

SPS HANDBOOK TABLE OF CONTENT				Document Number: AO-100-40-S001-000185	
				Revision : 04	Status : AFC
				Rev. Date : 17-Nov-2017	
Doc. Type : MAN	Discipline : SPS	Phase: DE	Class: 1	Page 1 of 316	
CTR Ref.: 10002504361			System / Subsystem : S		Equipment Type :

TOTAL E&P ANGOLA BLOCK 32	
 KAOMBO Project	

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SPS HANDBOOK TABLE OF CONTENT
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04	AFC	17-Nov-2017	Accepted for Construction	FALLRØ, EIRIK	HØIMYR, THOMAS	BORHAUG, HÅVARD
03	AFC	26-Sep-2017	Accepted for Construction	BORHAUG, HÅVARD	BAGGERØD, JOACHIM	JACOBY, PETRA MARGARETA
02	AFC	19-Jul-2017	Accepted for Construction	NORDSTRØM, ANDREAS	BAGGERØD, JOACHIM	JACOBY, PETRA MARGARETA
01	IFA	16-May-2017	Issued for acceptance	NORDSTRØM, ANDREAS	HØIMYR, THOMAS	BAGGERØD, JOACHIM
00	IFR	16-Oct-2015	Issued for Review	MOTROGAN, GEORGE	NILSSEN, GLENN LEVI	RANADE, VINEET
Rev.	Status	Date	Revision Description	Issued by	Reviewed by	Approved by



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Subsea

Ver.	Status	Issue date	Made by	Checked by	Approved by
05	Re-issued Constr	2017.11.17	FALLRØ, EIRIK	HØIMYR, THOMAS	BORHAUG, HÅVARD
Originator:		MOTROGAN, GEORGE			

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

10002504361-PDC-000

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TABLE OF CONTENTS

1	SYSTEM INFORMATION.....	11
1.1	Reference List.....	11
1.2	Introduction	12
1.2.1	KAOMBO general description.....	12
1.2.2	Aker Solution Support & Office Contact	13
1.3	Abbreviations	14
1.4	Main Deliverables	16
1.5	Overall Field Layout Kaombo	17
1.5.1	Field schematic CARIL	18
1.5.2	Field schematic GINDUNGO	19
1.5.3	Field schematic GENGIBRE.....	20
1.5.4	Field schematic GAS EXPORT LINE	21
1.5.5	Field schematic CANELA	22
1.5.6	Field schematic MOSTARDA WEST	23
1.5.7	Field schematic LOURO	24
1.5.8	Field schematic GAS EXPORT LINE	25
1.6	Production drill center layout	26
1.6.1	Typical Drill center layout Interface drawing 4-Slot manifold.....	26
1.6.2	Typical Drill centre layout elevation view	27
1.7	General Design Parameters	28
2	PRODUCTION CONTROL SYSTEM.....	31
2.1	Reference List.....	31
2.2	Topside Architecture North & South	32
2.3	Control System Top Assembly drawing.....	33
2.3.1	Inline 4slot Manifold	33
2.3.2	Inline 4slot Manifold Instrumentation	34
2.3.3	End 4slot Manifold	35
2.3.4	End 4slot Manifold Instrumentation	36
2.3.5	Inline 2slot Manifold	37
2.3.6	Inline 2slot Manifold Instrumentation	38
2.3.7	End 2slot Manifold	39
2.3.8	End 2slot Manifold Instrumentation	40
2.3.9	Water Injection Subsea Distribution Unit (WI SDU).....	41
2.3.10	Production XT	42
2.3.11	Water Injection XT	43
2.3.12	Subsea Safety Isolation Valve (SSIV) Module	44
2.3.13	Umbilical pre-commissioning test jumpers (4slot inline Manifold shown)	45

SPS HANDBOOK TABLE OF CONTENT		Document:	10002504361-PDC-000
		Version:	05 - Re-issued Constr
		Issue date:	2017.11.17
BLOCK 32 - KAOMBO SPS		Page:	3 of 315
2.4	Control System Elec/Optical Schematic System Drawing.....	46	
2.5	Control System Hyd/Chem Schematic	57	
2.6	Topside Elec/Hyd Interface Schematic.....	64	
2.7	Hydraulic Power Unit (HPU) Electrical Schematic.....	69	
2.7.1	HPU Electrical Schematic Diagram North	69	
2.7.2	HPU Electrical Schematic Diagram South.....	70	
2.8	Manifold Control Module (MCM) Electrical Schematic	71	
2.9	Subsea Control Module (SCM) Electrical Schematic	79	
2.10	Subsea Router Module (SRM) Electrical Schematic.....	89	
2.11	HPU Hydraulic Schematic	97	
2.11.1	HPU Hydraulic Schematic North	97	
2.11.2	HPU hydraulic Schematic South	98	
2.12	MCM Hydraulic schematic.....	99	
2.13	SCM Hydraulic schematic.....	100	
2.14	Rack assembly DRAWINGS.....	101	
2.14.1	Rack assembly Master Control Station (MCS) Network Cabinet	101	
2.14.2	Rack assembly MCS Server 1 Cabinet	101	
2.14.3	Rack assembly MCS PLC Cabinet 1	101	
2.14.4	Rack assembly Overall Control of Wells and Risers (OCWR)	102	
2.14.5	Rack assembly OTS	102	
2.14.6	Rack assembly Subsea Shutdown System	103	
2.14.7	Rack assembly HPU UCP Cabinet.....	103	
2.15	HPU	104	
2.16	Subsea Gateways.....	107	
2.17	Electric Power Unit (EPU).....	108	
2.18	Emergency Shutdown Diagram (ESD)	109	
2.18.1	Emergency shutdown logic diagram North.....	109	
2.18.2	ESD logic diagram South.....	120	
3	WELLHEAD SYSTEM.....	131	
3.1	Reference List.....	131	
3.2	Wellhead Scope of Supply.....	132	
3.3	Stack-Up Well Head (WH) System Light Architecture.....	133	
3.4	Stack-Up WH System Heavy Architecture	133	
3.5	Wellhead system components.....	134	
3.5.1	36" Conductor Housing.....	134	
3.5.2	18-3/4 "Wellhead assembly with Slimline Rigid Lockdown (SRLD)	134	
3.5.3	18 ¾ Bore protector	135	
3.5.4	18 ¾ Special Wear Bushing	135	
3.5.5	13 3/8" Spacer sleeve.....	136	

SPS HANDBOOK TABLE OF CONTENT		Document:	10002504361-PDC-000
		Version:	05 - Re-issued Constr
		Issue date:	2017.11.17
BLOCK 32 - KAOMBO SPS		Page:	4 of 315
3.5.6	13 3/8" Casing Hanger.....	136	
3.5.7	18 3/4 Corrosion Cap.....	137	
3.5.8	18 3/4 Debris Cap.....	137	
3.5.9	18 3/4 Casing Hanger Packoff.....	138	
3.5.10	10 3/4" Casing hanger	138	
3.5.11	13 3/8 Wear Bushing	139	
3.5.12	10 3/4" Wear Bushing	139	
3.6	Wellhead tools	140	
3.6.1	Drill Ahead Tool	140	
3.6.2	Conductor Housing Running Tool (RT)	140	
3.6.3	18 3/4 Wellhead Running Tool	141	
3.6.4	Single Trip Multi-Purpose Tool (STMPT).....	141	
3.6.5	Hydraulic Activated Running Tool (HART) tool	142	
3.6.6	SRLD Activation Tool.....	143	
3.6.7	Casing Hanger RT	144	
3.6.8	Lead impression/Washout Tool	144	
4	PRODUCTION GUIDE BASE (PGB) SYSTEM	145	
4.1	Reference List.....	145	
4.2	PGB Scope of Supply	146	
4.3	Production PGB	147	
4.4	WI PGB	148	
4.5	Production PGB IN COUNTRY	149	
4.6	WI PGB IN COUNTRY	150	
4.7	PGB Running Retrieval Re-orientation Tool.....	151	
4.8	Blowout Preventer (BOP) Orientation funnel.....	152	
5	TUBING HANGER (TH) SYSTEM	153	
5.1	Reference List.....	153	
5.2	Tubing hanger.....	154	
5.2.1	Scope of supply	154	
5.2.2	Production Tubing Hanger.....	155	
5.2.3	Water Injection tubing hanger.....	156	
5.2.4	TH packoff Assembly Drawing.....	157	
5.2.5	TH Orientation Joint (THOJ).....	158	
5.2.5.1	TH Orientation Joint THOJ Hydraulic Schematic	159	
5.2.6	TH Running Tool (THRT).....	160	
5.2.6.1	TH Running Tool THRT Hydraulic schematic.....	161	
5.2.7	BOP Pin Skyros	162	
5.2.7.1	THROT/BOP PIN SKYROS.....	163	
5.2.8	BOP Pin DS8	164	

SPS HANDBOOK TABLE OF CONTENT	Document:	10002504361-PDC-000
	Version:	05 - Re-issued Constr
	Issue date:	2017.11.17
BLOCK 32 - KAOMBO SPS	Page:	5 of 315
5.2.8.1	THROT/BOP PIN, ENSCO DS-8.....	165
5.2.9	TH Handling & Test Tool (THHTT).....	166
5.2.10	TH Space-out measurement tool.....	167
5.2.11	TH Washout tool + BOP test plug add on same page.....	168
5.2.12	TH Orientation Check Elevation Tool (THOECT).....	169
5.2.13	TH contingency tools (1 page with one drawing per tool)	170
5.2.14	Annulus Wireline Plug.....	171
5.2.15	5" Production Wireline Plug	171
5.3	Electrical Feed through System (EFTS).....	172
6	VERTICAL SUBSEA TREE (VXT) SYSTEM.....	173
6.1	Reference list.....	173
6.2	VXT System Scope of Supply	174
6.3	Production VXT.....	175
6.3.1	Production PVXT ISO VIEW.....	175
6.3.2	Production PVXT DIMENSIONS	176
6.3.3	Production PVXT Schematic	177
6.3.4	Production PVXT Remote Operated Vehicle (ROV) Panel & Markings.....	178
6.3.5	Production PVXT Valves	179
6.3.6	Production PVXT Valve torque list	180
6.3.6.1	Valve cross section 2 1/16" actuator valve	181
6.3.6.2	Valve cross section AIVLO ACTUATOR	181
6.3.6.3	Valve cross section 5 1/8" Gate valve	182
6.3.6.4	Valve cross section 2-1/16" – 10k Actuator valve.....	182
6.3.6.5	Valve cross section 2-1/16"	183
6.3.6.6	Valve cross section ½" Rotary Gate valve.....	183
6.3.6.7	Valve cross section ½" Rotary gate	184
6.3.7	Production PVXT Retrievable Components ISO overview	185
6.3.7.1	FCM	186
6.3.7.2	SWIMS Maintain page as per CPY email.....	189
6.3.7.3	DIU Maintain page as per CPY email.....	190
6.3.7.4	XTC CAP	191
6.3.7.5	CITV LF & CITV HF	192
6.3.8	PVXT STACK-UP	193
6.3.8.1	TRT & VXT.....	193
6.3.8.2	TH/WH/PGB/TREE CAP	194
6.4	Water Injection VXT.....	195
6.4.1	WI VXT ISO VIEW	195
6.4.2	WI VXT DIMENSIONS.....	196
6.4.3	Water Injection VXT Schematic.....	197
6.4.4	WI VXT ROV Panel & Markings	198

SPS HANDBOOK TABLE OF CONTENT		Document:	10002504361-PDC-000
		Version:	05 - Re-issued Constr
		Issue date:	2017.11.17
BLOCK 32 - KAOMBO SPS		Page:	6 of 315
6.4.5	WI VXT Valves.....	199	
6.4.6	WI VXT Valve torque list.....	200	
6.4.7	WI VXT Retrievable Components.....	201	
6.4.8	WI VXT STACK-UP	202	
6.4.8.1	TRT / WIVXT.....	202	
6.4.8.2	TH/WH/PGB/TREE CAP	203	
6.5	VXT tooling	204	
6.5.1	Tree Running Tool (TRT).....	204	
6.5.1.1	TRT hydraulic schematic	205	
6.5.1.2	TRT Valve torque list	206	
6.5.2	XT Installation and Comissioning Tool (XTICT)	207	
7	WORKOVER SYSTEM	208	
7.1	Reference list.....	208	
7.2	Workover Scope of supply.....	209	
7.3	Workover TH Mode.....	210	
7.3.1	Valve layout TH mode	210	
7.3.2	TH Mode Electric schematic.....	211	
7.4	Workover XT Mode.....	212	
7.4.1	Valve layout XT mode.....	212	
7.4.2	XT Mode Electric Schematic.....	213	
7.5	Workover Control System (WOCS) Network Diagram	214	
7.6	Workover Shut Down Sequence	215	
7.6.1	Figure 4 Shutdown sequence, TH mode (in-riser),RIG Emergency Quick Disconnect (EQD) ...	215	
7.6.2	Figure 1 Shutdown sequence, XT mode (Open water) Normal / Well Flowing (non-concentric) operation	216	
7.6.3	Figure 2 Shutdown sequence, XT mode (Open water) CT/WL (concentric) operation.....	217	
7.6.4	Figure 3 - Shutdown sequence, XT mode (open water) Annulus Access	218	
7.7	Lower Workover Riser Package (LWRP)	219	
7.7.1	LWRP Stack-up Drawing	219	
7.7.2	LWRP hydraulic schematic.....	220	
7.8	Emergency Disconnect Package (EDP).....	221	
7.8.1	EDP Stalk view and ROV Panels	222	
7.8.2	EDP Valve torque list.....	223	
7.9	Workover Control Module (WOCM).....	224	
7.9.1	WOCM Schematic	225	
7.10	Lower Riser Package (LRP)	226	
7.10.1	LRP stalk view and ROV panels.....	227	
7.10.2	LRP Valve torque list	228	
7.11	Simplified Landing String (SLS).....	229	
7.11.1	SLS Assembly	229	

