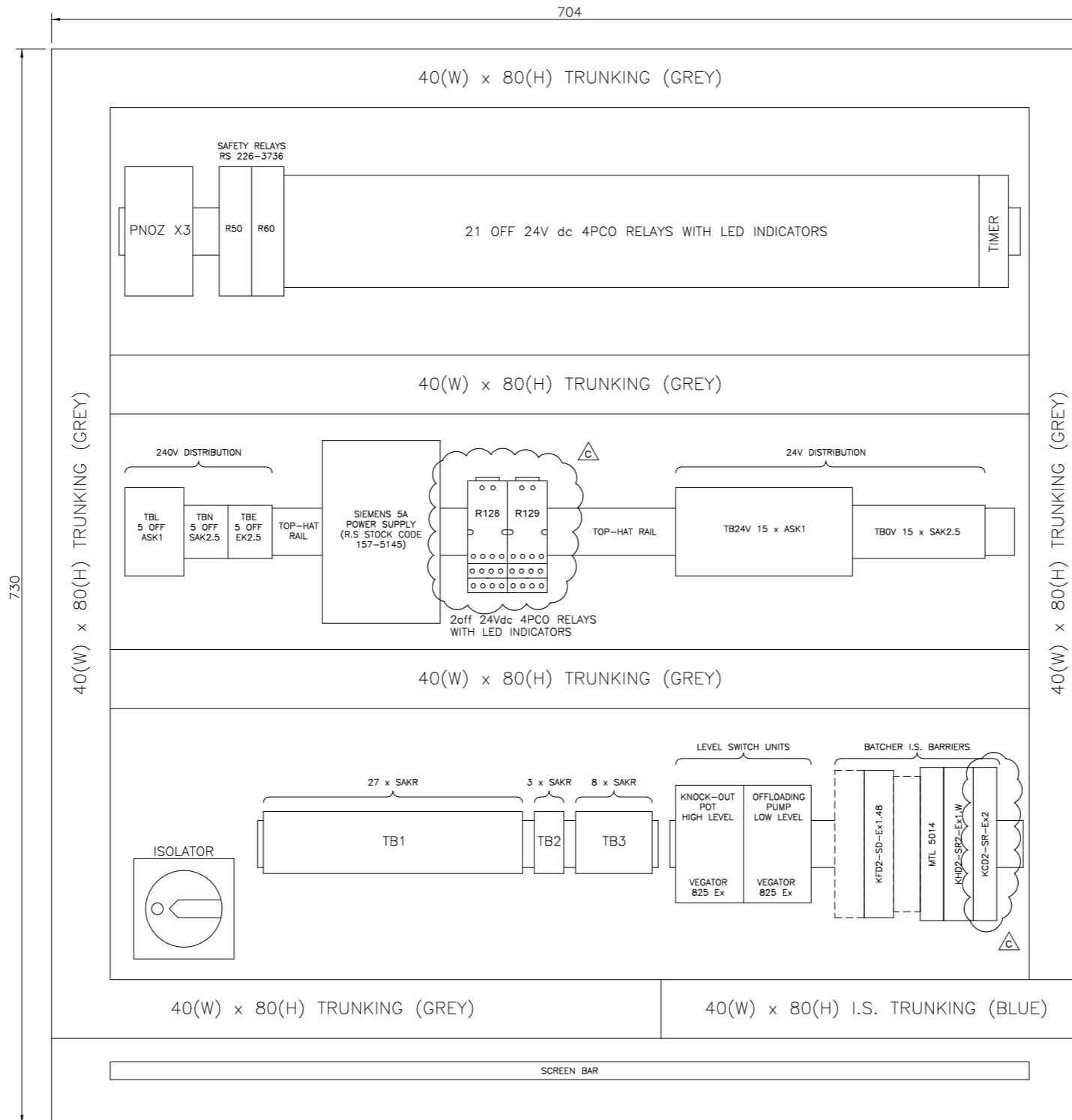
- NOTES:**
1. ALL DIMENSIONS IN mm UNLESS OTHERWISE STATED.
 2. IP RATING: IP 56
 3. CABLE ENTRY: BOTTOM
 4. PANEL DEPTH: 210
 5. SEE DRAWING No. SI347005 FOR INTERNAL LAYOUT

SCALE 1:2
WHEN PRINTED TO FULL A1
SIZE ONLY

REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION
A	03/10/97	M.S.	M.S.	D.R.R.	D.R.R.	ORIGINAL ISSUE

PLANT	SIMON STORAGE - TYNE TERMINAL		
TITLE	FLUOROBENZENE SYSTEM TANK 24 LOGIC PANEL FRONT LAYOUT		
DATE	03/10/97		
CLIENT	Simon Storage Terminals VELVA LIQUIDS LTD, TYNE TERMINAL, NORTHUMBERLAND DOCK, NORTH SHIELDS, TYNE & WEAR, NE29 6DY.		
SHEET	01 OF 01		
CLIENT DRG. No.	P&I DRG No: SI347004		





RITTAL AE 1077
BACKPLATE

- NOTES:
1. ALL DIMENSIONS IN mm UNLESS OTHERWISE STATED.
 2. IP RATING: IP 56
 3. CABLE ENTRY: BOTTOM
 4. SEE DRAWING No. SI347004 FOR FRONT OF PANEL DETAILS

SCALE 1:2
WHEN PRINTED TO FULL A1
SIZE ONLY

IF NOT SIGNED THIS DOCUMENT IS UNCONTROLLED

REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION
A	08/10/97	M.S.	M.S.	D.R.R	D.R.R	ORIGINAL ISSUE
B	19/06/14	P.P.	P.P.	M.M.	M.M.	BATCHER & METER UPGRADE
C	31/01/17	P.P.	P.P.	M.M.	M.M.	ROAD TANKER SENSOR ADDED

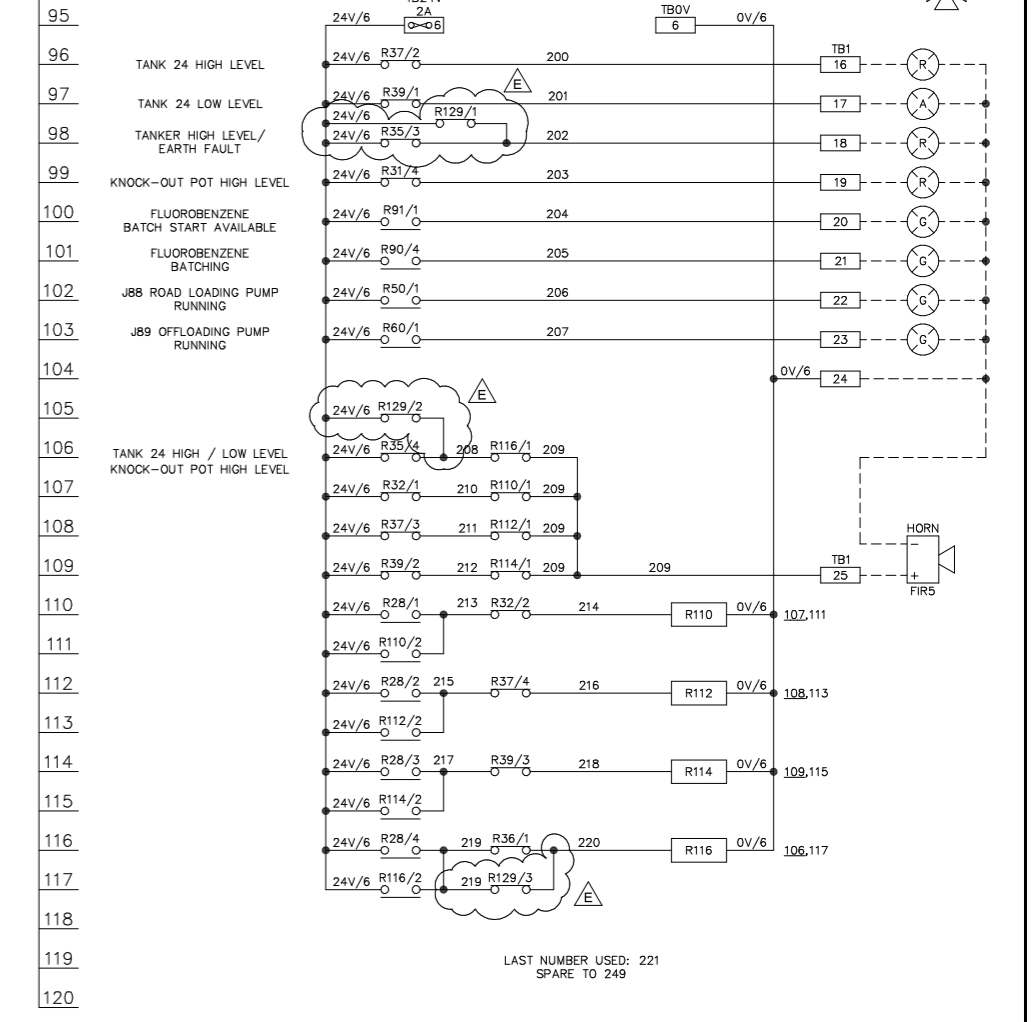
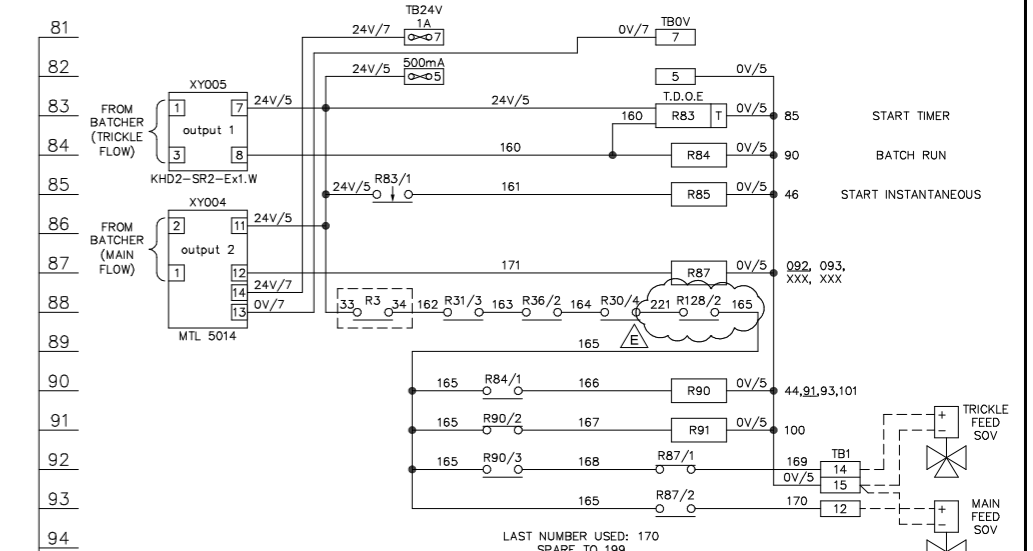
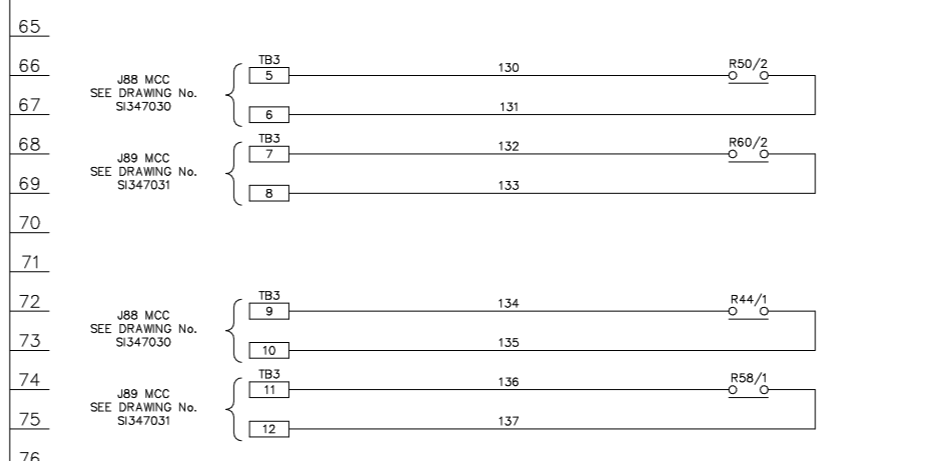
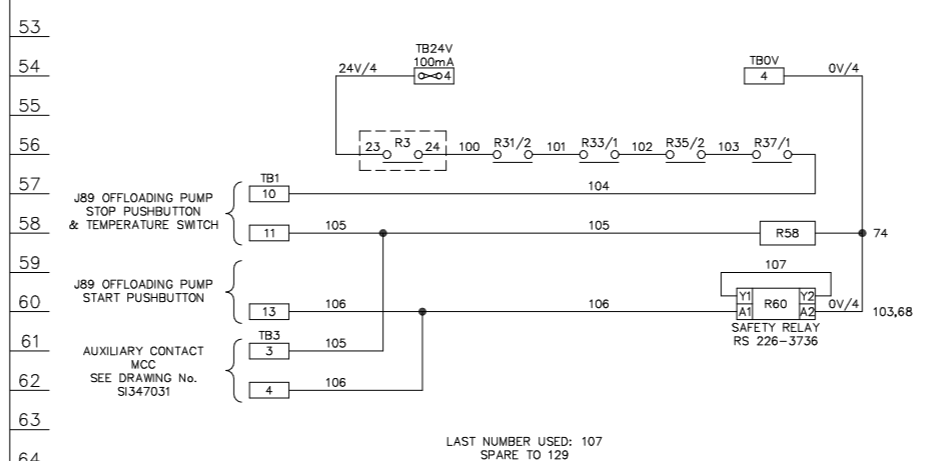
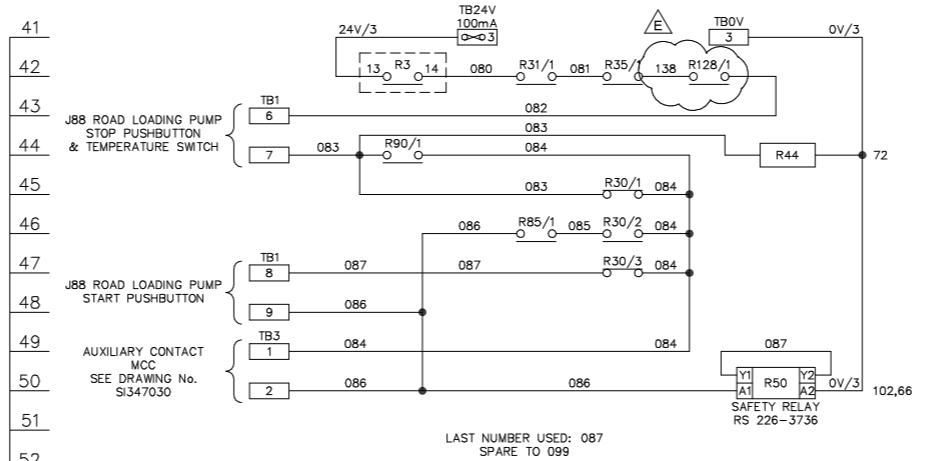
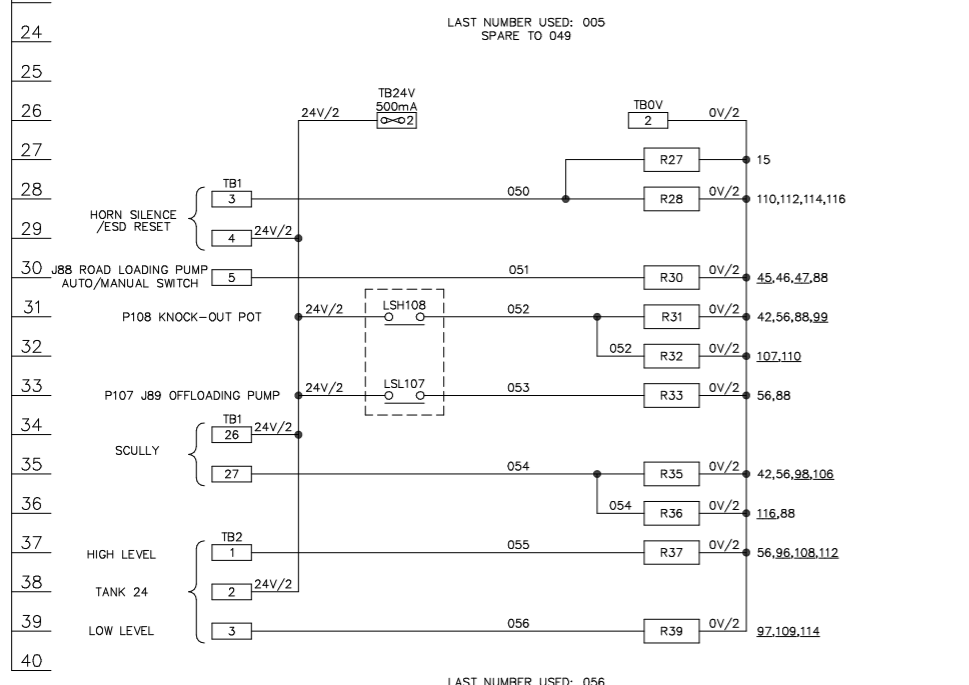
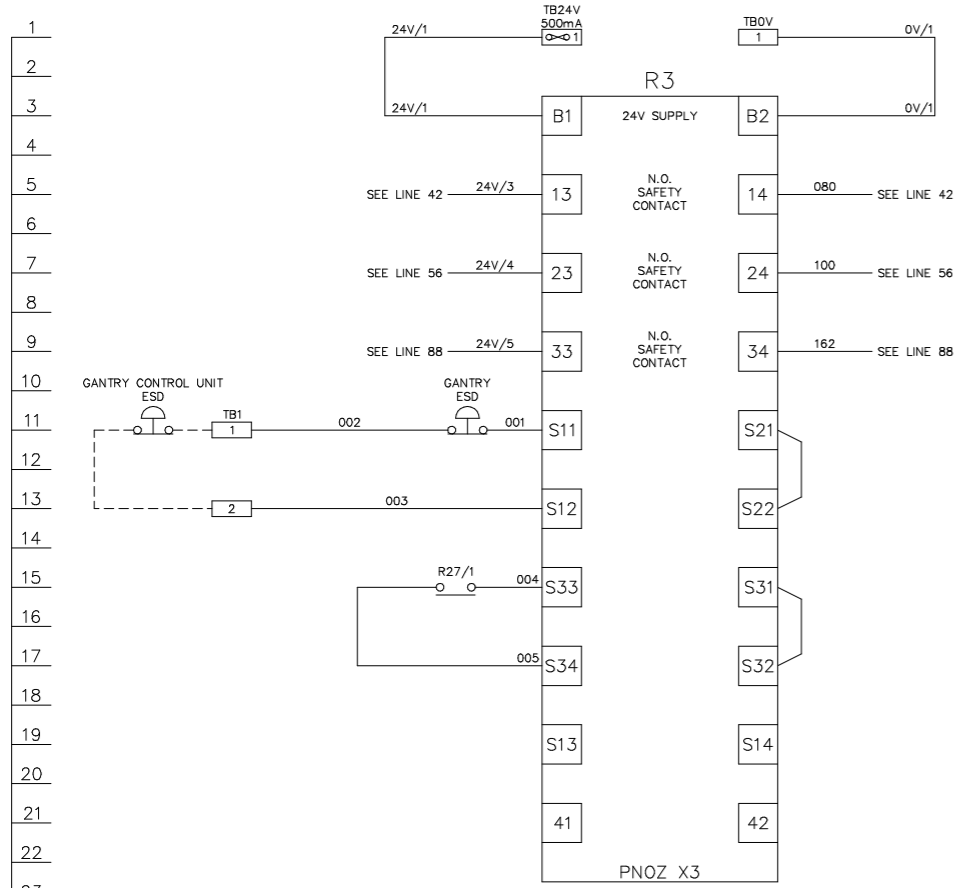
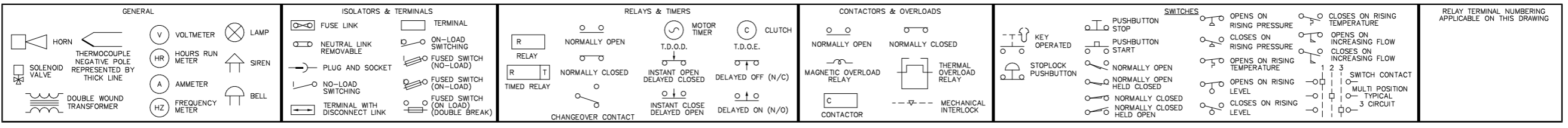
PLANT	INTER TERMINALS - TYNE TERMINAL
TITLE	FLOUROBENZENE SYSTEM - TANK 24 LOGIC PANEL INTERNAL LAYOUT
CLIENT DRG. No.	P&I DRG No. SI347005_DWG