SPS HANDBOOK TABLE OF CONTENT		Document:	10002504361-PDC-000
		Version:	05 - Re-issued Constr
		Issue date:	2017.11.17
BLOCK 32 - KAOMBO SPS		Page:	7 of 315
7.11.2	SLS Schematic	229	
7.11.3	SLS & BOP ENSCO DS-8/SLS	230	
7.12	Riser special joints	231	
7.12.1	Landing joint + Cased wear joint (CWJ)	231	
7.12.1	Upper stress joint (upper and lower stress joint in same page)	232	
7.13	Lubricator valves.....	233	
7.13.1	Open water Lubricator valve 6.125 (merge page with below)	233	
7.13.2	In-riser Cutting lubricator valve 6.125	233	
7.14	Circulation head (CH)	234	
7.14.1	CH schematic	234	
7.15	Surface flow tree (SFT).....	235	
7.15.1	SFT schematic	235	
7.16	Coil tubing lifting frame (CTLF) One view to be included	236	
7.17	Umbilicals.....	237	
7.18	GLOBAL STACK-UP DRAWINGS	238	
7.18.1	TH MODE GLOBAL RISER STACK-UP DRAWING	238	
7.18.2	XT MODE RIG A, SKYROS.....	239	
8	PRODUCTION JUMPER SYSTEM.....	240	
8.1	Reference List.....	240	
8.2	Scope of Supply Production Jumper	241	
8.3	Production Well Jumper (PWJ).....	242	
8.4	Fabrication/Test Jig	243	
8.5	Typical Spreader Bar Lifting Arrangement	244	
9	MANIFOLD SYSTEM	245	
9.1	Reference list.....	245	
9.2	Foundation Structure manifold.....	246	
9.3	Manifold types summary Table	247	
9.4	Valve torque list 2-slot & 4 slot	248	
9.5	2 Slot 12" End Manifold	249	
9.5.1	Manifold 2 slot end Schematic.....	249	
9.5.2	Manifold 2 slot end GA	250	
9.5.3	Manifold 2 slot end – Retrievable components.....	251	
9.5.4	Manifold 2 slot end ROV Panel Markings	252	
9.6	2 Slot 12" Infield Manifold	253	
9.6.1	Manifold 2 slot Inline Schematic	253	
9.6.2	Manifold 2 slot Inline GA	254	
9.6.3	Manifold 2 slot inline – Retrievable components	255	
9.6.4	Manifold 2 slot Inline ROV Panel Markings	256	

SPS HANDBOOK TABLE OF CONTENT	Document:	10002504361-PDC-000
	Version:	05 - Re-issued Constr
	Issue date:	2017.11.17
BLOCK 32 - KAOMBO SPS	Page:	8 of 315

9.7	4 Slot 12" End Manifold	257
9.7.1	Manifold 4 slot end Schematic	257
9.7.2	Manifold 4 slot end GA	258
9.7.3	Manifold 4 slot end – Retrievable components	259
9.7.4	Manifold 4 slot end ROV Panel Markings	260
9.8	4 Slot 12" Infield Manifold	261
9.8.1	Manifold 4 slot Inline Schematic	261
9.8.2	Manifold 4 slot Inline GA	262
9.8.3	Manifold 4 slot Inline – Retrievable components	263
9.8.4	Manifold 4 slot Inline ROV Panel Markings	264
9.9	Retrievable components	265
9.9.1	SRM	265
9.9.2	MCM	266
9.10	Cross section 12" Manifold 4-slot End	267
9.10.1	Valve cross section 12" Ball Valve	267
9.10.2	Valve cross section 2 1/16" Gate Valve	267
9.10.3	Valve cross section 1/2" Rotary Gate (10 turn) Valve	268
9.10.4	Valve cross section 1/2" Rotary Gate (1/4 turn) valve	268
9.10.5	Valve cross section 1/2" Rotary Gate Valve	269
9.10.6	Valve cross section 1" Gate Valve	269
9.10.7	Valve cross section 6" Gate (35,2turn) Valve	270
9.10.8	Valve cross section 6" Gate (17,5turn) Valve	270
9.10.9	Valve cross section 10" Ball Valve	271
9.11	Manifold Pig detector	272
9.12	Gas export system SSIV	273
9.12.1	Gas Export System SSIV Schematic	273
9.12.2	SSIV Retrievable structure	274
9.12.3	SSIV Foundation & Support Structure	275
9.12.4	SSIV ROV Panel marking	276
9.12.5	SSIV Valve torque list	277
9.12.6	SSIV Valves description & Cross section	278
9.12.6.1	Valve cross section 10" HYDRAULIC ACTUATOR	278
9.12.6.2	Valve cross section 10" SUBSEA WORM GEAR	278
10	TIE-IN SYSTEM	279
10.1	Reference List	279
10.2	Tie-In Connectors Scope of Supply	280
10.3	Tie-In Tools Scope of Supply	281
10.4	Tie in general assembly connections	282
10.4.1	Horizontal Connection System (HCS)-R 16"	282
10.4.2	HCS-R 12" (Insulated)	283

SPS HANDBOOK TABLE OF CONTENT	Document:	10002504361-PDC-000
	Version:	05 - Re-issued Constr
	Issue date:	2017.11.17
BLOCK 32 - KAOMBO SPS	Page:	9 of 315
10.4.3	HCS-R 6"	284
10.4.4	HCS-U 12"	285
10.4.5	Flow Control Module (FCM) connection	286
10.4.6	SSIV Vertical Connection Module (VMC)	287
11	ROV INTERVENTION TOOLING.....	288
11.1	Reference list.....	288
11.2	Scope of Supply ROV & Intervention tooling.....	289
11.3	Deployment Basket.....	290
11.4	SCM/SRM/MCM Running Tool.....	291
11.5	FCM running Tool	292
11.6	Umbilical Termination Head (UTH) Hang-off & offshore rack	293
11.7	UTH temporary installation frame.....	293
11.8	Acoustic Sand Detector (ASD) CRADLE.....	294
11.9	Downhole Interface Unit (DIU) CRADLE	294
11.10	Chemical Injection Throttling Valve (CITV) Low Flow CRADLE	294
11.11	CITV High Flow CRADLE	295
12	SUBSEA DISTRIBUTION SYSTEM	296
12.1	Reference list.....	296
12.2	Cobra Head.....	297
12.3	Flying lead for Umbilical commissioning.....	298
12.4	Electrical & Optical Flying Lead (incl. WI XT, SSIV).....	299
12.5	Hydraulic Flying Lead (incl. WI XT, SSIV)	300
12.6	FLDF Flying Lead Deployment Frame	301
12.7	Overlay Flying Lead Deployment Frame	302
12.8	SDU	303
12.8.1	SDU Schematic	303
12.8.2	SDU	304
12.8.3	ROV Panel marking SDU	305
12.9	LTPC.....	306
12.9.1	8WAY (5POP) Retrievable Integrated Modular Stabplate (RIMS) Outboard (OB) Long Term Protective Cover (LTPC).....	306
12.9.2	22WAY (15POP) WI XMT RIMS LTPC	306
12.9.3	4W ROV SOC LTPC.....	307
12.9.4	4W ROV ELEC SOC LTPC	307
13	SUBSEA EMERGENCY RESPONSE SYSTEM (SERS)	308
13.1	Reference List.....	308
13.2	Scope of Supply.....	309

SPS HANDBOOK TABLE OF CONTENT	Document:	10002504361-PDC-000
	Version:	05 - Re-issued Constr
	Issue date:	2017.11.17
BLOCK 32 - KAOMBO SPS	Page:	10 of 315

13.3	SERS	310
13.3.1	SERS CONNECTOR ,10M.....	310
13.3.2	SERS TEST STUMP 13"5/8 ASSY	310
13.3.3	SERS REMOVAL TOOL BX164 ASSY	311
13.3.4	SERS SLINGSET WITH SPREADING BEAM, ASSY.....	311
13.3.5	SERS TRANSPORTATION SKID ASSEMBLY	312
13.3.6	SERS Re-entry Hub (REH) ADAPTER - EQUIPMENT PACKAGE	313
13.3.7	SERS FRAME, TEST STAND, ADAPTER.....	313
13.3.8	SERS GUIDE FUNNEL REH ADAPTER	314
13.3.9	SERS RE-ENTRY HUB Adapter	315

SPS HANDBOOK TABLE OF CONTENT	Document:	10002504361-PDC-000
	Version:	05 - Re-issued Constr
	Issue date:	2017.11.17
BLOCK 32 - KAOMBO SPS	Page:	11 of 315

1 SYSTEM INFORMATION

1.1 Reference List

SPS HANDBOOK TABLE OF CONTENT	Document:	10002504361-PDC-000
	Version:	05 - Re-issued Constr
	Issue date:	2017.11.17
BLOCK 32 - KAOMBO SPS	Page:	12 of 315

1.2 Introduction

1.2.1 KAOMBO general description

This document covers the Outline Installation Procedure (OIP) for all the Manifolds (4-slot and 2-slot) in the Kaombo Subsea Production System (SPS). The OIP defines the requirements and establishes a guideline for installation. OIP for Manifold Support Structure's (MSS's) and the Closed Can Foundation's (CCF's) for the Kaombo (SPS) is given in separate report [14].

Aker Solution will supply the following structures in Kaombo SPS project:

- ☐ 19 off Manifolds of 7 different configurations:
- ☐ 5 off 4-slot single header inline 12" production Manifold, daisy chained.
- ☐ 5 off 2-slot single header inline 12" production Manifold, daisy chained.
- ☐ 1 off 2-slot single header 12" end production Manifold.
- ☐ 3 off 4-slot single header 12" end production Manifold.
- ☐ 2 off 4-slot single header inline 10" production Manifold, daisy chained.
- ☐ 1 off 2-slot single header inline 10" production Manifold, daisy chained.
- ☐ 2 off 2-slot single header 10" end production Manifold.
- ☐ 2 off Subsea Safety Isolation Valve's (SSIV's) + 1 spare retrievable module.
- ☐ 21 Subsea Distribution Unit's (SDU's) + 1 spare.
- ☐ 35 Production Vertical Christmas Trees (PVXT) + 1 spare.
- ☐ 29 Water Injection Christmas Trees (WIVXT).

The KAOMBO project is a development in Block 32 offshore Angola, located at about 150km offshore Angola. The development will include six fields, Caril, Gindungo, Gengibre, Canela, Louro and Mostarda west, which will be tied back to two FPSO's.

All six fields are similar in layout, and are operated in a similar way. Each Field will be developed using a dedicated hybrid loop production system. Each hybrid loop comprises one insulated production line and one non-insulated service line. Water injection is required on all fields.

On each field, manifolds are tied into the production line. Production wells are clustered at the manifolds and connected to them by multi-bore jumpers.

Gas is exported to GEP Network. This can take the gas to the onshore LNG plant or inject it offshore.

Kaombo development covers 1090 km², with water depths in the area from 1417m (Gindungo) to 1926m (Louro). The production network is composed of 33 production wells connected to in-line single header manifolds through well jumpers. There are three off contingency production wells.

The water injection network is composed of 29 water injection (WI) wells (26 WI wells + 3 contingency WI wells) connected to in-line tees through well jumpers.

System design basis	10002192731	AO-100-40-S001-000007	
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TYPE 3 Use as is (if possible)

SPS HANDBOOK TABLE OF CONTENT	Document:	10002504361-PDC-000
	Version:	05 - Re-issued Constr
	Issue date:	2017.11.17
BLOCK 32 - KAOMBO SPS	Page:	13 of 315

1.2.2 Aker Solution Support & Office Contact

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SPS HANDBOOK TABLE OF CONTENT	Document:	10002504361-PDC-000
	Version:	05 - Re-issued Constr
	Issue date:	2017.11.17
BLOCK 32 - KAOMBO SPS	Page:	14 of 315

1.3 Abbreviations

AAAT	Annulus Access Adaptor Tool
AC	Air Conditioning
AIV	Annulus Isolation Valve
AKSO	Aker Solutions (SPS Contractor)
AMV	Annulus Master Valve
APD	Acoustic Pig Detector
ASD	Acoustic Sand Detector
AWV	Annulus Wing Valve
BOP	Blow Out Preventer
CCF	Closed Can Foundation
CIV	Chemical Injection Valve
CITV	Chemical Injection Throttle Valve
CH	Circulation Head
CHA	Cobra Head Assembly
CTLF	Coiled Tubing Lifting Frame
CWJ	Cased Wear Joint
DHLP	Down Hole Low Pressure
DIU	Downhole Interface Unit
EDP	Emergency Disconnect Package
EFL	Electrical Flying Lead
EFTS	Electrical Feed Through System
EPU	Electrical Power Unit
EQD	Emergency Quick Disconnect
ESD	Emergency Shut Down
FCM	Flow Control Module
FLDF	Flying Lead Deployment Frame
FPSO	Floating Production Storage and Offloading unit
GA	General Arrangement
GEP	Gas Export Pipeline
HART	Hydraulic Activated Running Tool
HCS-R	Horizontal Connection System – Rigid
HCS-U	Horizontal Connection System – Umbilical
HFL	Hydraulic Flying Lead
HP	High Pressure
HPU	Hydraulic Power Unit
IMV	Injection Master Valve
ISO	Isometric
IWV	Injection Wing Valve
LLS	Lower Landing String
LNG	Liquid Natural Gas
LP	Low Pressure
LRP	Lower Riser Package
LTPC	Long Term Protective Cover
LV	Low Voltage
LVDI	Linear Variable Differential Transformer
LWRP	Lower Workover Riser Package
MCM	Manifold Control Module
MCS	Master Control Station
MIV	Methanol Injection Valve
MSS	Manifold Support Structure
MPFM	Multi-Phase Flow Meter
MQC	Multi-Quick Connector / Coupling
OB	Outboard
OCWR	Overall Control of Well and Risers
OIP	Outline Installation Procedure
OMM	Operation and Maintenance Manual
PGB	Production Guide Base
PLC	Programmable Logic Controller
RRRT	Running, Retrieving & Re-Orientation Tool
PMV	Production Master Valve
PSD	Production Shut Down
PT	Pressure Transmitter
PWJ	Production Well Jumper
PWV	Production Wing Valve
PVXT	Production Vertical X-mas Tree
P&ID	Piping and Instrumentation Diagram
RAM	Reliability Availability and Maintainability
RIMS	Retrievable Integrated Modular Stabplate
ROV	Remotely Operated Vehicle
RT	Running Tool
SCM	Subsea Control Module
SDU	Subsea Distribution Unit
SERS	Subsea Emergency Response System
SLS	Simplified Landing String
SLV	Service Line Valve
SFT	Surface Flow Tree
SoS	Scope of Supply
SPS	Subsea Production System
SPWV	Surface Production Wing Valve
SRM	Subsea Router Module
SRLD	Slimline Rigid Lock Down
SSIV	Subsea Isolation Valve
STMP	Single Trip Multi-Purpose Tool
SWL	Safe Working Load
TH	Tubing Hanger
THHTT	Tubing Hanger Handling & Test Tool
THOECT	Tubing Hanger Orientation and Elevation Check Tool
THOJ	Tubing Hanger Orientation Joint
THRT	Tubing Hanger Running Tool
TRT	Tree Running Tool
TT	Temperature Transmitter
UTA	Umbilical Termination Assembly
UTH	Umbilical Termination Head
VMC	Vertical Module Connection
WH	Wellhead
WI	Water Injection

SPS HANDBOOK TABLE OF CONTENT

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 15 of 315

WIVXT	Water Injection Vertical X-mas Tree
WO	Workover
WOCS	Workover Control System
WOS	Workover System
XOV	X (Cross)-Over Valve
XT	X-mas Tree
XTICT	X-mas Tree Installation and Commissioning Tool

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000

Version: 05 - Re-issued Constr

Issue date: 2017.11.17

Page: 16 of 315

1.4 Main Deliverables

	AKSO Work-package	Top Assembly Reference	Components	Quantity		
Subsea Structures	WP03	AO-100-41-S001-000013 / 10002197511	Manifolds	19 off		
			SSIV	3 off		
			SDU	22 off		
			Foundation Structures	41 off		
	WP04	AO-100-43-S001-000008 / 10002262031	Wellhead System	65 off		
	WP05	AO-100-43-S001-000004 / 10002310273	PVXT	36 off		
			WIVXT	29 off		
			Prod. PGB	36 off		
WI PGB			29 off			
Flying Leads (across subsea structures)	WP06	AO-100-44-S001-000014 / 10002217926	Electrical Flying Leads (EFLs)			
Hydraulic Flying Leads (HFLs)						
Subsea Instruments; Control Modules; Electrical, Hydraulic and FO Flying Leads and Connectors						
Subsea Control Unit			4 off			
Master Control Station			2 off			
Electrical Power unit			2 off			
Hydraulic Power Unit			2 off			
Misc. Subsea Instruments and Control Modules			WP07	AO-100-45-S001-000001 / 10002176858	EDP	1 off
Topside Control System	LRP	1 off				
	WO Umbilicals					
	multiWOCS				1 off	
	ROV Tooling	WP08			AO-100-46-S001-000006 / 10002484290	Flying Lead Deployment Frames
Running Tools						
Valve Manipulation Tools						
Production Jumper between Manifold and PXT	WP10	AO-100-42-S001-000003 / 10002442979			Production Well Jumper	35 off
Tie-In Tooling			AO-100-46-S001-000003 / 10002419156	Cleaning Tools, Installation Tools etc.		