inter terminals
inter terminals Tyne Terminal
North Shields
Tyne & Wear
NE29 6DY

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

SHEET 1 OF 1

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



IF NOT SIGNED THIS DOCUMENT IS UNCONTROLLED

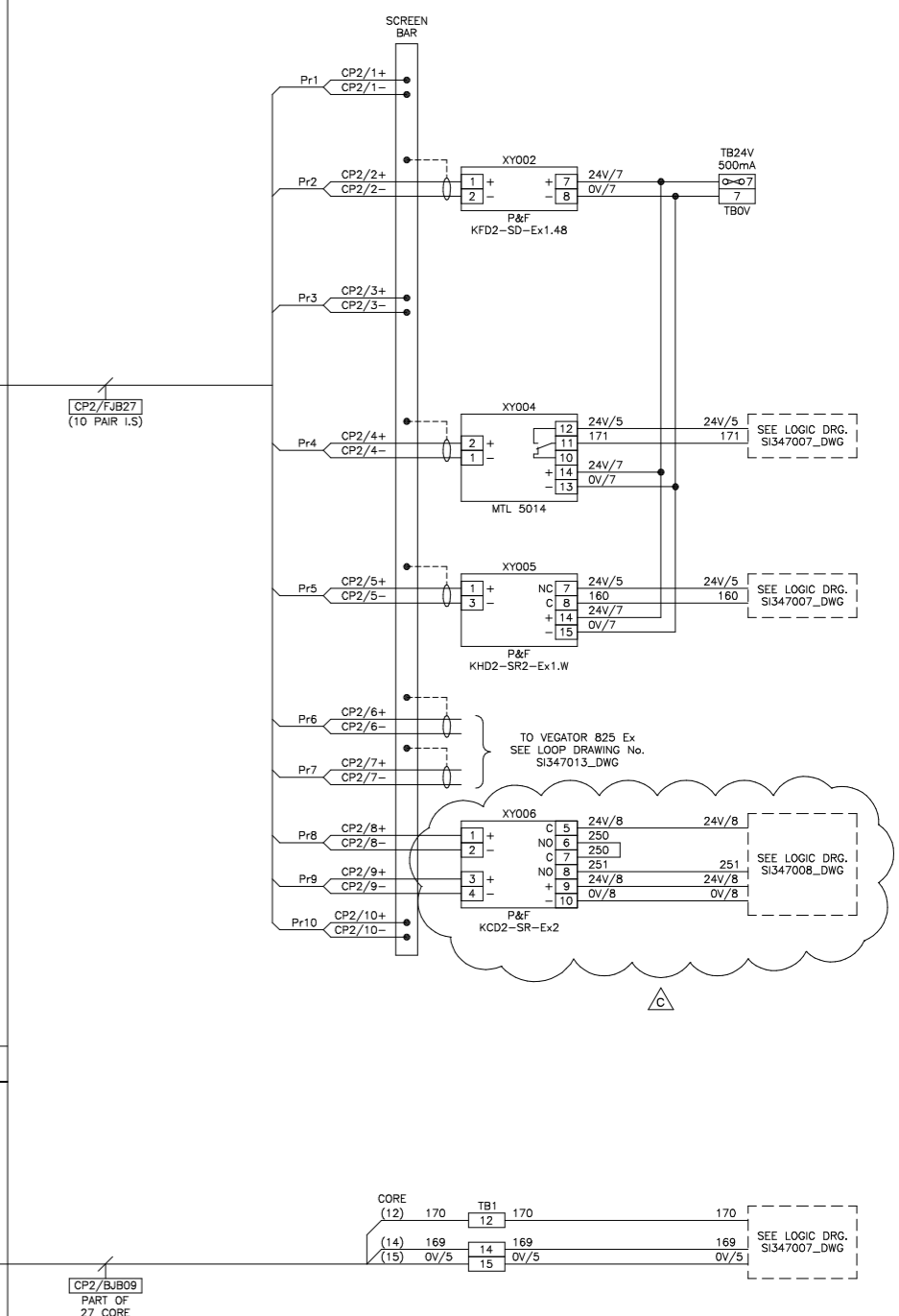
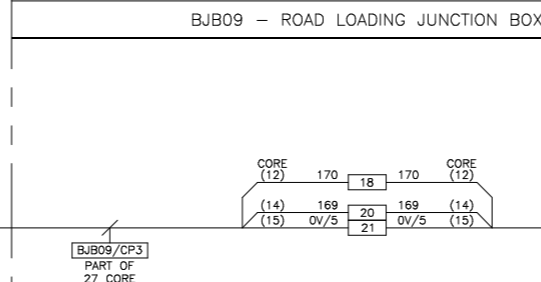
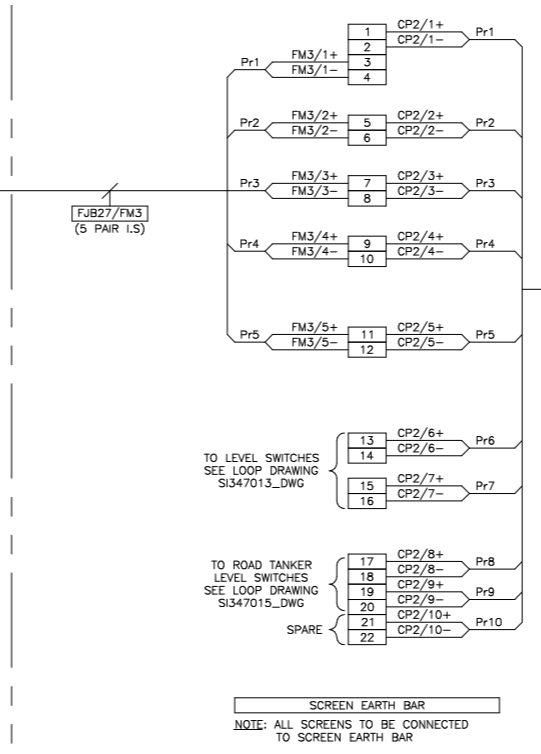
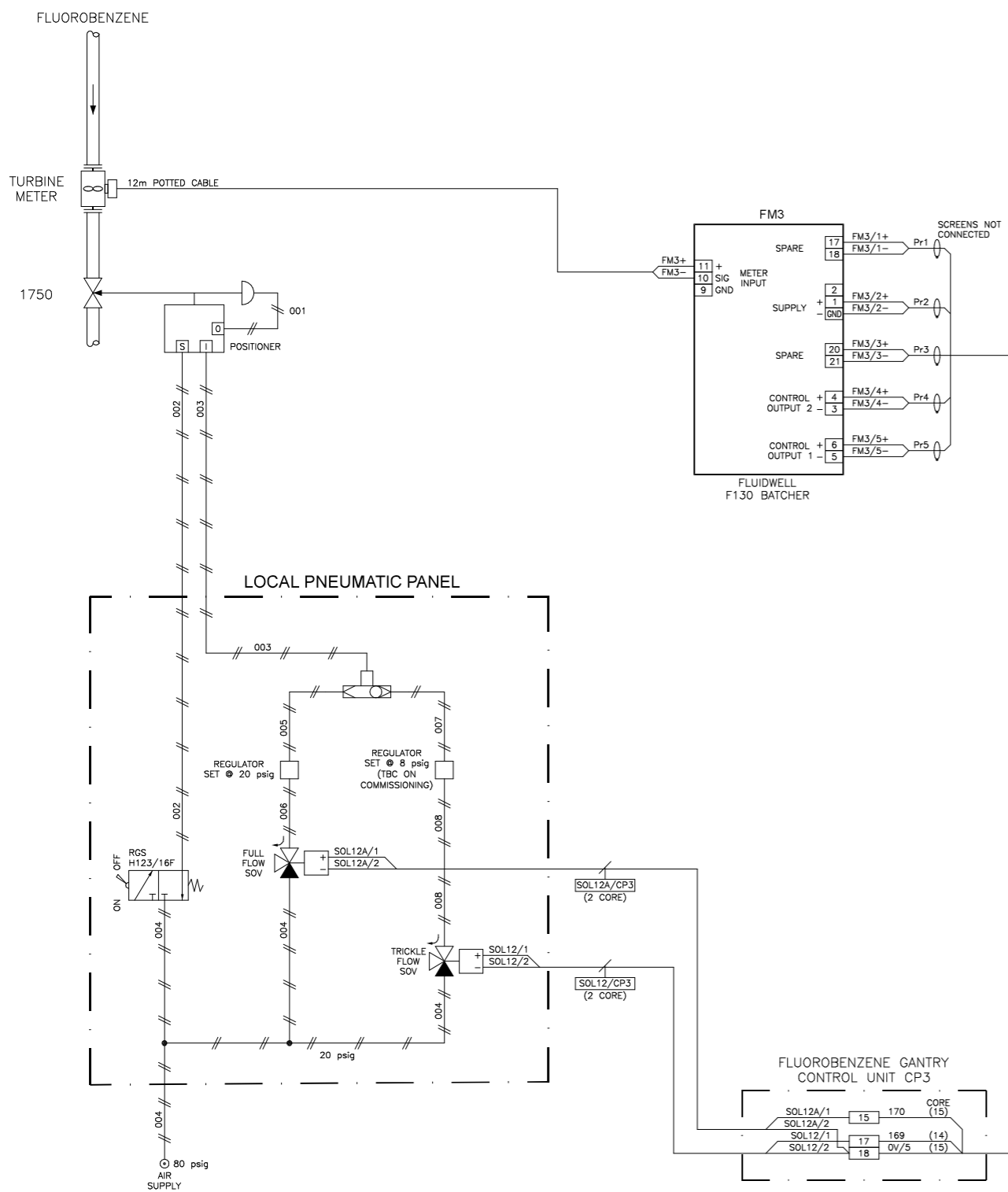
REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION
A	08/10/97	M.S.	M.S.	D.R.R.	D.R.R.	ORIGINAL ISSUE
B	24/11/97	M.S.	N.L.	D.R.R.	D.R.R.	AS BUILT
C	18/09/98	D.P.	N.L.	D.R.R.	D.R.R.	GENERAL UPDATE
D	19/06/14	P.P.	P.P.	M.M.	M.M.	BATCHER & METER UPGRADE
E	31/01/17	P.P.	P.P.	M.M.	M.M.	ROAD TANKER SENSOR ADDED

PLANT	INTER TERMINALS - TYNE TERMINAL
TITLE	FLOUROBENZENE SYSTEM - TANK 24 LOGIC DRAWING 1
CLIENT DRG. No.	P&I DRG No. S1347007 DWG

inter terminals
 Inter Terminals Tyne Terminal
 Northumberland Dock
 Hayholme Road
 North Shields
 Tyne & Wear
 NE29 6DY

P & I Design Ltd
 P&I DESIGN
 www.pidesign.co.uk

SHEET 1 OF 1



CERTIFIED EQUIPMENT			
TAG No.	CERTIFICATE No.	ATEX CERTIFICATION	I.S. CALCULATION

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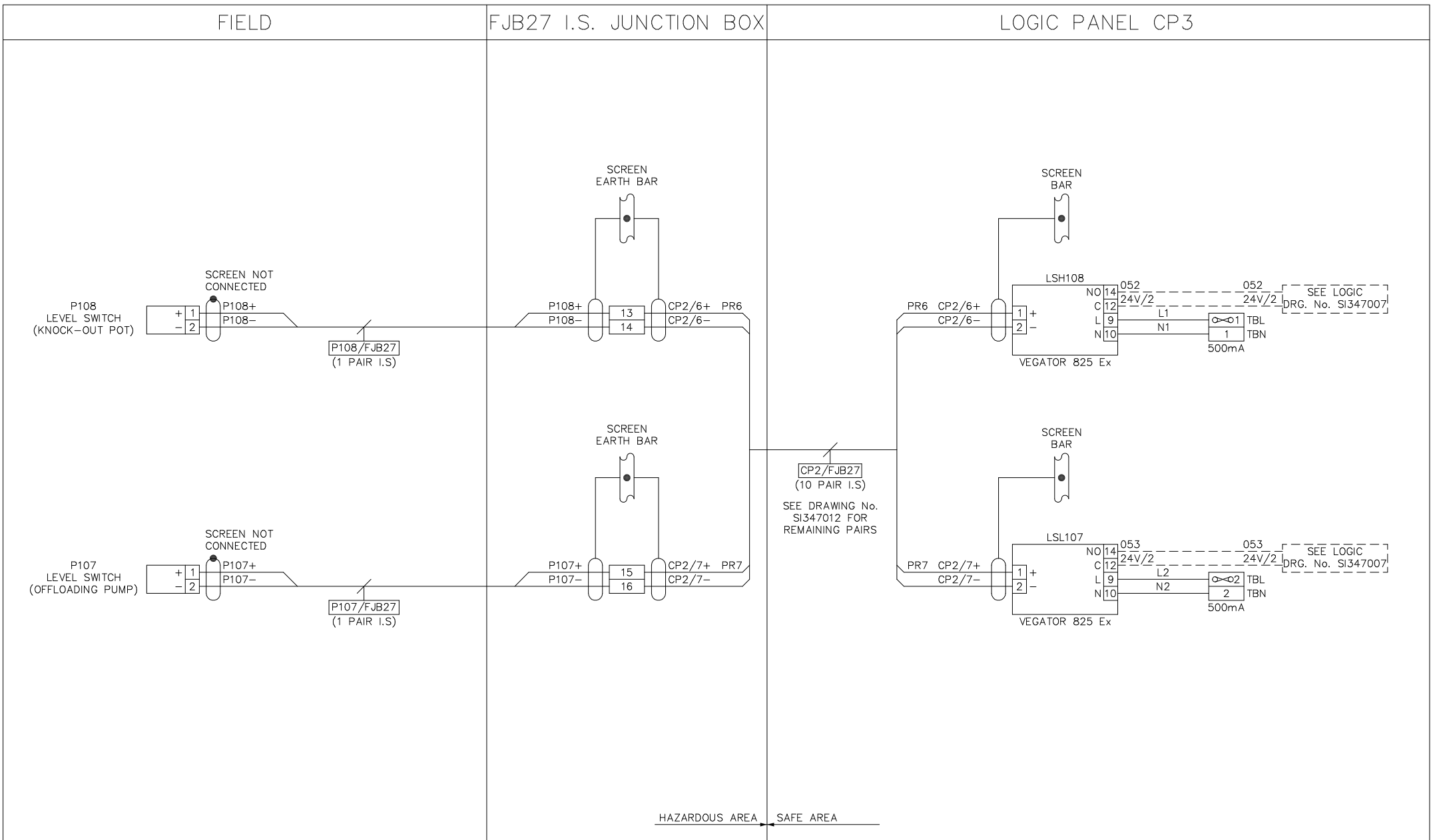
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B	13/06/14	P.P.	P.P.	M.M.	M.M.	BATCHER & METER UPGRADE
C	31/01/17	P.P.	P.P.	M.M.	M.M.	ROAD TANKER SENSOR ADDED

PLANT	INTER TERMINALS - TYNE TERMINAL
TITLE	FLOUROBENZENE SYSTEM - TANK 24 TANKER LOADING BATCHER
CLIENT DRG. No.	P&I DRG No. SI347012_DWG

inter terminals
 Inter Terminals Tyne Terminal
 Northumberland Dock
 Hayle Road
 North Shields
 Tyne & Wear
 NE28 4DZ