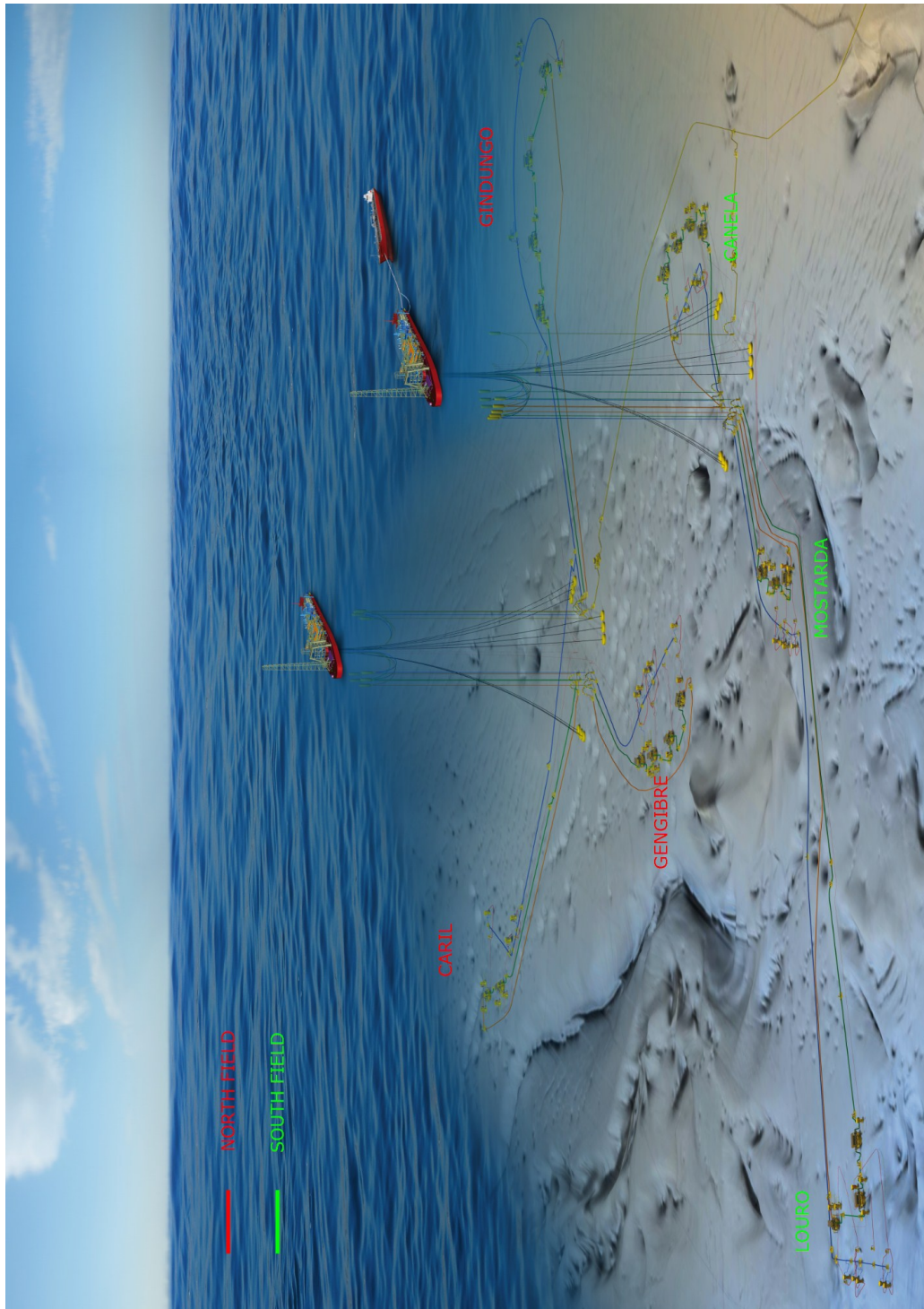
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SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 17 of 315

1.5 Overall Field Layout Kaombo



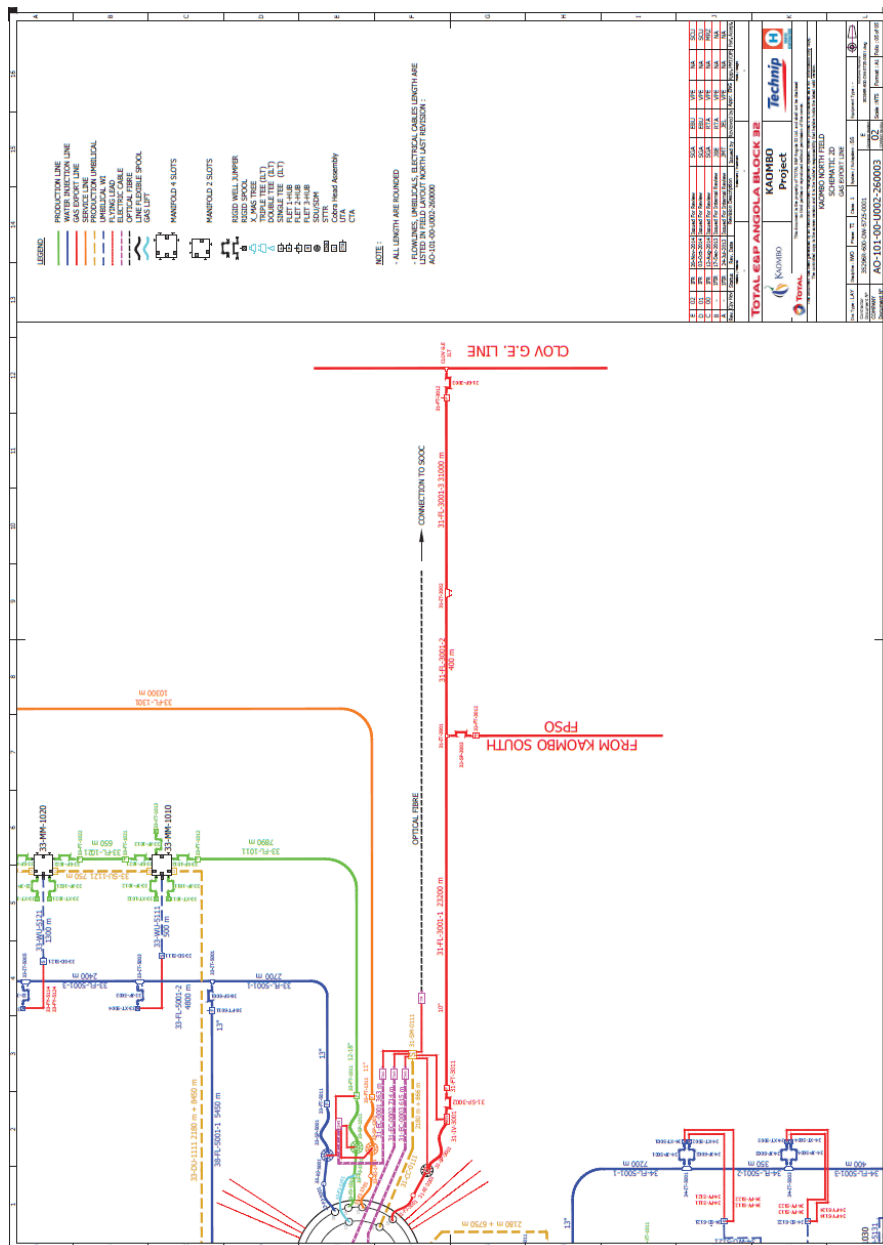
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SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 21 of 315

1.5.4 Field schematic GAS EXPORT LINE



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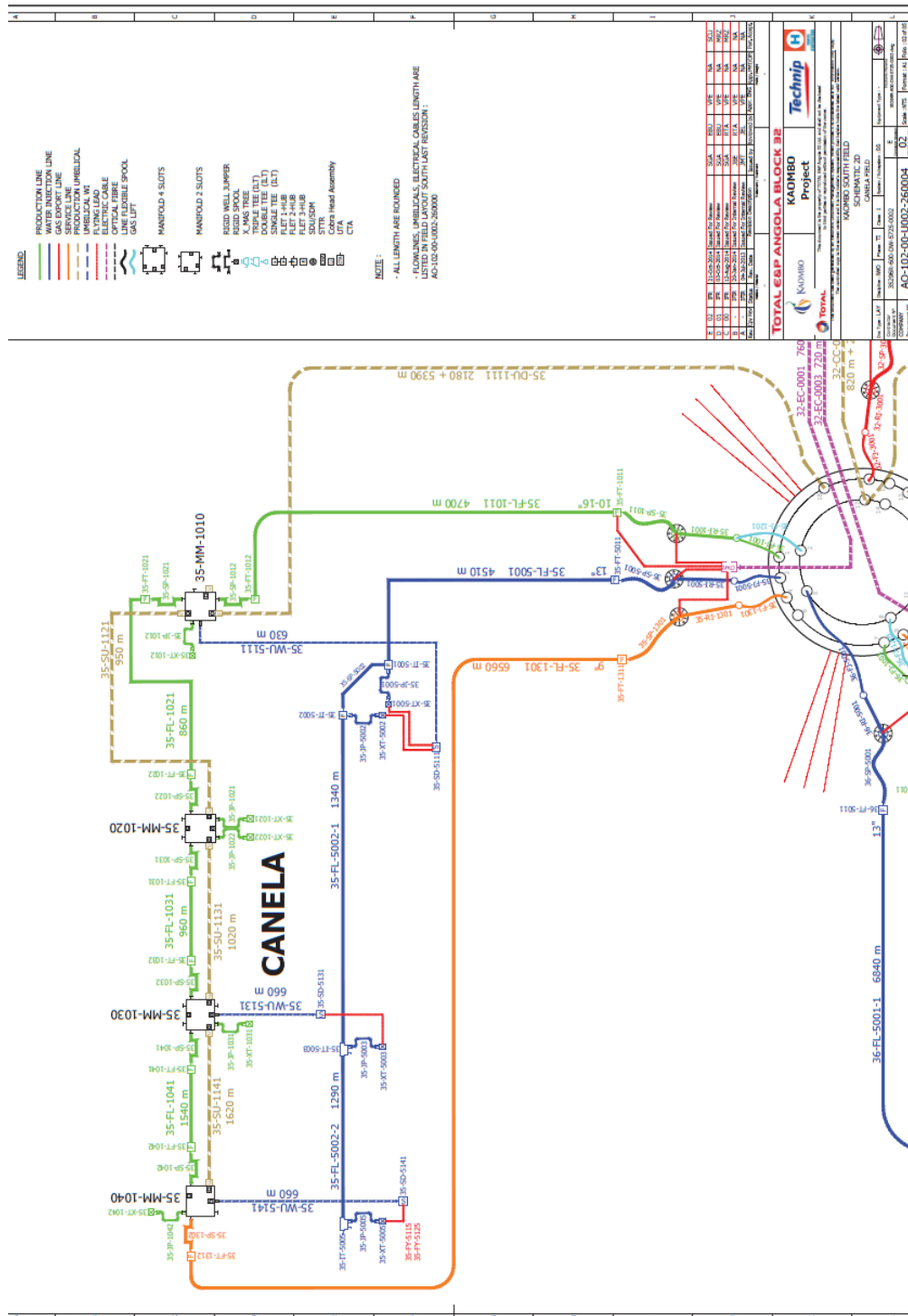
INCLUDE LEGENDS ON FIRST/LAST PAGE

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 22 of 315

1.5.5 Field schematic CANELA



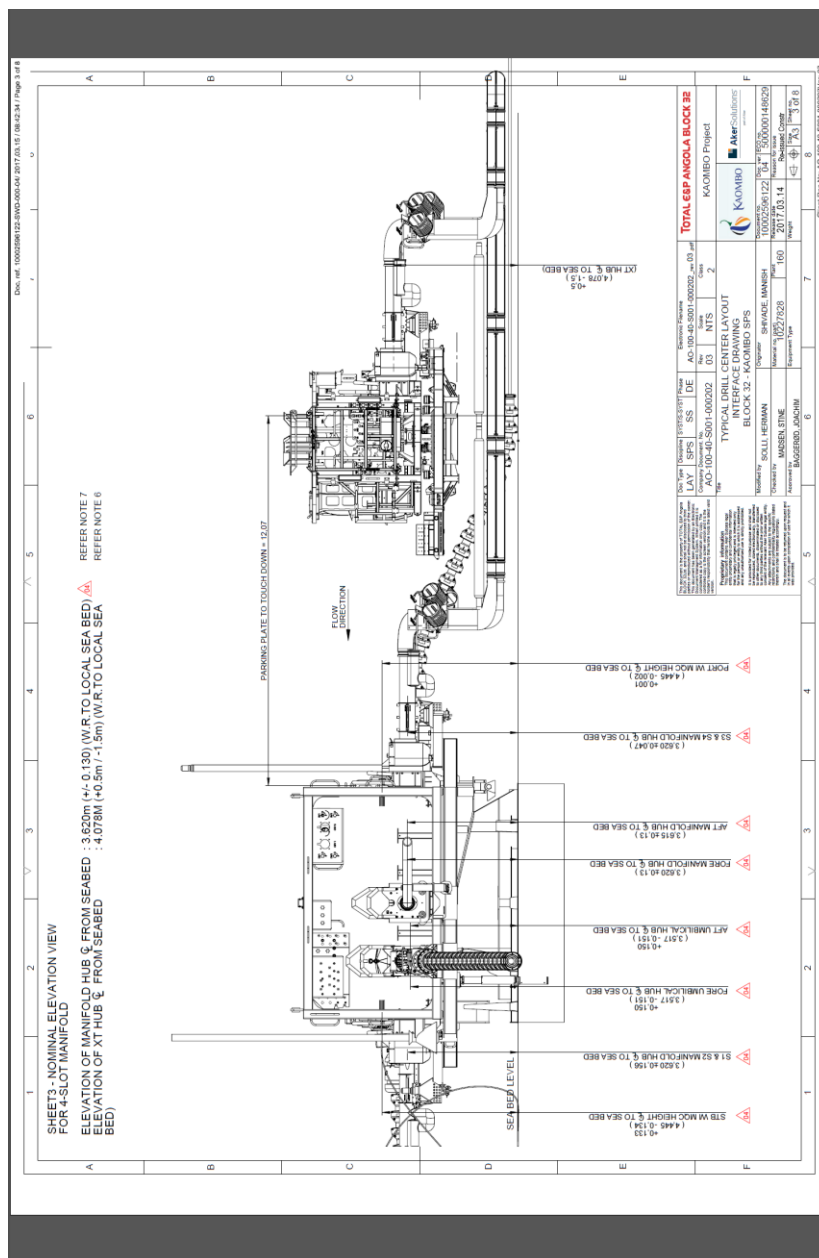
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SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 27 of 315