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

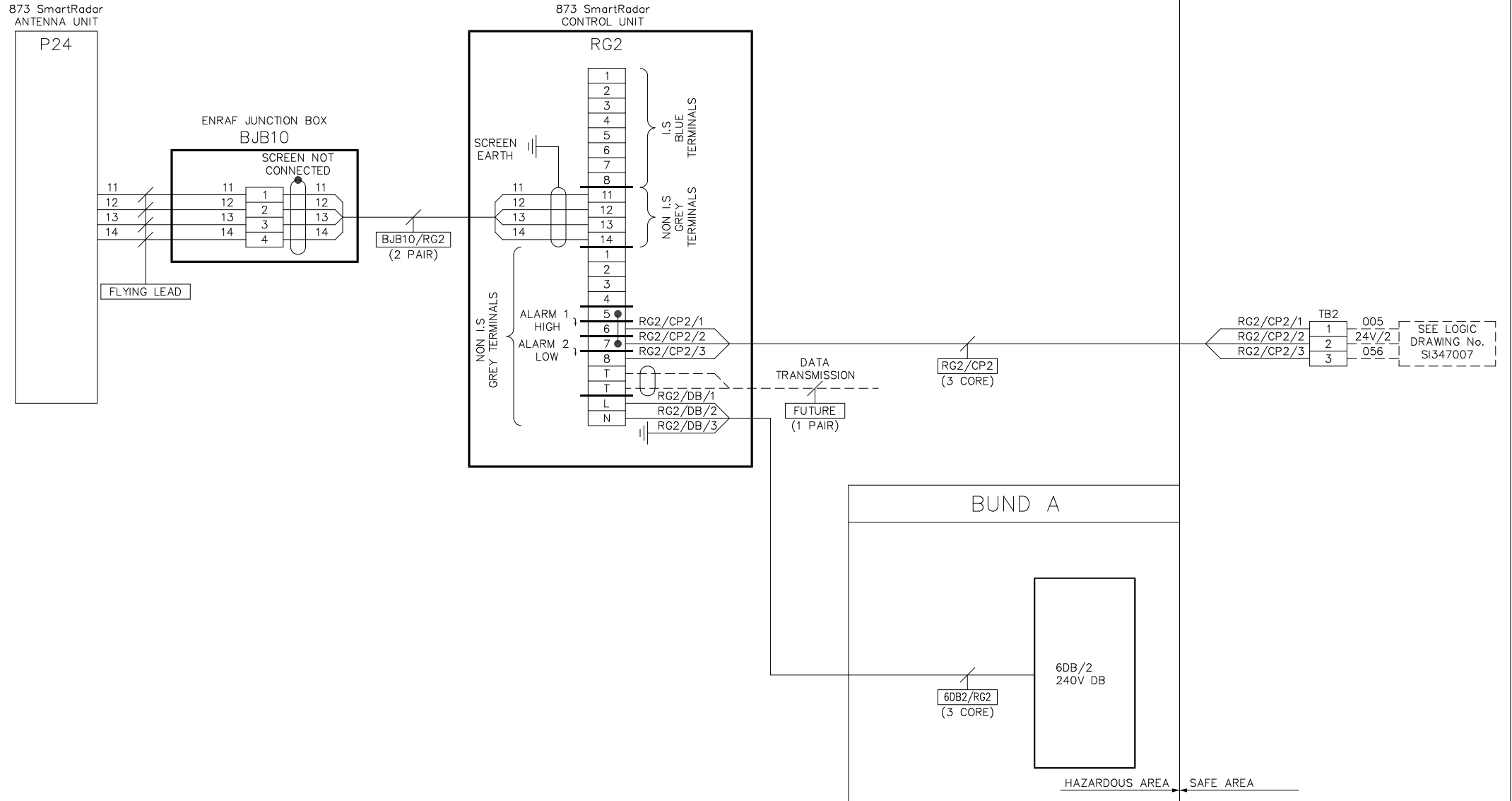
SHEET 1 OF 1



SAFETY PROTECTION INTRINSIC SAFETY		CERTIFIED EQUIPMENT				REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION	PLANT	SIMON STORAGE - TYNE TERMINAL		
REQ	ACHI	TAG No.	CERTIFICATE No.	CERTIFICATION	AUTHORITY	A	02/10/97	M.S.	M.S.	D.R.R	D.R.R	D.R.R	D.R.R	ORIGINAL ISSUE	TITLE	FLUOROBENZENE SYSTEM TANK 24 - P107 / P108 VEGA LEVEL SWITCHES LOOP
AREA CLASS	ZONE 1 ZONE 0	P107/P108	Ex-92.C.2141	EEx ia IIC T6	CENELEC	B	25/11/97	M.S.	A.H.	D.R.R		D.R.R		LSL/H TERMINALS AMENDED		25/11/97
GAS GROUP	IIB IIC	LSL107	Ex-89.C.2158	[EEx ia] IIC	CENELEC											
TEMPERATURE CLASS	T4 T6	LSH108	Ex-89.C.2158	[EEx ia] IIC	CENELEC											
												SIMON Storage Terminals	VELVA LIQUIDS Ltd, TYNE TERMINAL, NORTHUMBERLAND DOCK, NORTH SHIELDS, TYNE & WEAR, NE29 6DY.			
												INSTRUMENT LOOP SHEET FOR USE IN HAZARDOUS AREA		SHEET		01 OF 01
												CLIENT DRG. No.		P&I DRG No. SI347013		

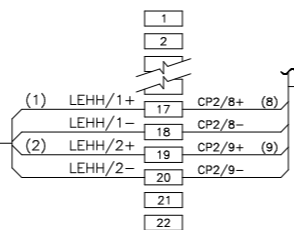
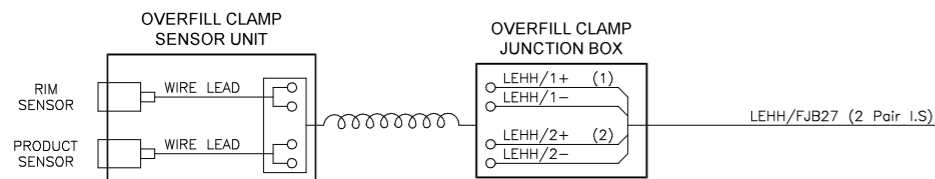
FIELD

LOGIC PANEL CP2

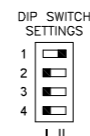
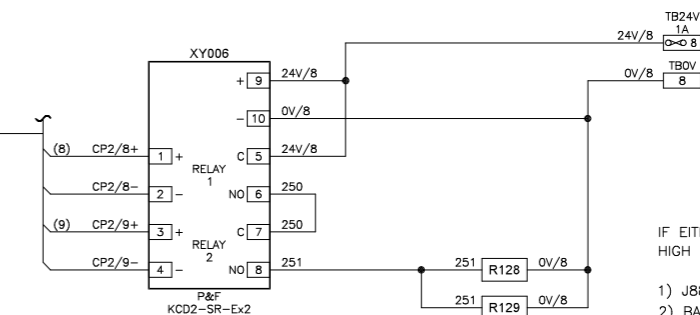


SAFETY PROTECTION		CERTIFIED EQUIPMENT				REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION	PLANT	SIMON STORAGE - TYNE TERMINAL		
REQ	ACHI	TAG No.	CERTIFICATE No.	CERTIFICATION	AUTHORITY	A	08/10/97	M.S.	M.S.	D.R.R	D.R.R	D.R.R	D.R.R	TITLE	FLUOROBENZENE SYSTEM TANK 24 - RG2 ENRAF SMART RADAR LOOP SHEET	
AREA CLASS	ZONE 1	P24	Ex-95.C.8026 X	EEExd IIB T6	KEMA	B	13/10/97	M.S.	A.H.	D.R.R	D.R.R				13/10/97	
GAS GROUP	IIB IIB	RG2	Ex-95.C.8026 X	EEExd IIB T6	KEMA											
TEMPERATURE CLASS	T4 T6															
													SIMON Storage Terminals	VELVA LIQUIDS Ltd, TYNE TERMINAL, NORTHUMBERLAND DOCK, NORTH SHIELDS, TYNE & WEAR, NE29 6DY.		
													INSTRUMENT LOOP SHEET FOR USE IN HAZARDOUS AREA		SHEET	01 OF 01
													CLIENT DRG. No.		P&I DRG No. SI347014	





CP2/FJB27 (Part of 10 Pair I.S)



BARRIER RELAY 1 ENERGISED
WHEN RIM SENSOR DETECTS RTW BARREL

BARRIER RELAY 2 ENERGISED
WHEN HIGH LEVEL NOT DETECTED

IF EITHER OVERFILL CLAMP NOT SEATED or
HIGH LEVEL IN TANKER

- 1) J88 LOADING PUMP WILL STOP
- 2) BATCHER SOV's WILL SHUT
- 3) TANKER HIGH LEVEL LAMP WILL LIGHT
- 4) ALARM HORN WILL SOUND

CERTIFIED EQUIPMENT

TAG No.	CERTIFICATE No.	ATEX CERTIFICATION	I.S. CALCULATION
RIM SENSOR	PTB 00 ATEX 2048X	Ex II 2 G EEx ia IIC T6	SI347001_CAL
PROD. SENSOR	TUV 03 ATEX 2003X	Ex II 1 G EEx ia IIC T6...T1 Ga	
XY006	BASEEFA 06 ATEX 0092	Ex II (1) G [EEx ia Ga] IIC	

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REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION
A	01/02/17	P.P.	P.P.	M.M.	M.M.	ISSUED FOR CONSTRUCTION

PLANT	INTER TERMINALS - TYNE TERMINAL
TITLE	FLOUROBENZENE SYSTEM - TANK 24 RTW HIGH LEVEL LOOP SHEET
CLIENT	DRG. No.
DRG. No.	P&I DRG No. SI347015_DWG

inter terminals
Inter Terminals Tyne Terminal
Northumberland Dock
Hayle Road
North Shields
Tyne & Wear
NE28 4DZ

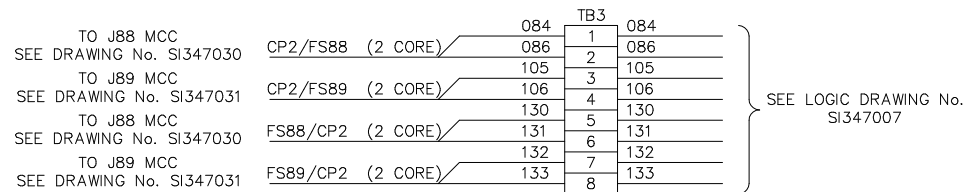
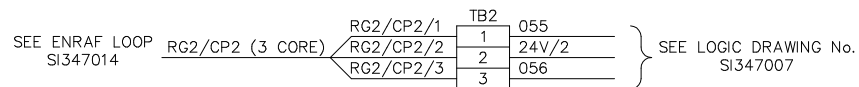
P & I Design Ltd
Tel. 01642 617444
www.pidesign.co.uk