1.6.2 Typical Drill centre layout elevation view



TYPE 3 Use as is (if possible)

Production drill centre layout	10002596122	AO-100-40-S001-000202	10227828
--------------------------------	-------------	-----------------------	----------

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
 Version: 05 - Re-issued Constr
 Issue date: 2017.11.17
 Page: 28 of 315

1.7 General Design Parameters

Design Life	20years
Design Water depth	2000m

Design Pressure

	Item	Design Pressure (bara)	Internal / Differential pressure in design
Production System (including Service Line)	WH	690	Internal
	PVXT	690	Internal
	Manifold piping	517	Internal
	Valve body	517	Internal
	Jumper	450	Internal
	HCS	444-690	Differential
Water Injection System	WH	690	Internal
	WIVXT	690	Internal
	HCS	453-690	Differential
Gas Export System	SSIV piping	517	Internal
	Valve body	517-690	Internal
	HCS	404-517	Differential
DHLP system from HPU to PVXT	SCM	759	Differential
	HPU	380	Differential
	WO HPU	380	Differential
	UTA pipe	690	Differential
	Manifold pipe	690	Differential
	Valve body	690	Internal
	Jumper	690	Differential
	PVXT small bore pipe	759	Internal
	HCS	690	Differential
DHLP system from Manifold to WIVXT	SCM	759	Differential
	WO HPU	380	Differential
	Manifold pipe	690	Differential
	Valve body	690	Internal

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 29 of 315

	CHA pipe	690	N/A
	SDU pipe	690	Differential
	HFL	690	Differential
	WIVXT small bore pipe	759	Internal
LP system from HPU to PVXT	SCM	380	
	HPU	380	
	PVXT valve actuator	380	
	PVXT valve body	380	
	PVXT pipe	380	
	Jumper	380	
	Valve body	380	
	Valve actuator	380	
	Manifold Pipe	380	
	UTA pipe	690	
LP system from Manifold to WIXT	SCM	380	
	WO HPU	380	
	WIVXT valve actuator	380	
	WIVXT small bore pipe	380	
	HFL	690	
	SDU pipe	690	
	CHA pipe	690	
	Valve body	380	
	Valve actuator	380	
	Manifold Pipe	380	
Chemicals from Topsides to Manifold	UTA pipe	345-690	
	Manifold Pipe	517-690	
	Valve body	690	
Chemicals from Manifold to PXT	HCS	690	
	Jumper	690	
	VXT pipe	690	
	VXT valve body	690	

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
 Version: 05 - Re-issued Constr
 Issue date: 2017.11.17
 Page: 30 of 315

Note: See CTR SYSTEM DESIGN BASIS for updated and more detailed pressure values.

Temperature

Components	Min temp	Max temp
Manifolds	-18	121
Production XT	-18	121
Water injection XT	-18	82
Production Well Jumper	-18	121
Water injection Well Jumper*	4	60
SSIV module	-10	60

Chemical injection & corresponding injection points

	Injection point location	Flow regulation	Fluid to treat
Demulsifier	Manifold	Subsea CITV	Produced oil + water
Scale inhibitor	Downhole for Gindungo Deep/ Caril wells Manifolds for other	Subsea CITV	Produced water
Corrosion inhibitor	Production XT	Subsea CITV Downstream PWV	Produced water
Asphaltene inhibitor	Downhole	Subsea CITV	Produced oil
Biocide	Furthest Operating Manifold from FPSO	Topside	Produced water
Spare 1	Production XT	Subsea CITV Downstream PWV	TBD
Spare 2	Manifold		TBD

SPS HANDBOOK TABLE OF CONTENT

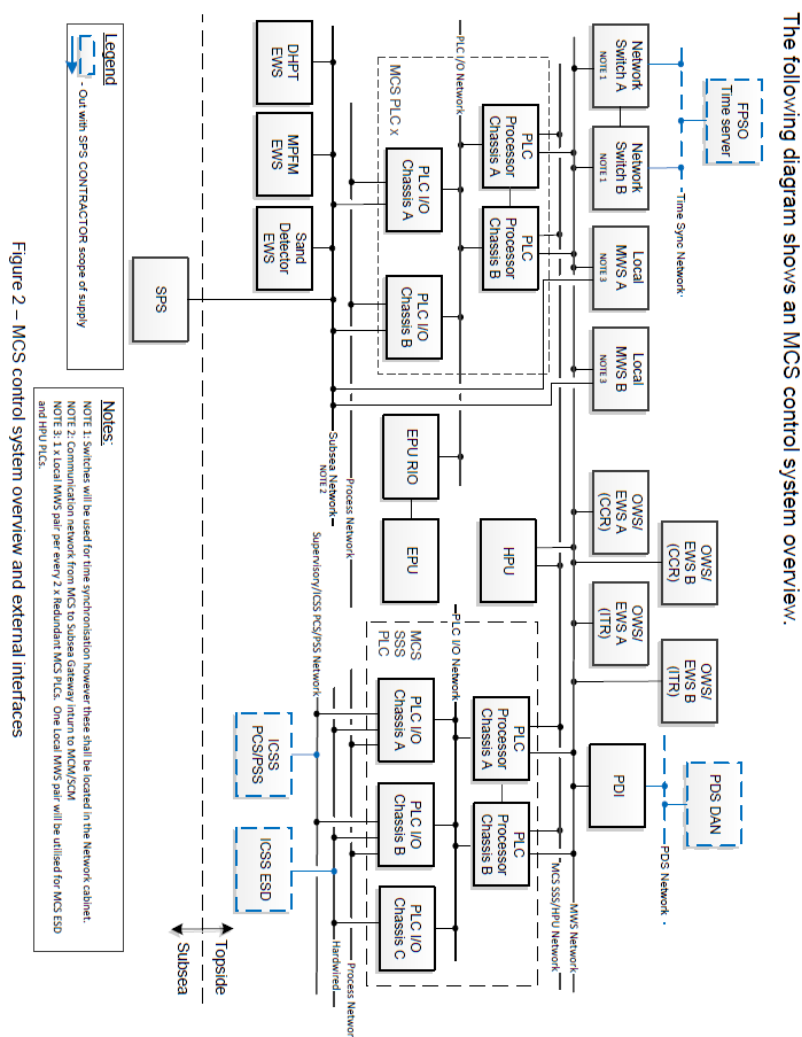
BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 31 of 315

2 PRODUCTION CONTROL SYSTEM

2.1 Reference List

2.2 Topside Architecture North & South



Topside Architecture Specification	10002217936	AO-100-44-S001-000001	10211880
TYPE 3 Use as is (if possible)			

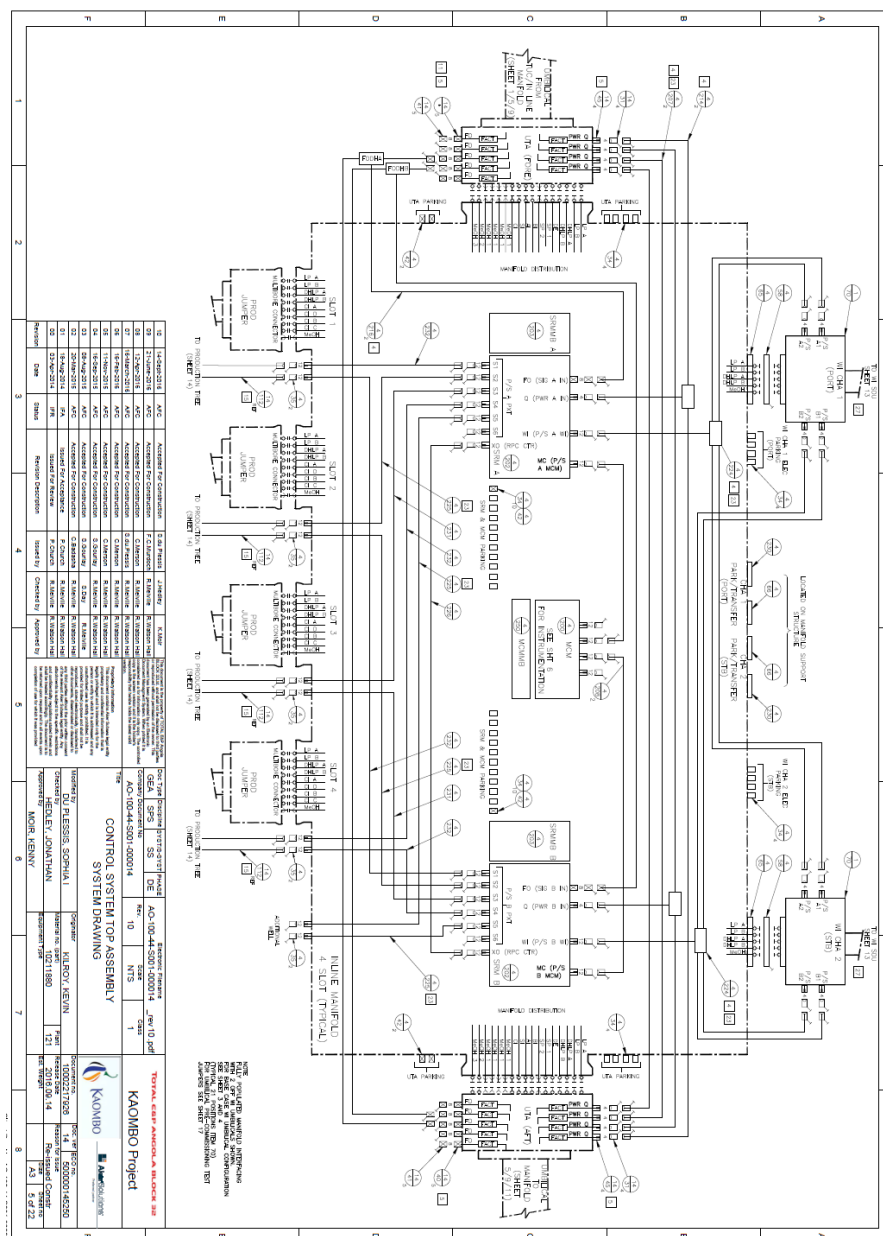
SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 33 of 315

2.3 Control System Top Assembly drawing

2.3.1 Inline 4slot Manifold



Control System Top assembly 4 Slot inline manifold

10002217926

AO-100-44-S001-000014

10211880

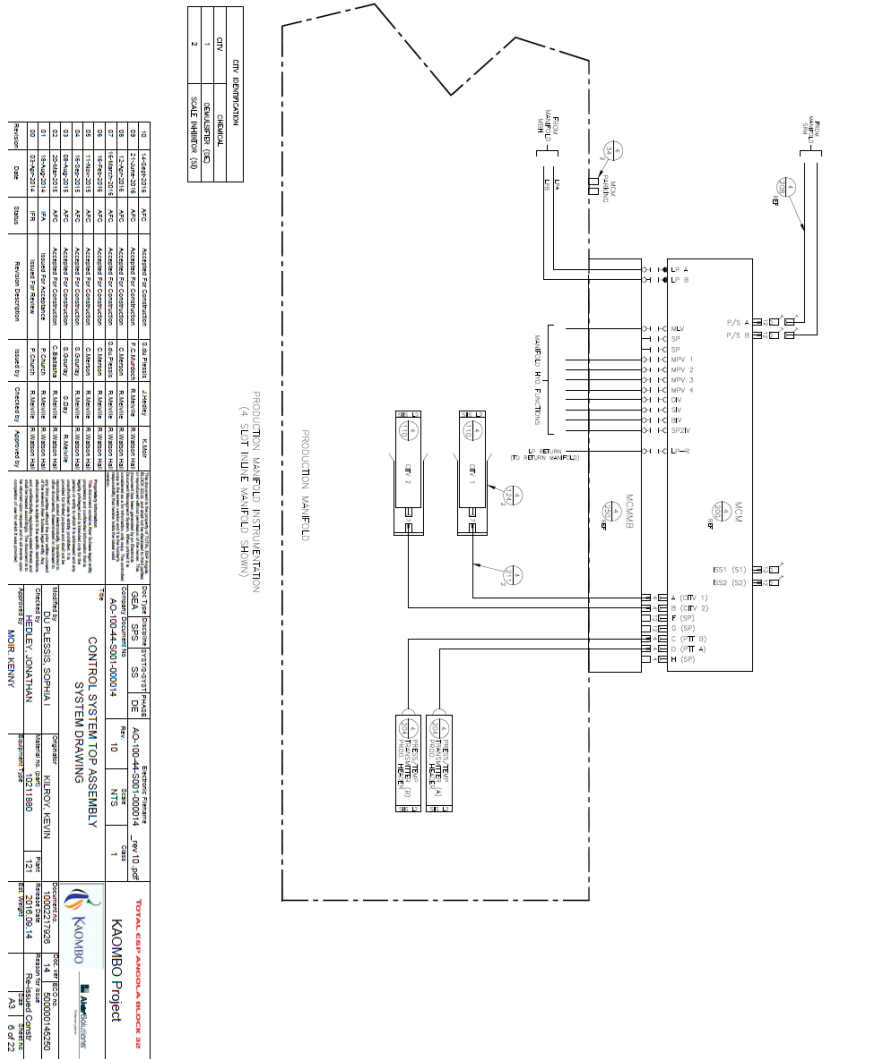
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SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 34 of 315