SHEET 1 OF 1

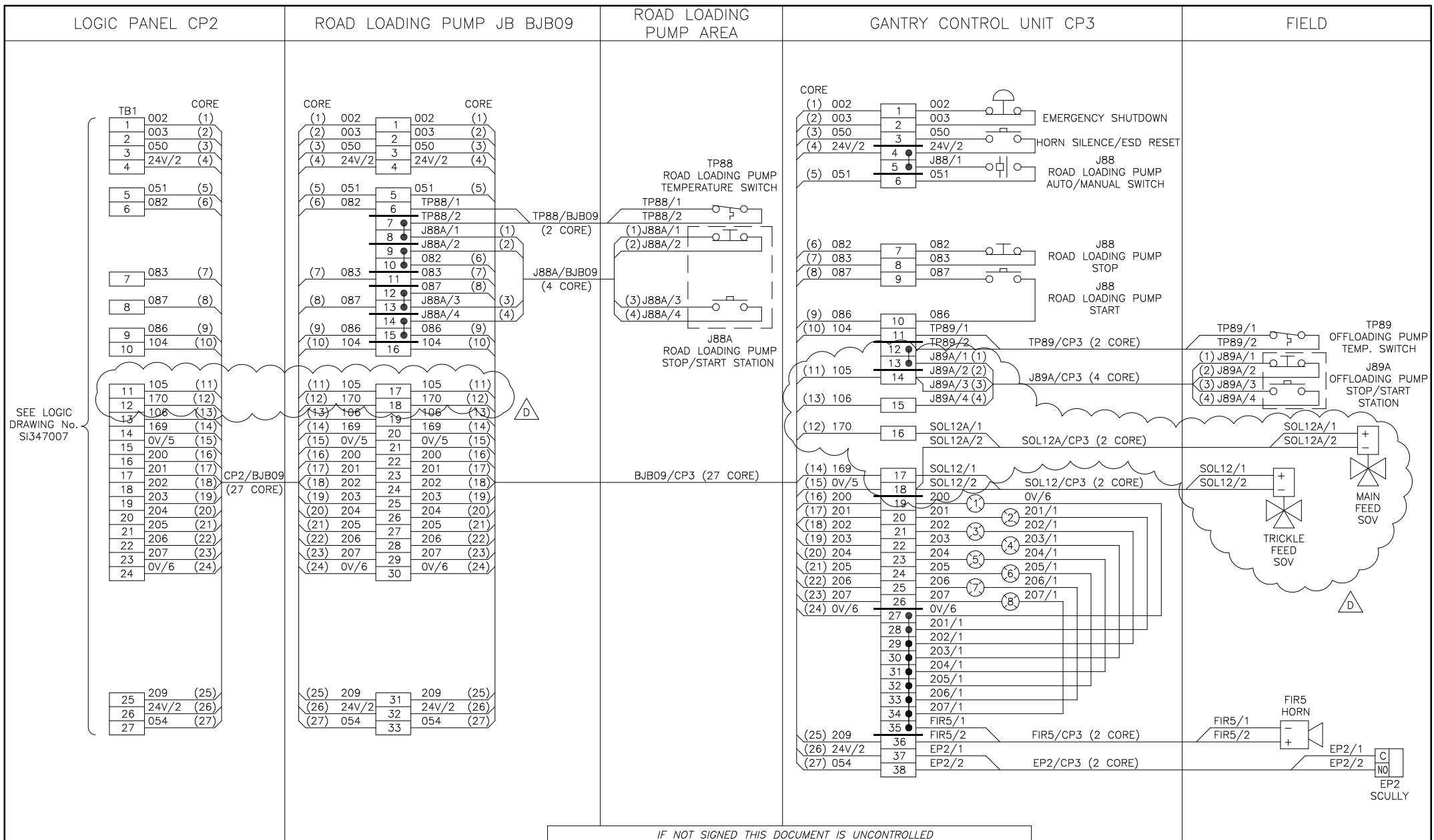
BJB09
ROAD LOADING PUMP
JUNCTION BOX
SEE DRAWING No. SI347025

CP2/BJB09 (27 CORE)

		TB1	
(1)	002	1	002
(2)	003	2	003
(3)	050	3	050
(4)	24V/2	4	24V/2
(5)	051	5	051
(6)	082	6	082
(7)	083	7	083
(8)	087	8	087
(9)	086	9	086
(10)	104	10	104
(11)	105	11	105
(12)	105	12	105
(13)	106	13	106
(14)	169	14	169
(15)	0V/5	15	0V/5
(16)	200	16	200
(17)	201	17	201
(18)	202	18	202
(19)	203	19	203
(20)	204	20	204
(21)	205	21	205
(22)	206	22	206
(23)	207	23	207
(24)	0V/6	24	0V/6
(25)	209	25	209
(26)	24V/2	26	24V/2
(27)	054	27	054



REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION	PLANT	SIMON STORAGE -- TYNE TERMINAL	
A	07/10/97	M.S.	M.S.	D.R.R	D.R.R	ORIGINAL ISSUE	TITLE	FLUOUROBENZENE SYSTEM TANK 24 - CP2 LOGIC PANEL TERMINATION DETAILS	
								08/10/97	
							Simon Storage	Terminals	VELVA LIQUIDS Ltd, TYNE TERMINAL, NORTHUMBERLAND DOCK, NORTH SHIELDS, TYNE & WEAR, NE29 6DY.
									
								SHEET	01 OF 01
							CLIENT DRG. No.	P&I DRG No. SI347024	



SEE LOGIC DRAWING No. SI347007

NOTES:
1. FERRULES TO EXCLUDE No's IN BRACKETS.

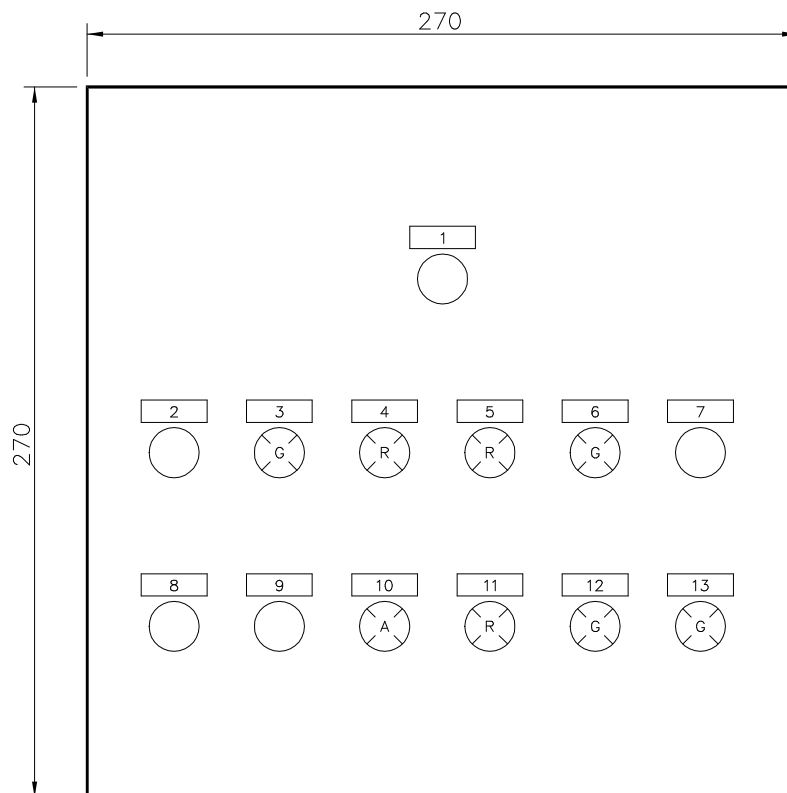
LAMPS:

1. RED - TANK 24 HIGH LEVEL
2. AMBER - TANK 24 LOW LEVEL
3. RED - TANKER HIGH LEVEL / EARTH FAULT
4. RED - KNOCK-OUT POT HIGH LEVEL
5. GREEN - FLUOROBENZENE BATCH START AVAILABLE
6. GREEN - FLUOROBENZENE BATCHING
7. GREEN - J88 ROAD LOADING PUMP RUNNING
8. GREEN - J89 OFFLOADING PUMP RUNNING

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REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION
A	25/09/97	M.S.	M.S.	D.R.R	D.R.R	ORIGINAL ISSUE
B	08/10/97	M.S.	M.S.	D.R.R	D.R.R	CABLE NUMBERS ADDED
C	24/11/97	M.S.	A.H.	D.R.R	D.R.R	ESD RESET ADDED
D	24/06/14	P.P.	P.P.	M.M.	M.M.	BATCHER & METER UPGRADE

PLANT	VELVA LIQUIDS (North Shields) Ltd - TYNE TERMINAL	
TITLE	FLOUROBENZENE SYSTEM - TANK 24 GANTRY CONTROL UNIT INTERCONNECTION DIAGRAM	
	SIMON STORAGE Ltd, TYNE TERMINAL, NORTHUMBERLAND DOCK, NORTH SHIELDS, TYNE & WEAR, NE29 6DY.	
	P & I Design Ltd Tel. 01642 617444 www.pidesign.co.uk	
CLIENT DRG. No.	P&I DRG No. SI347025_DWG	
SHEET 1 OF 1		



GANTRY CONTROL UNIT
ABB Ex 48
FRONT LAYOUT

ITEM	TOP LINE	BOTTOM LINE
1	EMERGENCY	SHUTDOWN
2	J88 ROAD LOADING PUMP	AUTO / MANUAL SWITCH
3	J88 ROAD LOADING PUMP	RUNNING
4	TANK 24	HIGH LEVEL
5	KNOCK-OUT POT	HIGH LEVEL
6	FLUOROBENZENE BATCH	START AVAILABLE
7	HORN SILENCE/ESD RESET	SILENCE
8	J88 ROAD LOADING PUMP	STOP
9	J88 ROAD LOADING PUMP	START
10	TANK 24	LOW LEVEL
11	TANKER HIGH LEVEL	EARTH FAULT
12	FLOUROBENZENE	BATCHING
13	J89 OFFLOADING PUMP	RUNNING

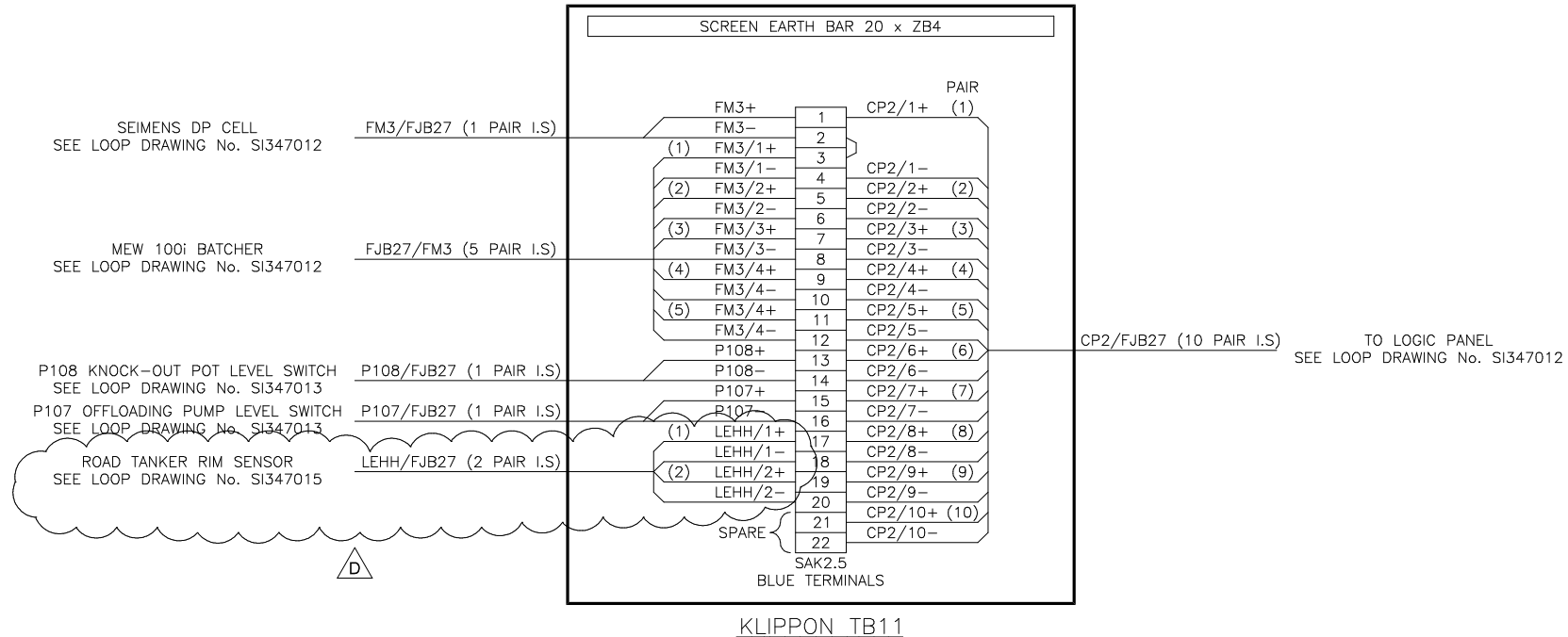
NOTES:

- ALL DIMENSIONS IN mm UNLESS OTHERWISE STATED
- ALL LABELS TO ENGRAVED ON TRAFFOLYTE. (WHITE/BLACK/WHITE)
- SEE INSTRUMENT SPECIFICATION SI347014.SPC FOR EQUIPMENT DETAILS

SCALE 1:2
WHEN PRINTED TO FULL A3
SIZE ONLY

REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION	PLANT	SIMON STORAGE - TYNE TERMINAL	
A	19/09/97	M.S.	M.S.	D.R.R	D.R.R	D.R.R	ORIGINAL ISSUE	TITLE	FLUOROBENZENE SYSTEM TANK 24 - GANTRY CONTROL UNIT FRONT LAYOUT
B	23/10/97	P.J.P	N.L.	D.R.R	D.R.R	D.R.R	LAYOUT CHANGE		24/11/97
C	24/11/97	P.J.P	A.H.	D.R.R		D.R.R	ESD RESET ADDED	SIMON Storage	Terminals
								VELVA LIQUIDS Ltd, TYNE TERMINAL, NORTHUMBERLAND DOCK, NORTH SHIELDS, TYNE & WEAR, NE29 6DY.	
									P & I DESIGN
								SHEET	01 OF 01
							CLIENT DRG. No.	P&I DRG No. SI347026	

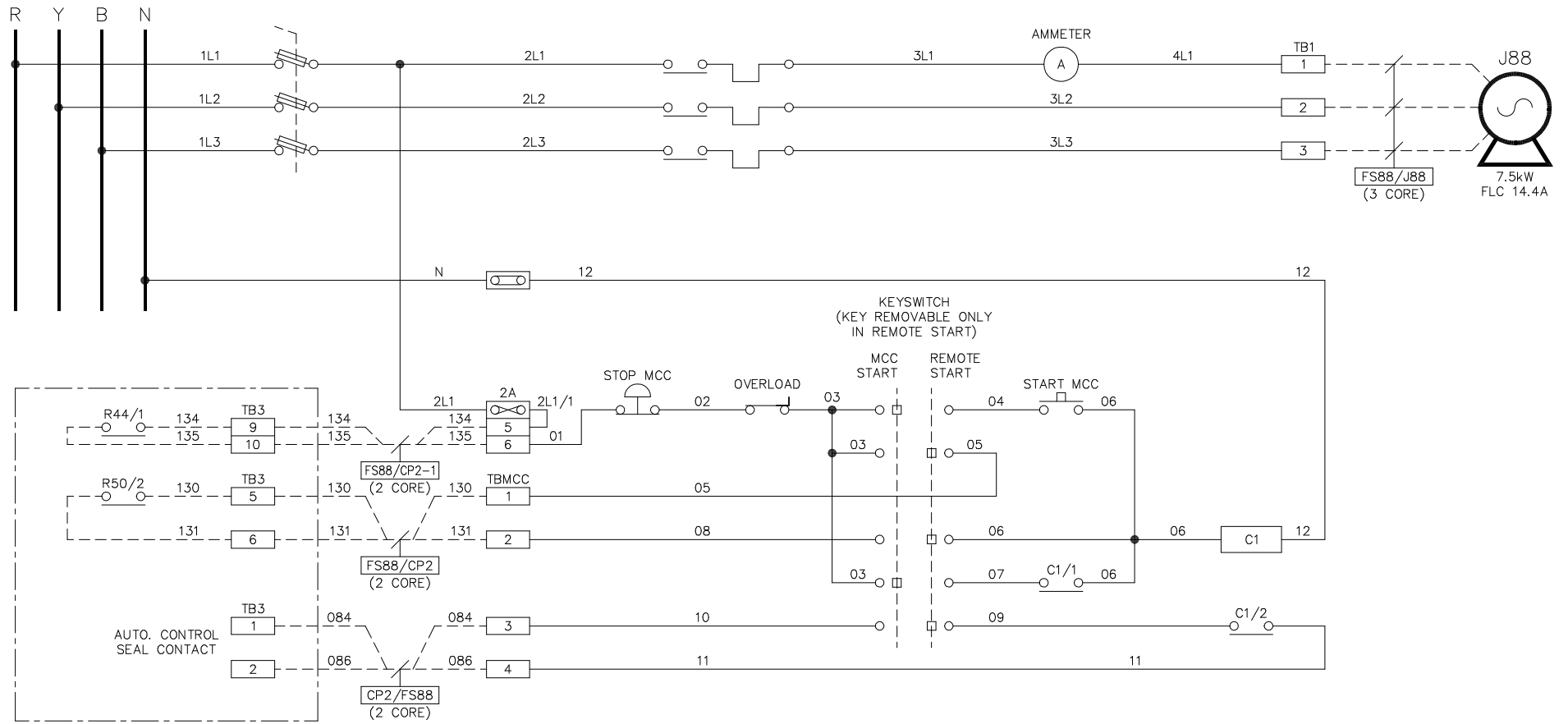
I.S. JUNCTION BOX
FJB27



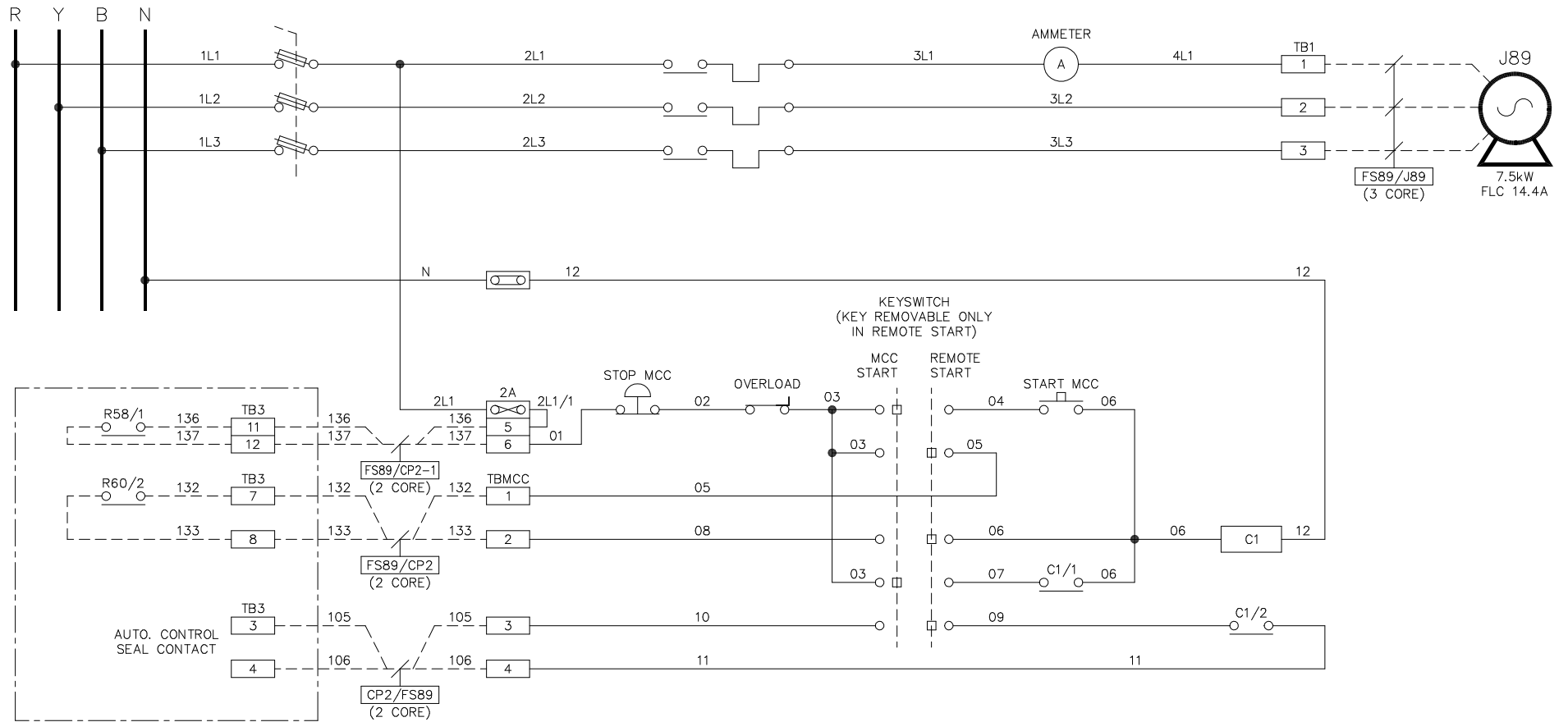
- NOTES:**
1. ALL SCREEN TO BE CONNECTED TO SCREEN EARTH BAR.
 2. SEE INSTRUMENT SPECIFICATION SI347017.SPC FOR FURTHER DETAILS.
 3. FERRULES TO EXCLUDE No's IN BRACKETS.