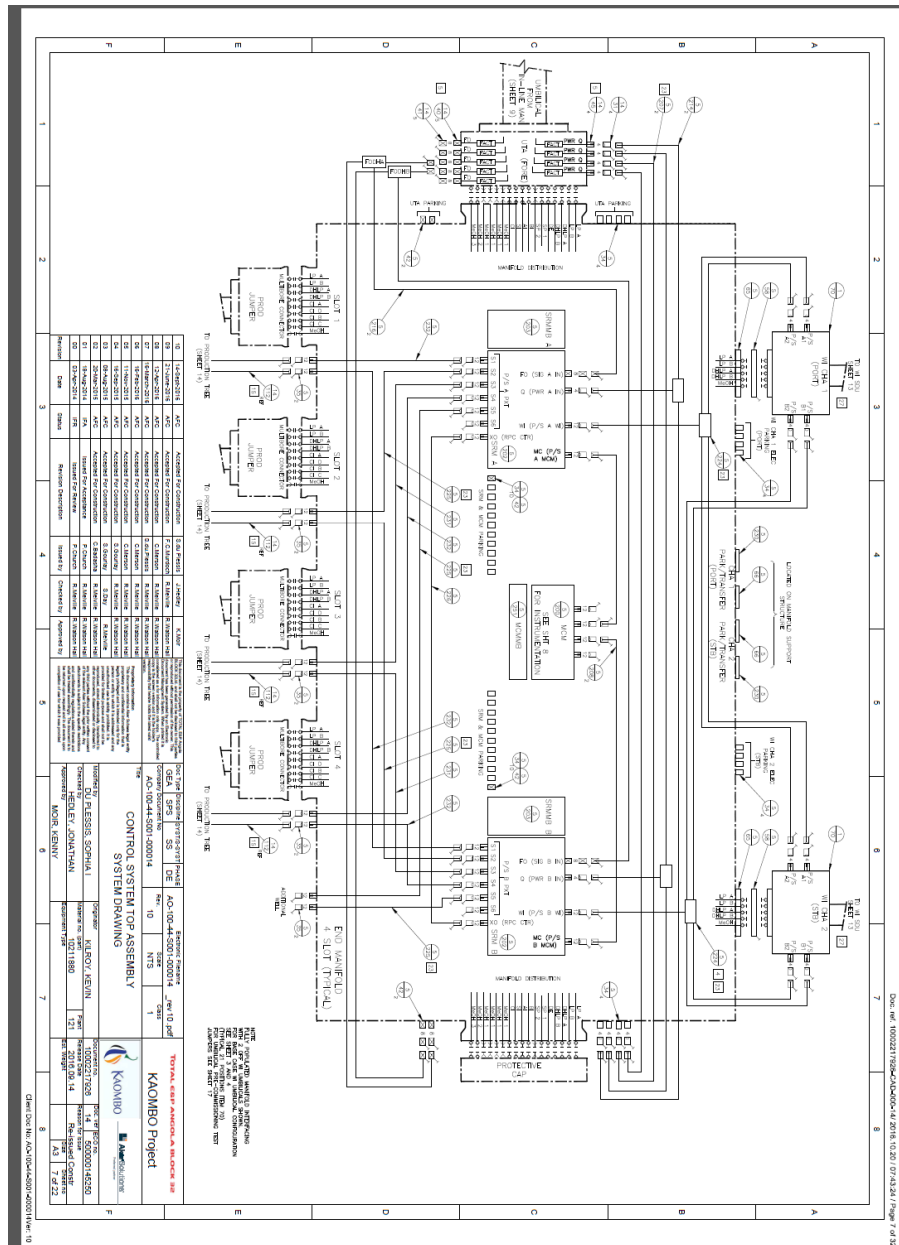
2.3.2 Inline 4slot Manifold Instrumentation



BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 35 of 315

2.3.3 End 4slot Manifold

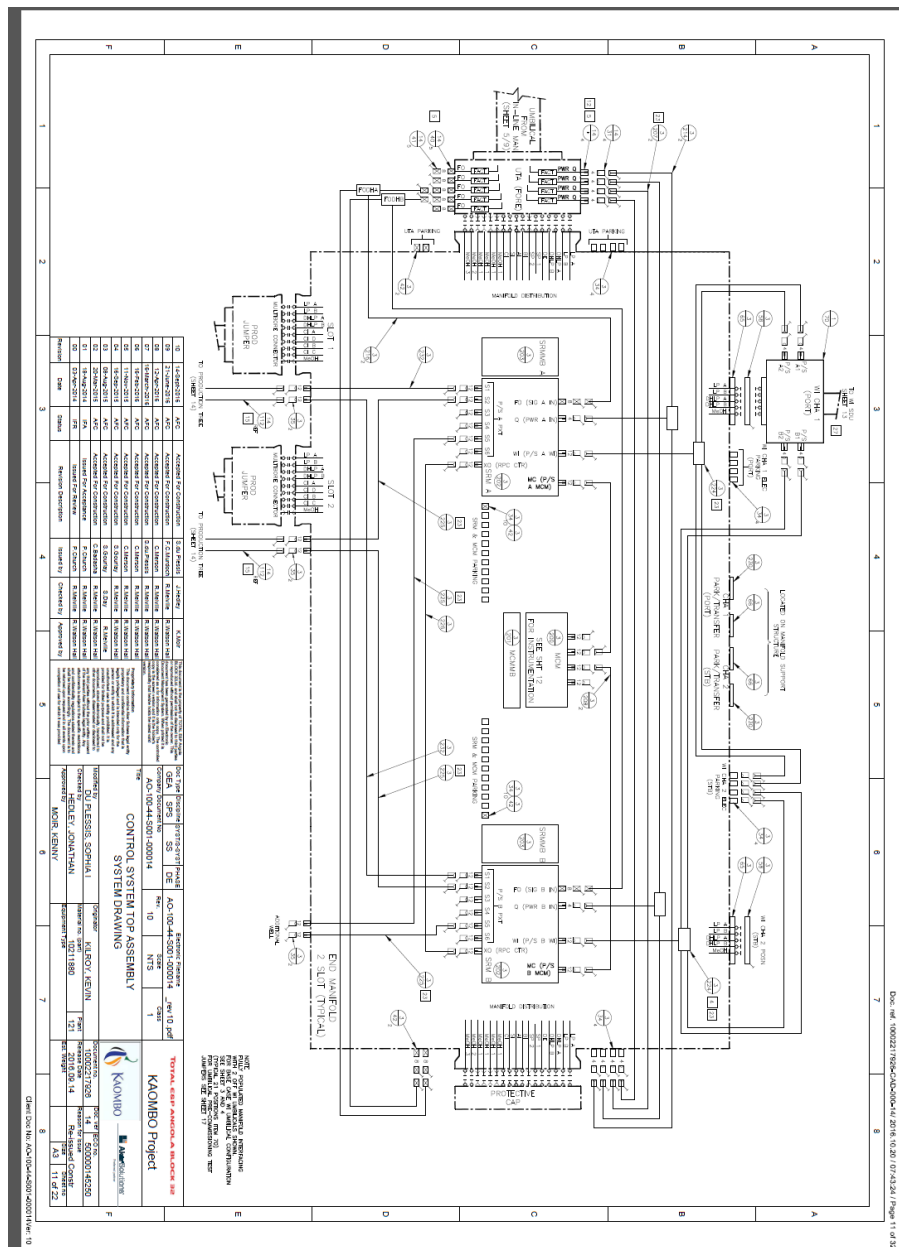


SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 39 of 315

2.3.7 End 2slot Manifold

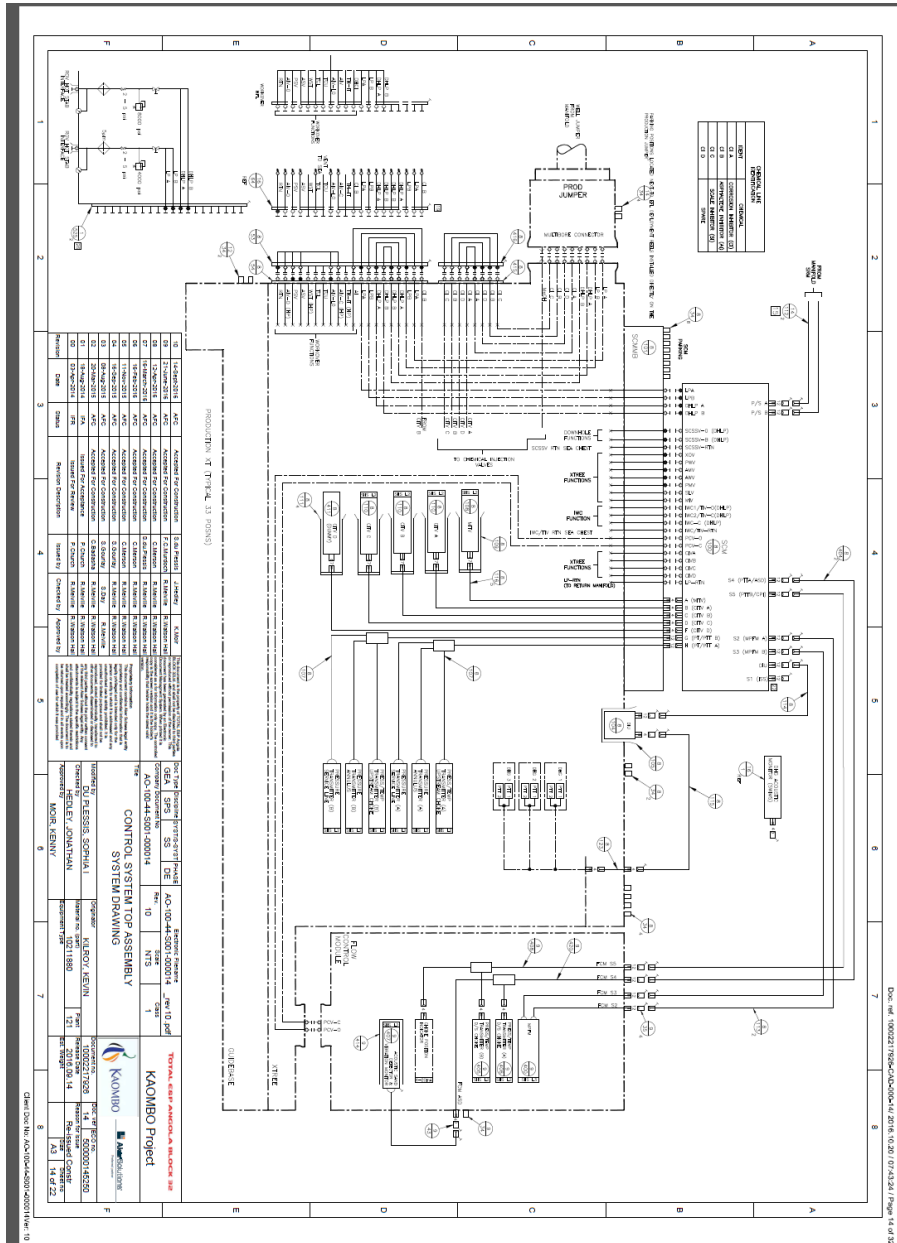


SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 42 of 315

2.3.10 Production XT



SPS HANDBOOK TABLE OF CONTENT

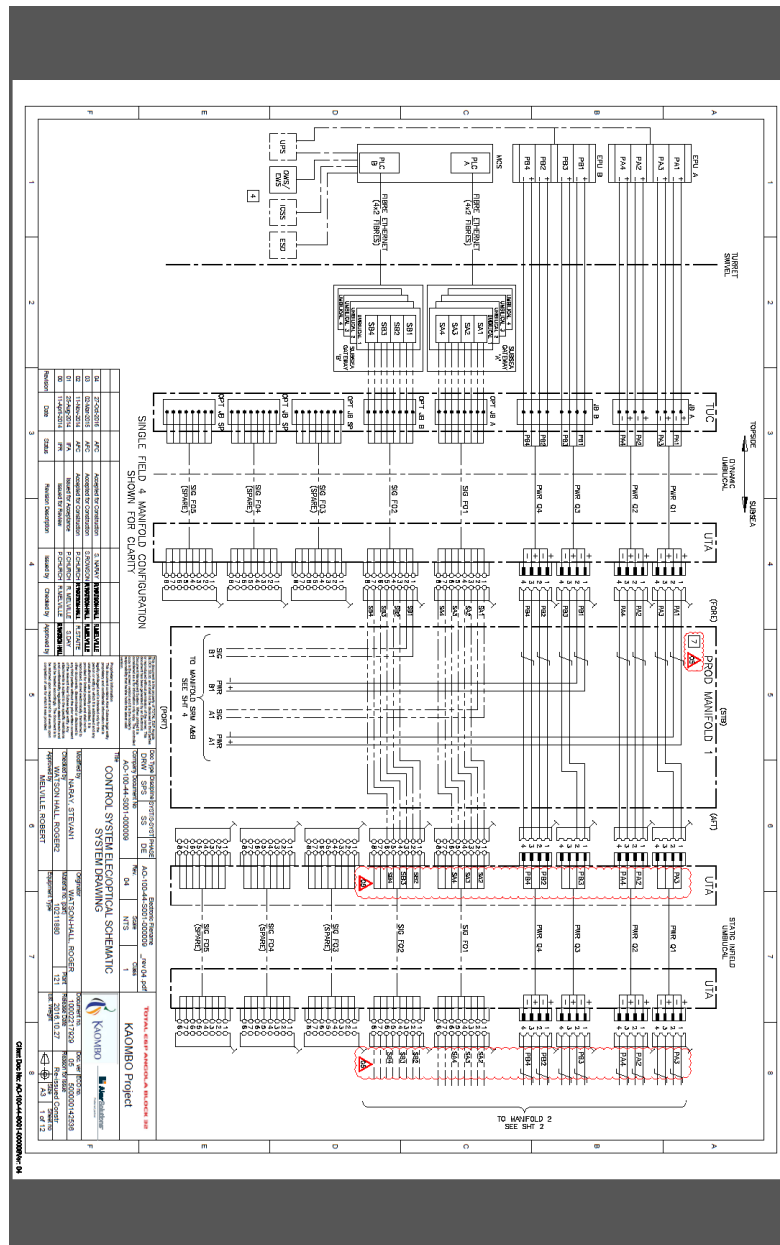
BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 46 of 315

2.4 Control System Elec/Optical Schematic System Drawing

HOLD; feasibility of inclusion in handbook pending draft example from sub-supplier

1/11

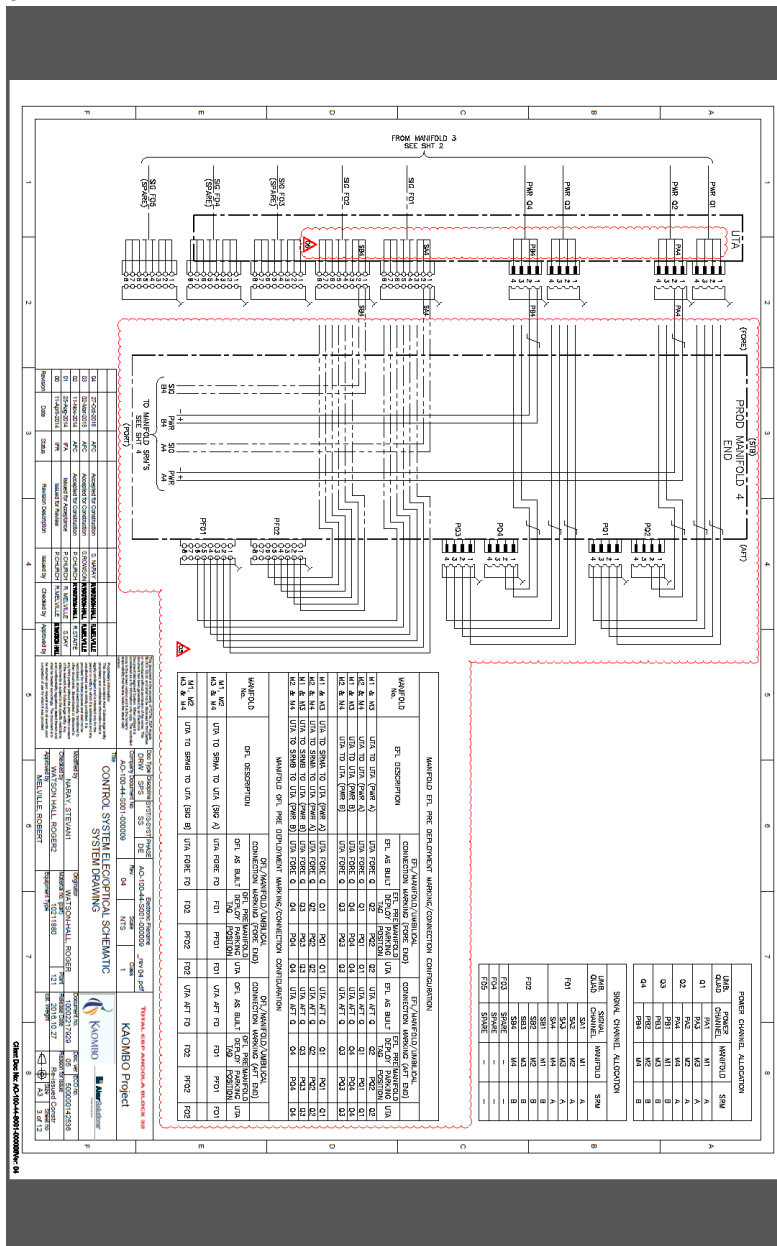


SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 48 of 315

3/11

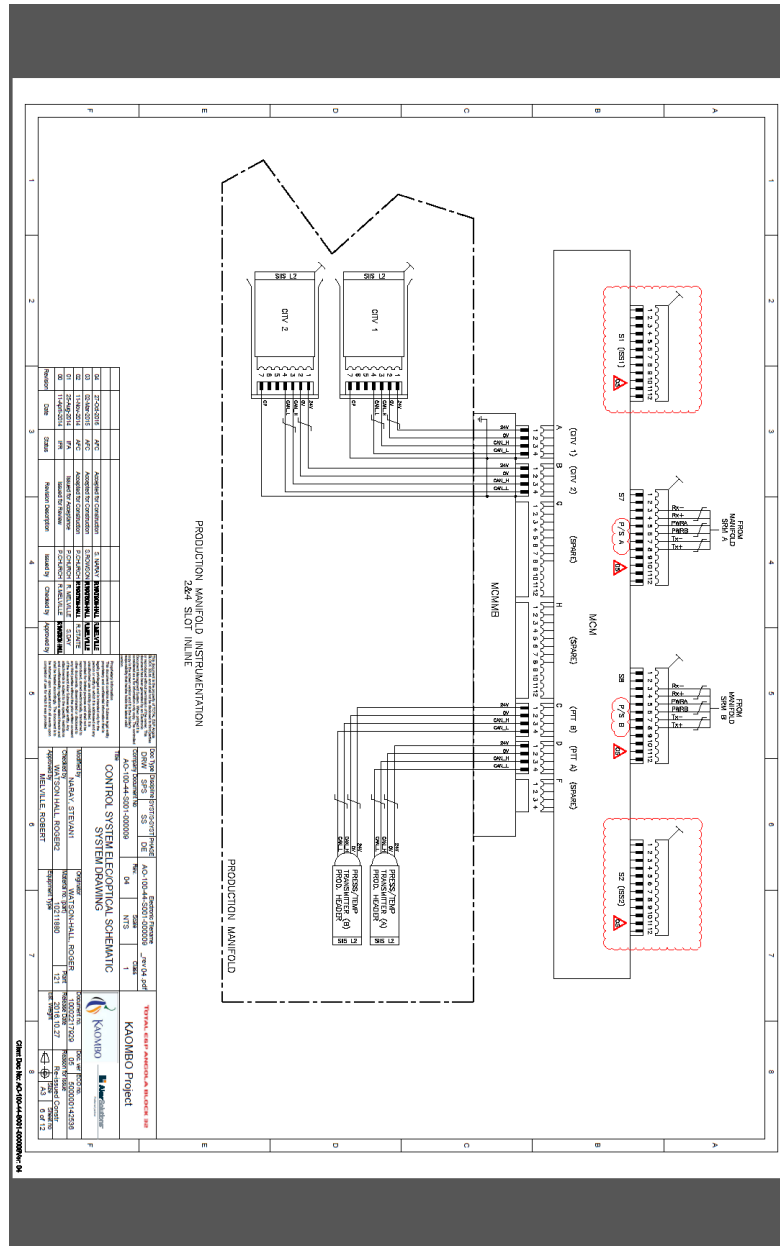


SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
 Version: 05 - Re-issued Constr
 Issue date: 2017.11.17
 Page: 51 of 315

6/11

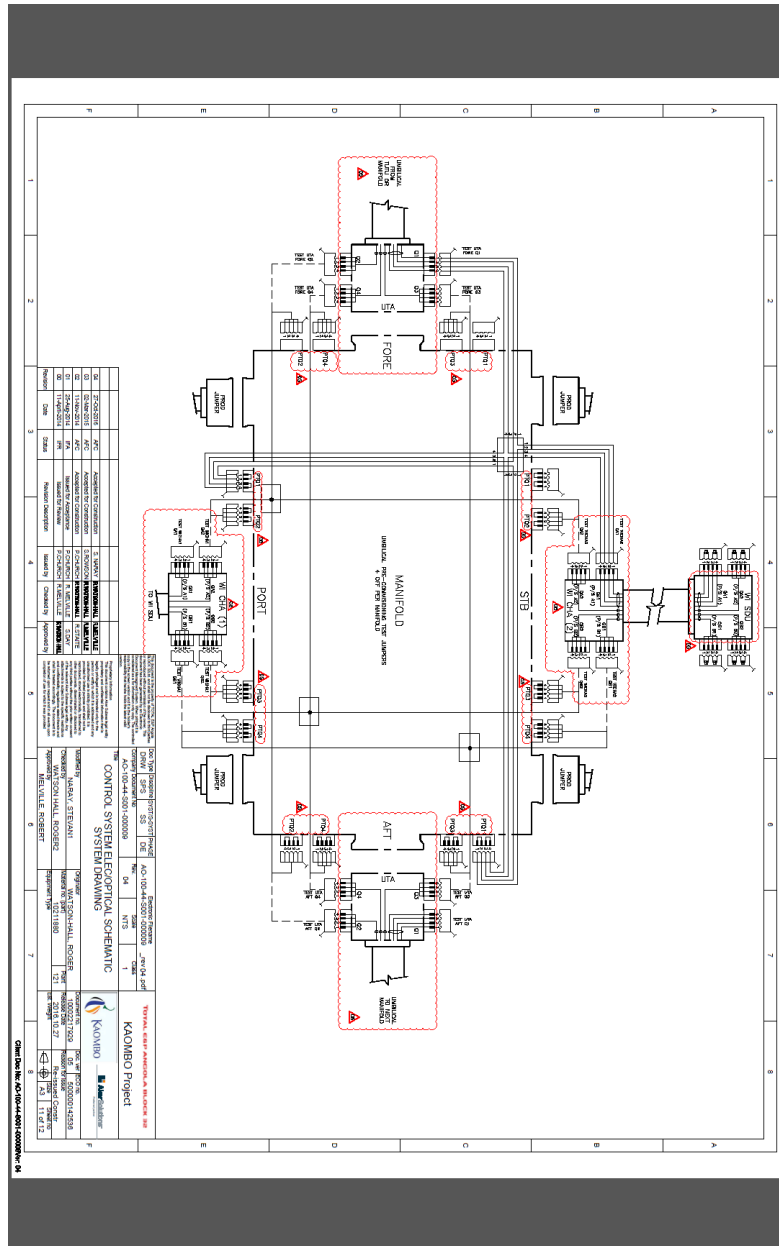


SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 56 of 315

11/11

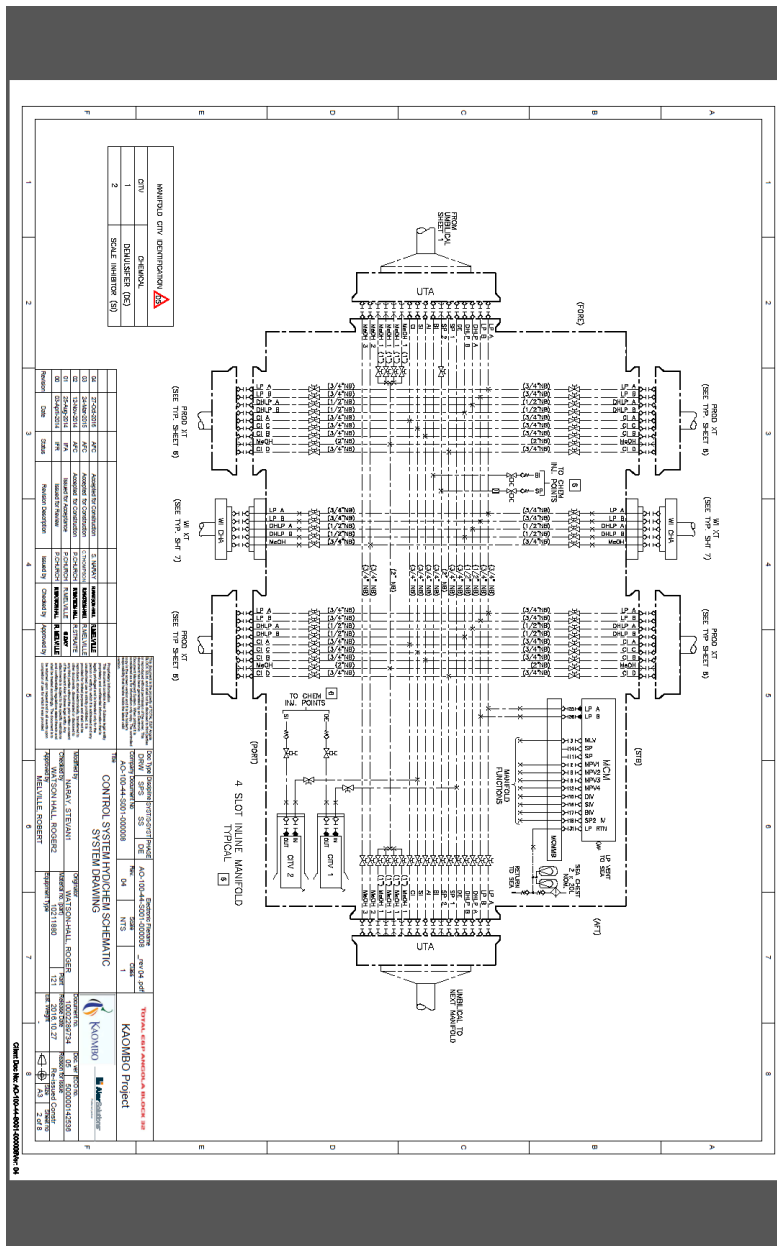


SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 58 of 315

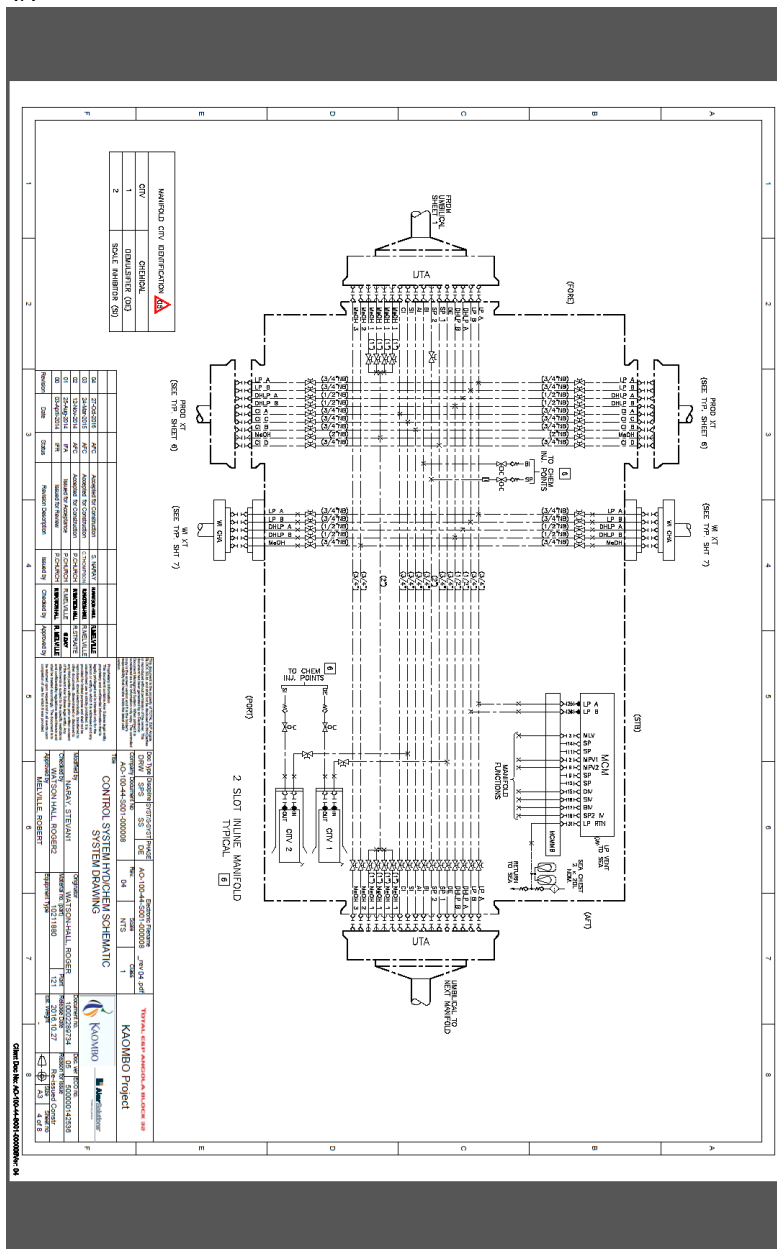
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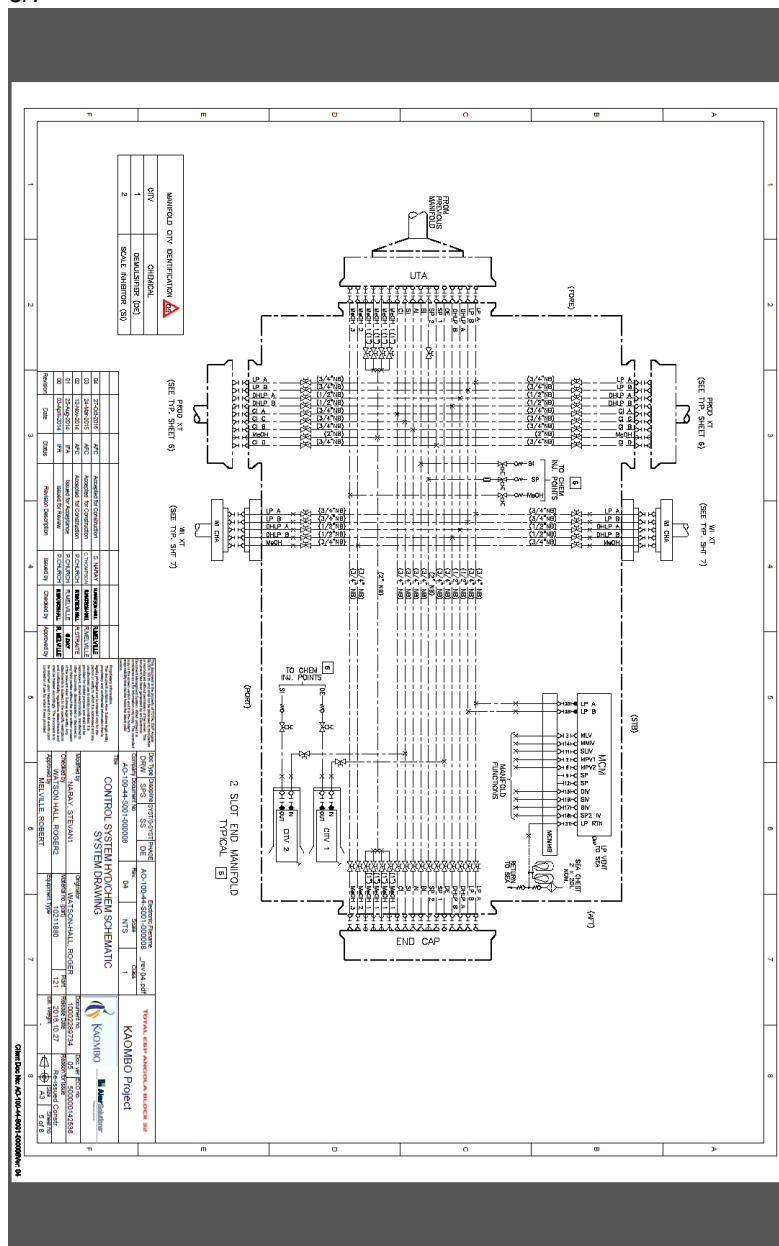
Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 60 of 315