IF NOT SIGNED THIS DOCUMENT IS UNCONTROLLED								
REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION		
A	25/09/97	M.S.	M.S.	D.R.R	D.R.R	D.R.R	D.R.R	ORIGINAL ISSUE
B	02/10/97	M.S.	M.S.	D.R.R	D.R.R	D.R.R	D.R.R	CABLE NUMBERS ADDED
C	13/10/97	S.P.	A.H.	D.R.R	D.R.R	D.R.R	D.R.R	DP CELL CHANGED
D	31/01/17	P.P.	P.P.	M.M.		M.M.		ROAD TANKER SENSOR ADDED

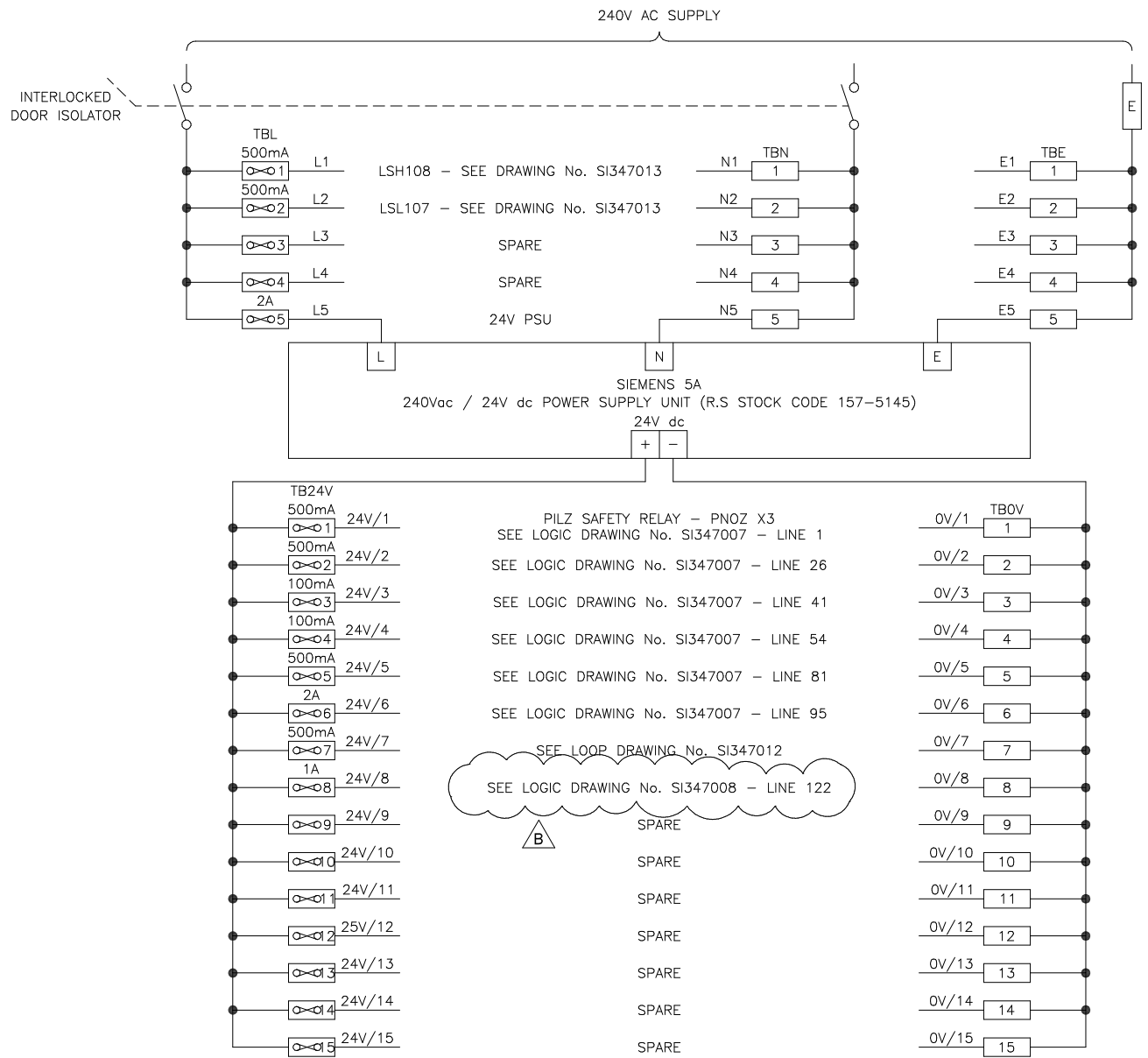
PLANT	INTER TERMINALS - TYNE TERMINAL	
TITLE	FLOUROBENZENE SYSTEM - TANK 24 FJB27 I.S. JUNCTION BOX TERMINAL LAYOUT	
<p>inter terminals Inter Terminals Tyne Terminal Northumberland Dock Hayhole Road North Shields Tyne & Wear NE29 6DY</p>	<p>P & I Design Ltd Tel. 01642 617444 www.pidesign.co.uk</p>	SHEET 1 OF 1
		CLIENT DRG. No.



REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION	PLANT	SIMON STORAGE - TYNE TERMINAL		
A	08/10/97	M.S.	M.S.	D.R.R	D.R.R	D.R.R	ORIGINAL ISSUE	TITLE		
B	13/10/97	M.S.	A.H.	D.R.R	D.R.R	D.R.R	N.LINK AMENDED	FLUOROBENZENE SYSTEM TANK 24 - J88 7.5kW ROAD LOADING PUMP MCC DIAGRAM		
C	18/09/98	D.P.	N.L.	D.R.R		D.R.R	GENERAL UPDATE	18/09/98		
							SIMON Storage	Terminals	VELVA LIQUIDS Ltd, TYNE TERMINAL, NORTHUMBERLAND DOCK, NORTH SHIELDS, TYNE & WEAR, NE29 6DY.	P & I DESIGN
								SHEET	01 OF 01	
CLIENT DRG. No.								P&I DRG No. SI347030		



REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION	PLANT	SIMON STORAGE - TYNE TERMINAL	
A	08/10/97	M.S.	M.S.	D.R.R	D.R.R	D.R.R	ORIGINAL ISSUE	TITLE	FLUOROBENZENE SYSTEM TANK 24 - J89 7.5kW OFF LOADING PUMP MCC DIAGRAM
B	14/10/97	M.S.	A.H.	D.R.R	D.R.R	D.R.R	N.LINK AMENDED		18/09/98
C	18/09/98	D.P.	N.L.	D.R.R		D.R.R	GENERAL UPDATE	SIMON Storage	VELVA LIQUIDS Ltd, TYNE TERMINAL, NORTHUMBERLAND DOCK, NORTH SHIELDS, TYNE & WEAR, NE29 6DY.
								Terminals	P & I DESIGN
									SHEET 01 OF 01
							CLIENT DRG. No.		P&I DRG No. SI347031



IF NOT SIGNED THIS DOCUMENT IS UNCONTROLLED


REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION
A	25/09/97	M.S.	M.S.	D.R.R	D.R.R	ORIGINAL ISSUE
B	31/01/17	P.P.	P.P.	M.M.	M.M.	ROAD TANKER SENSOR ADDED

PLANT	INTER TERMINALS - TYNE TERMINAL	
TITLE	FLOUROBENZENE SYSTEM - TANK 24 POWER DISTRIBUTION DRAWING	
 Inter Terminals Tyne Terminal Northumberland Dock Hayhole Road North Shields Tyne & Wear NE29 6DY	 P & I Design Ltd Tel. 01642 617444 www.pidesign.co.uk	SHEET 1 OF 1
		CLIENT DRG. No.

INSTRUMENT/ELECTRICAL CABLE SCHEDULE

CABLE		CONDUCTORS		CABLE ROUTE				APPROX. LENGTH METRES	REMARKS
REFERENCE	TYPE	AREA mm ²	No.	FROM	GLAND TYPE	TO	GLAND TYPE		
CP2/FJB27	F10I	1.5	10 pair	CP2 Panel	EEx'e'	FJB27 I.S. Junction Box	EEx'e'	200	
FJB27/FM3	F05I	1.5	5 pair	FJB27 I.S. Junction Box	EEx'e'	FM3 Fluorobenzene Batcher	EEx'e'	20	
FM3/FJB27	E01I	1.5	1 pair	FM3 DP Cell	EEx'e'	FJB27 I.S. Junction Box	EEx'e'	20	
IP1/FM3	E01I	1.5	1 pair	I/P1 Convertor	EEx'e'	FM3 Fluorobenzene Batcher	EEx'e'	20	
P107/FJB27	E01I	1.5	1 pair	P107 Level Switch - Offloading Pump	EEx'e'	FJB27 I.S. Junction Box	EEx'e'	20	
P108/FJB27	E01I	1.5	1 pair	P108 Level Switch - Knock-Out Pot	EEx'e'	FJB27 I.S. Junction Box	EEx'e'	20	
Air Supply/Panel AS/1750	! bore	6mm O.D.	1	80 psi Air Supply	N/A	Pneumatic Panel	N/A	10	
Control/1750	! bore	6mm O.D.	1	Pneumatic Panel	N/A	Control Valve 1750 Positioner Air Supply	N/A	10	
	1 bore	6mm O.D.	1	Pneumatic Panel	N/A	Control Valve 1750 Positioner Contol Signal	N/A	10	
								TOTAL	330

Note : Refer to P&I Design Cable Specifications for details on Cable Type.

REFERENCE DRAWINGS	REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION	PLANT	TITLE
	A	07/10/97	AS	AS	DRR	DRR	ORIGINAL ISSUE		Simon Storage - Tyne Terminal
	B	13/10/97	AS	AH	DRR	DRR	240V DB Revised		Fluorobenzene Tank 24 - I.S. & Tubing
									
									SHEET 3 OF 3
								CLIENT DRG No	REF NO SI347100.SCH