4/7



Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 61 of 315

5/7

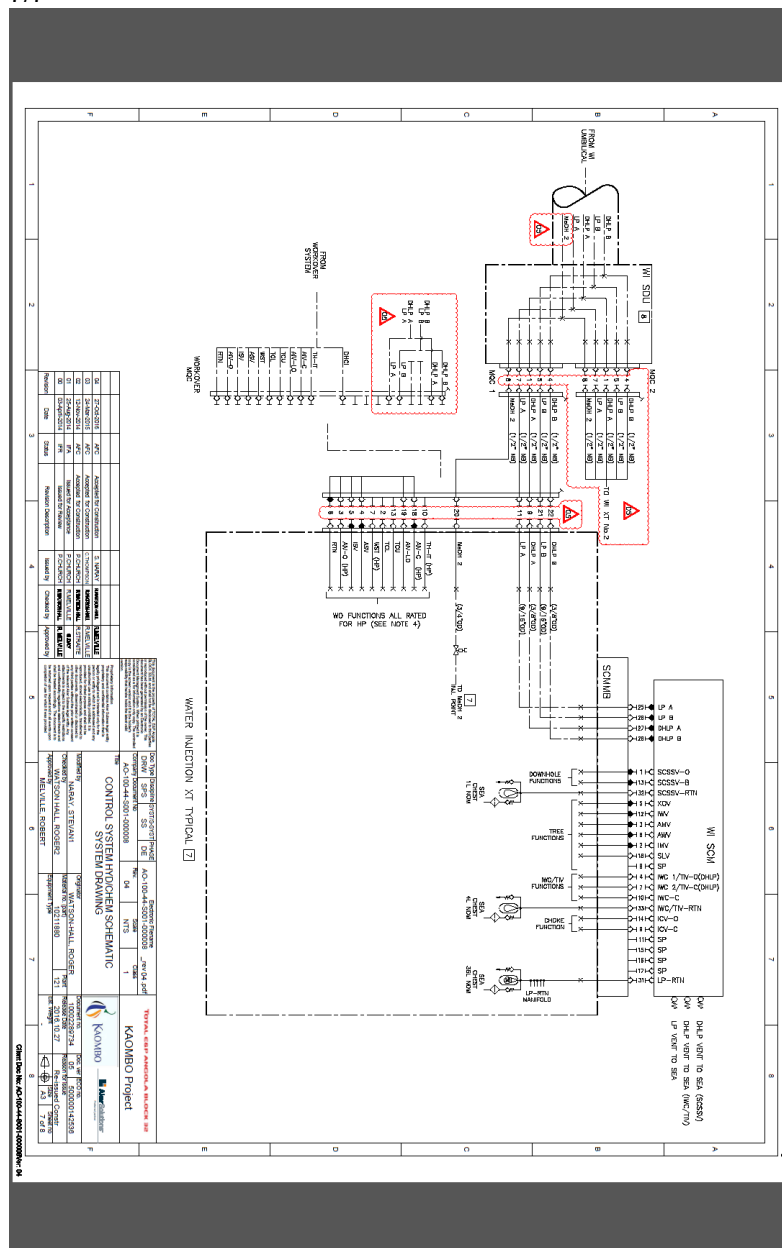


SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 63 of 315

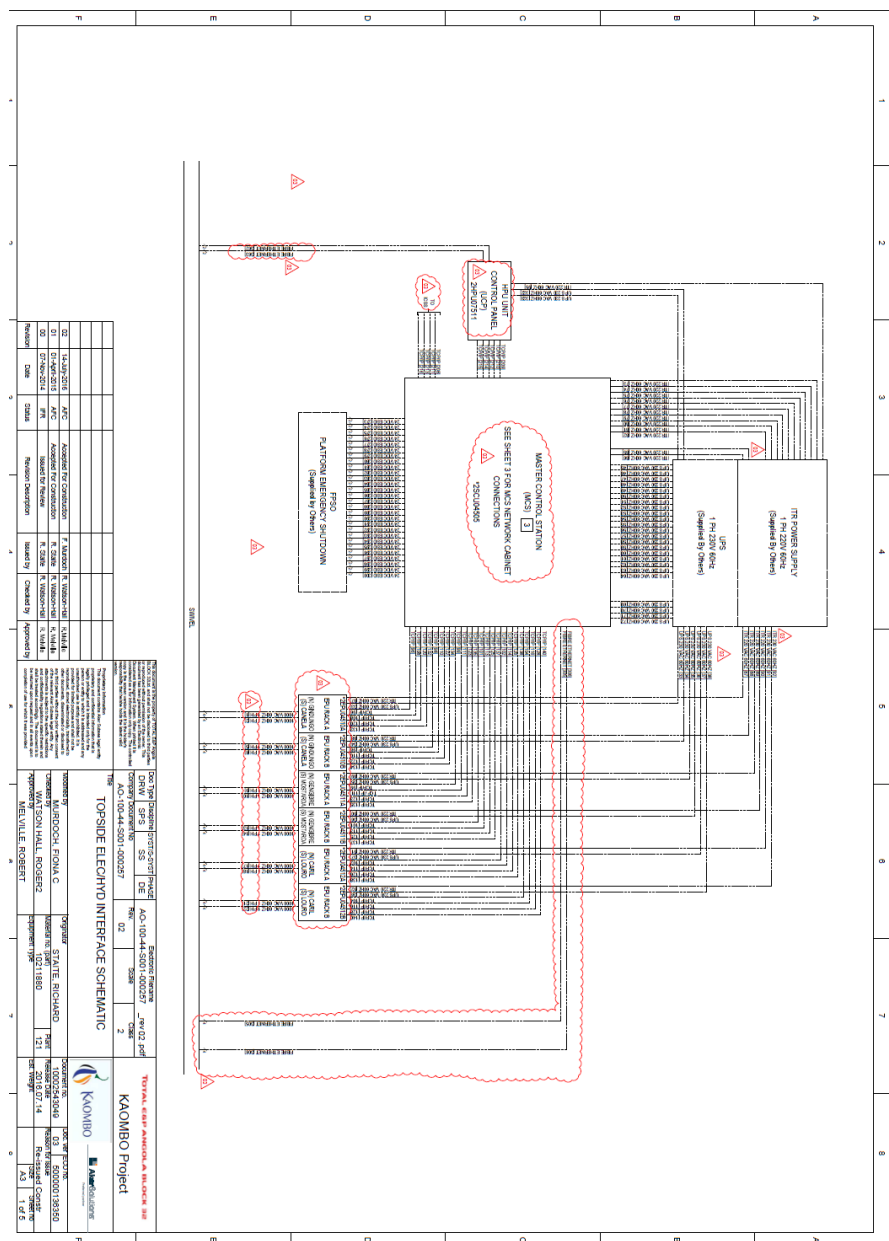
7/7



2.6 Topside Elec/Hyd Interface Schematic

HOLD; feasibility of inclusion in handbook pending draft example from sub-supplier

1/5 Topside ELEC/HYD interface schematic



Topside electrical interface schematic	10002543049	AO-100-44-S001-000257	10211880
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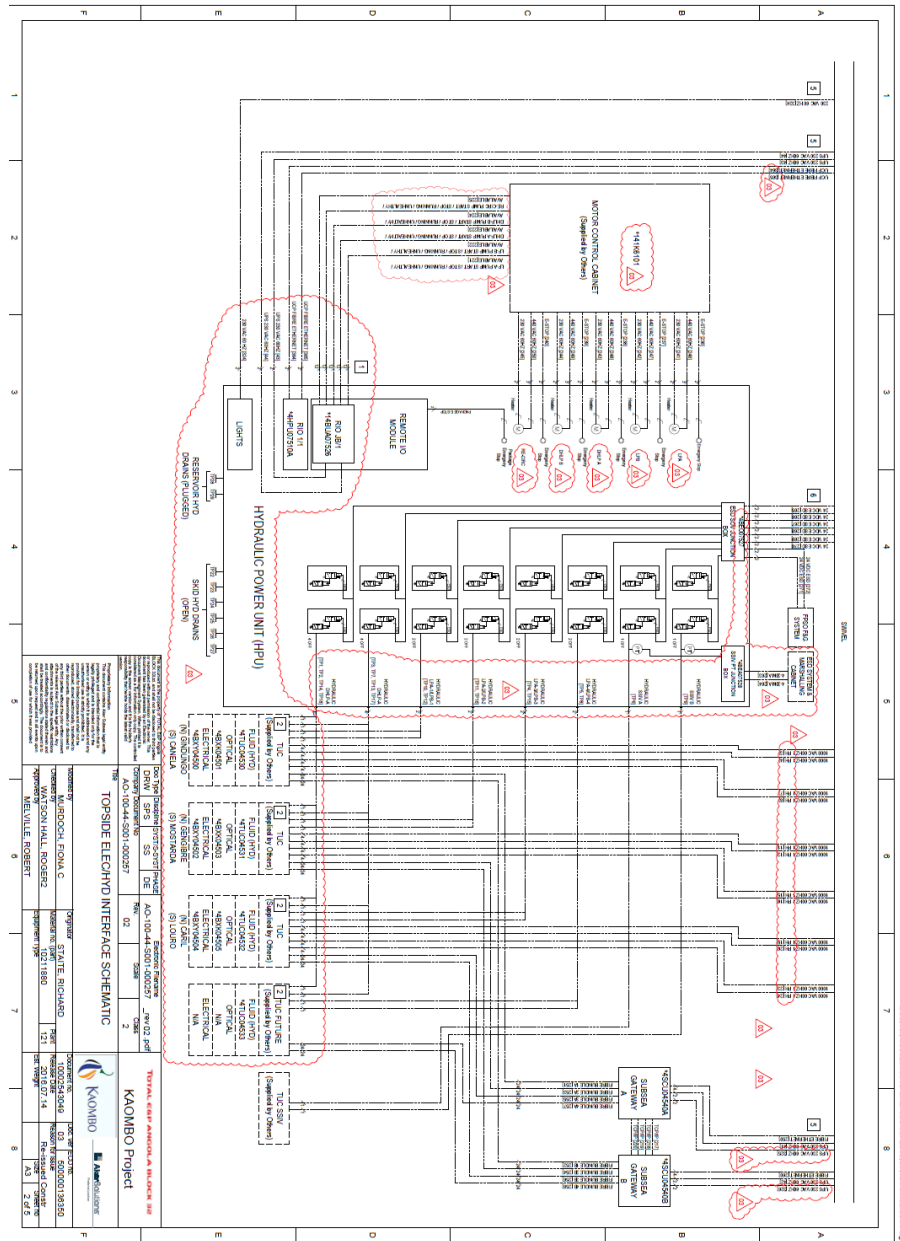
TYPE 3 Use as is (if possible)

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 65 of 315

2/5 Topside ELEC/HYD interface schematic

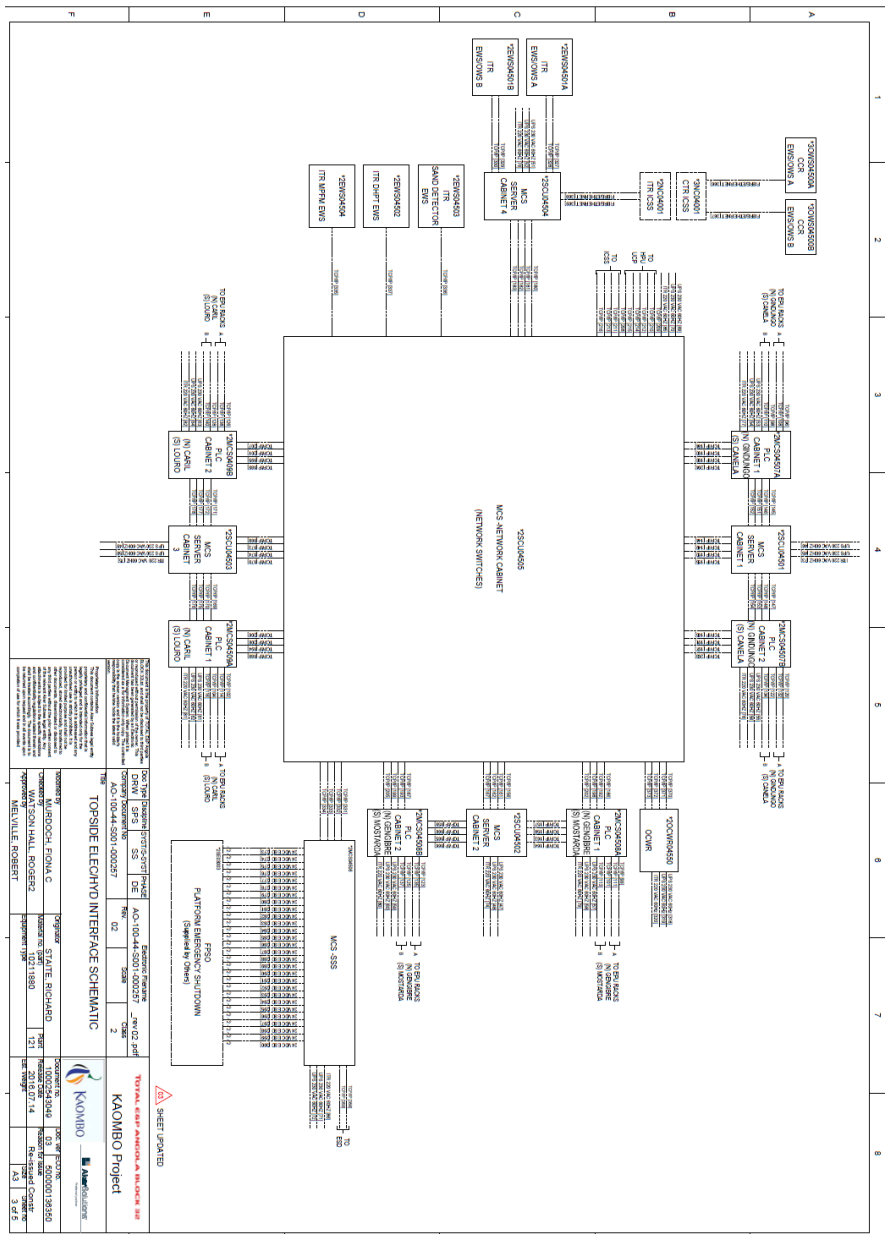


SPS HANDBOOK TABLE OF CONTENT

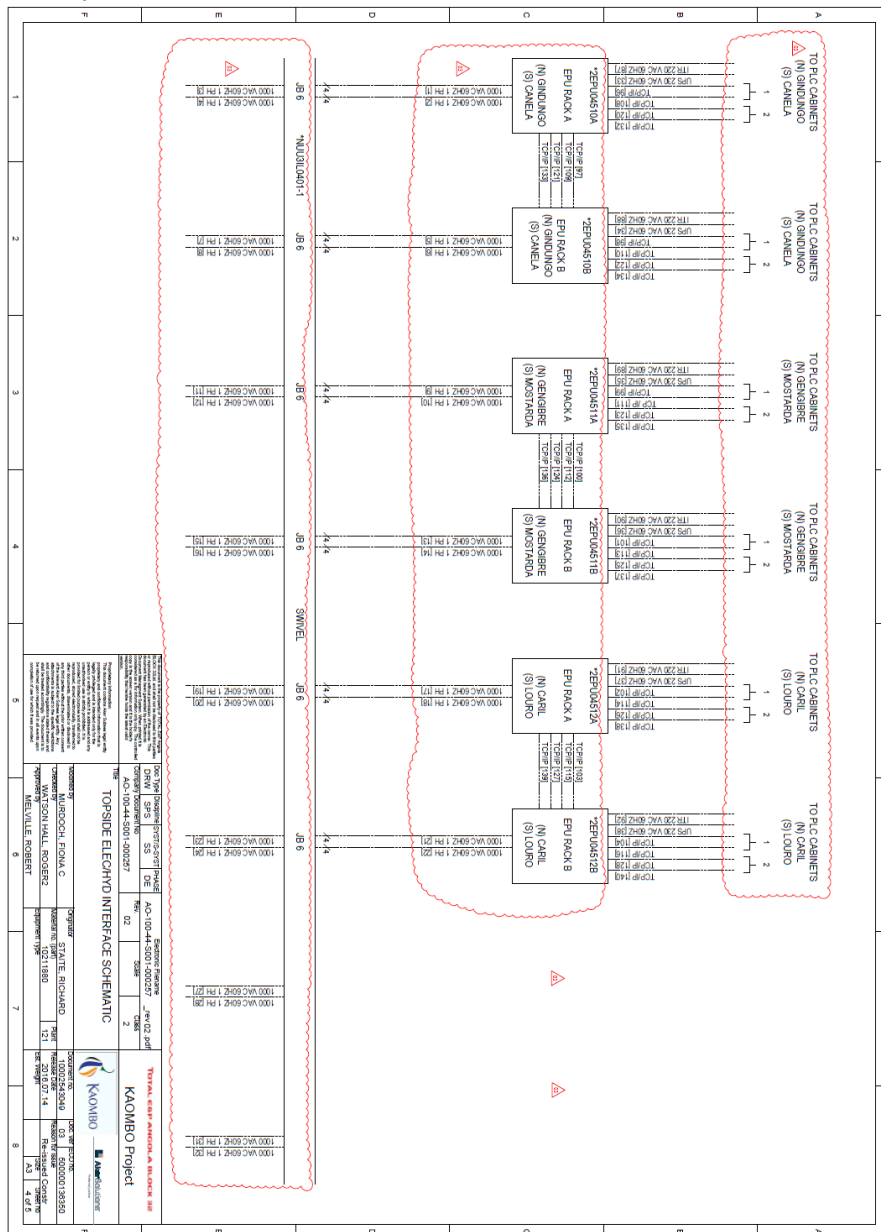
BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 66 of 315

3/5 Topside ELEC/HYD interface schematic



4/5 Topside ELEC/HYD interface schematic



SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 68 of 315

5/5 Topside ELEC/HYD interface schematic

CONN.	QUAD CORE	POWER ONLY
1	A	POWER +
2	C	POWER -
3	B	POWER +
4	D	POWER -

EQUIPMENT TAG (TYPICAL)
* 1 (NORTH) OR 2 (SOUTH) SEE NOTE [4]

REFERENCE DRAWINGS

ASER NO.

COMPANY NO.

SYSTEM ASSEMBLY	1000227926	AO-100-44-5001-100014
SYSTEM HYDRAULIC SCHEMATIC	1000228974	AO-100-44-5001-100018
SYSTEM ELECTRICAL AND OPTICAL SCHEMATIC	1000214473	AO-100-44-5001-100017
2 SLOT PROD. END MANIFOLD SCHEMATIC	1000219475	AO-100-44-5001-100004
2 SLOT PROD. END MANIFOLD SCHEMATIC	1000228958	AO-100-44-5001-100011
2 SLOT INLINE MANIFOLD SCHEMATIC	1000248570	AO-100-44-5001-100010
2 SLOT INLINE MANIFOLD SCHEMATIC	1000217754	AO-100-44-5001-100002
2 SLOT INLINE MANIFOLD SCHEMATIC	1000234018	AO-100-44-5001-100003
SSW MODULE SCHEMATIC	1000246438	AO-100-44-5001-100002
HPH HYDRAULIC SCHEMATIC	1000242766	AO-100-44-5001-100003
MSH HYDRAULIC SCHEMATIC	1000228954	AO-100-44-5001-100010
MSH HYDRAULIC SCHEMATIC	1000231138	AO-100-44-5001-100017
MSH HYDRAULIC SCHEMATIC	1000231137	AO-100-44-5001-100017
EXTERNAL INTERCONNECTION DIAGRAM	10002251837	AO-100-44-5001-100010
TOPSIDE INTERFACE SCHEMATIC	1000222830	AO-100-44-5001-100010

NOTES

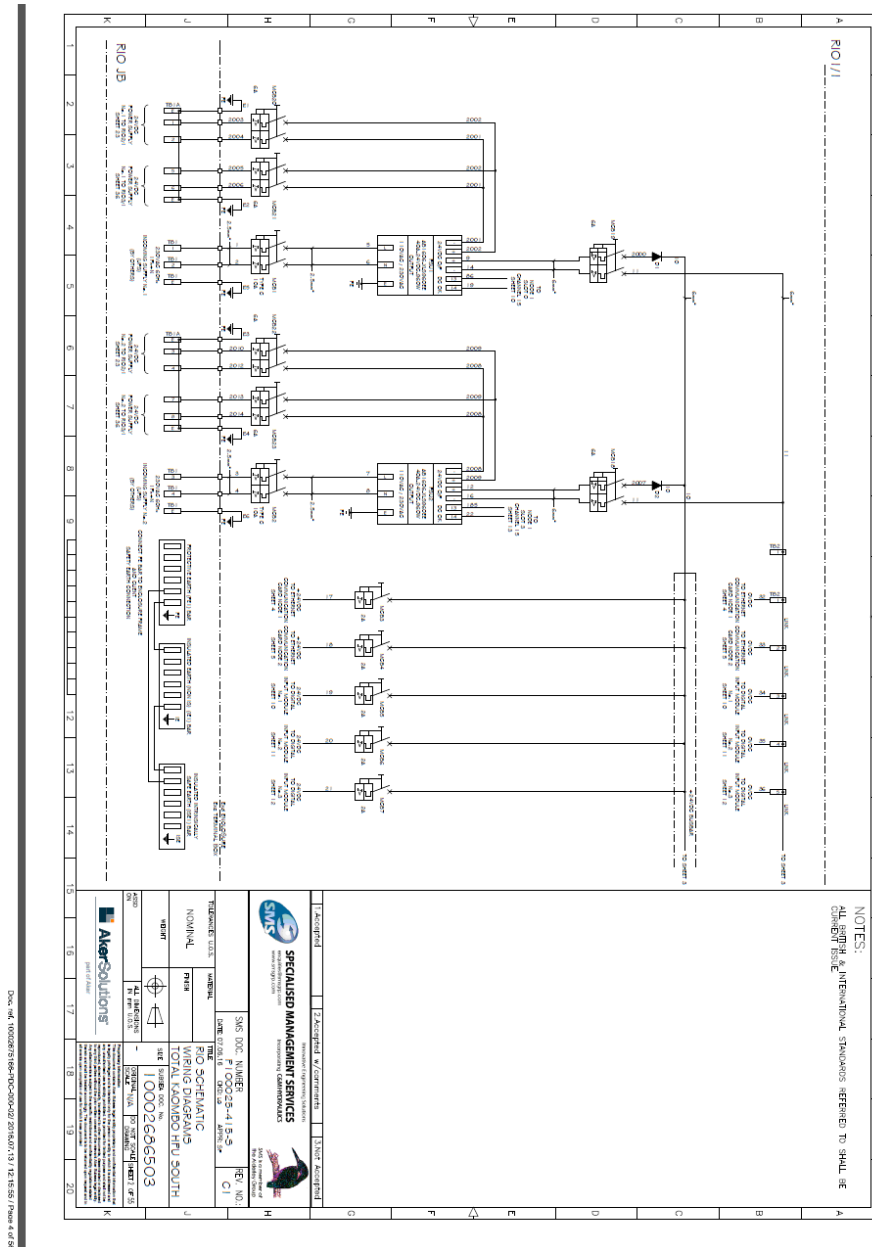
- EACH OF 221 TO 225 LINES HAVE 6 PAINS, RUNNING, AVAILABLE, STATISTOP, UNHEALTHY AND 2 SPARES.
- HYDRAULIC LINES GO TO TUC (FLUID), 4TU (OIL), 4U (OIL),

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 70 of 315

2.7.2 HPU Electrical Schematic Diagram South



HPU Electrical Schematic South

10002675166

AO-100-44-S167-000051

10232645

TYPE 3 Use as is (if possible)

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

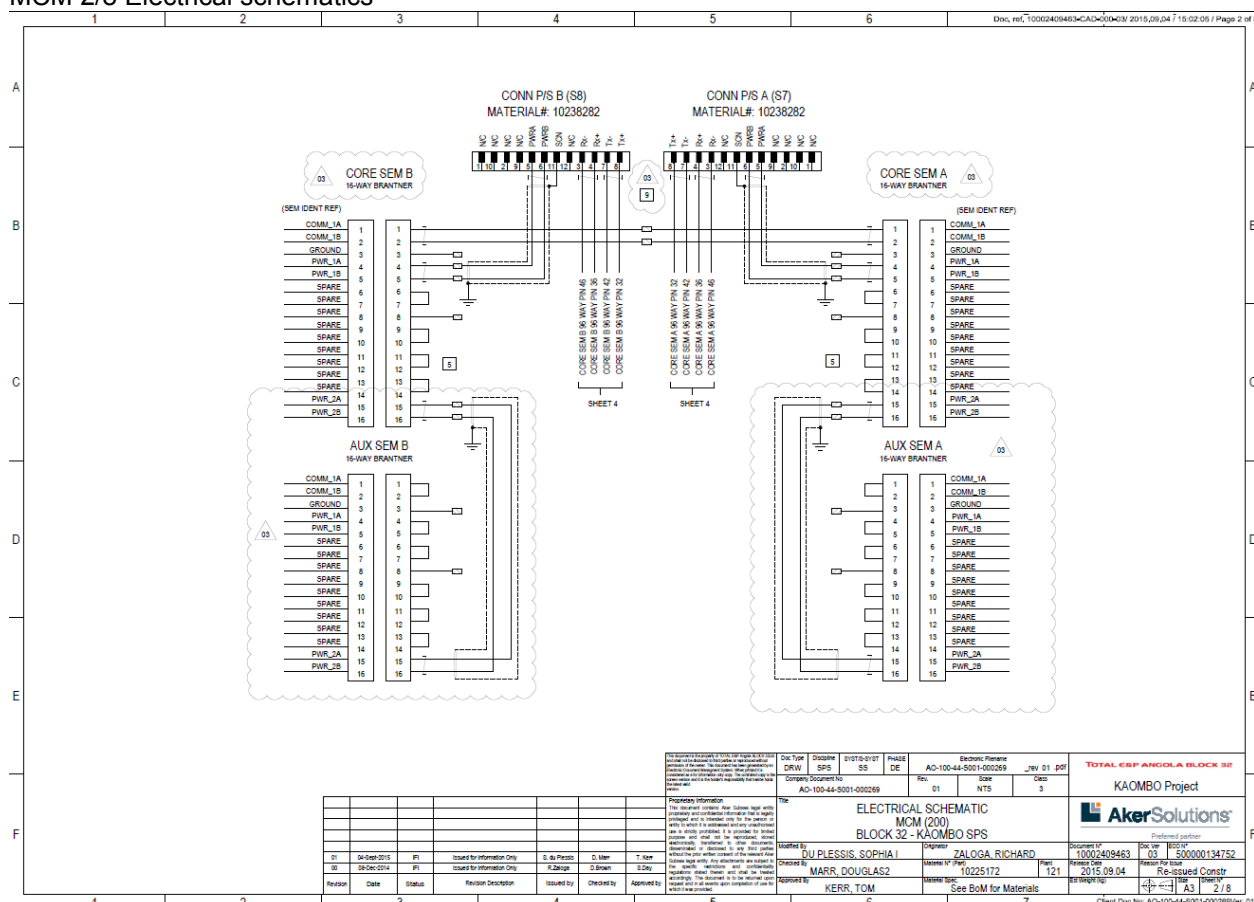
Document: 10002504361-PDC-000

Version: 05 - Re-issued Constr

Issue date: 2017.11.17

Page: 72 of 315

MCM 2/8 Electrical schematics



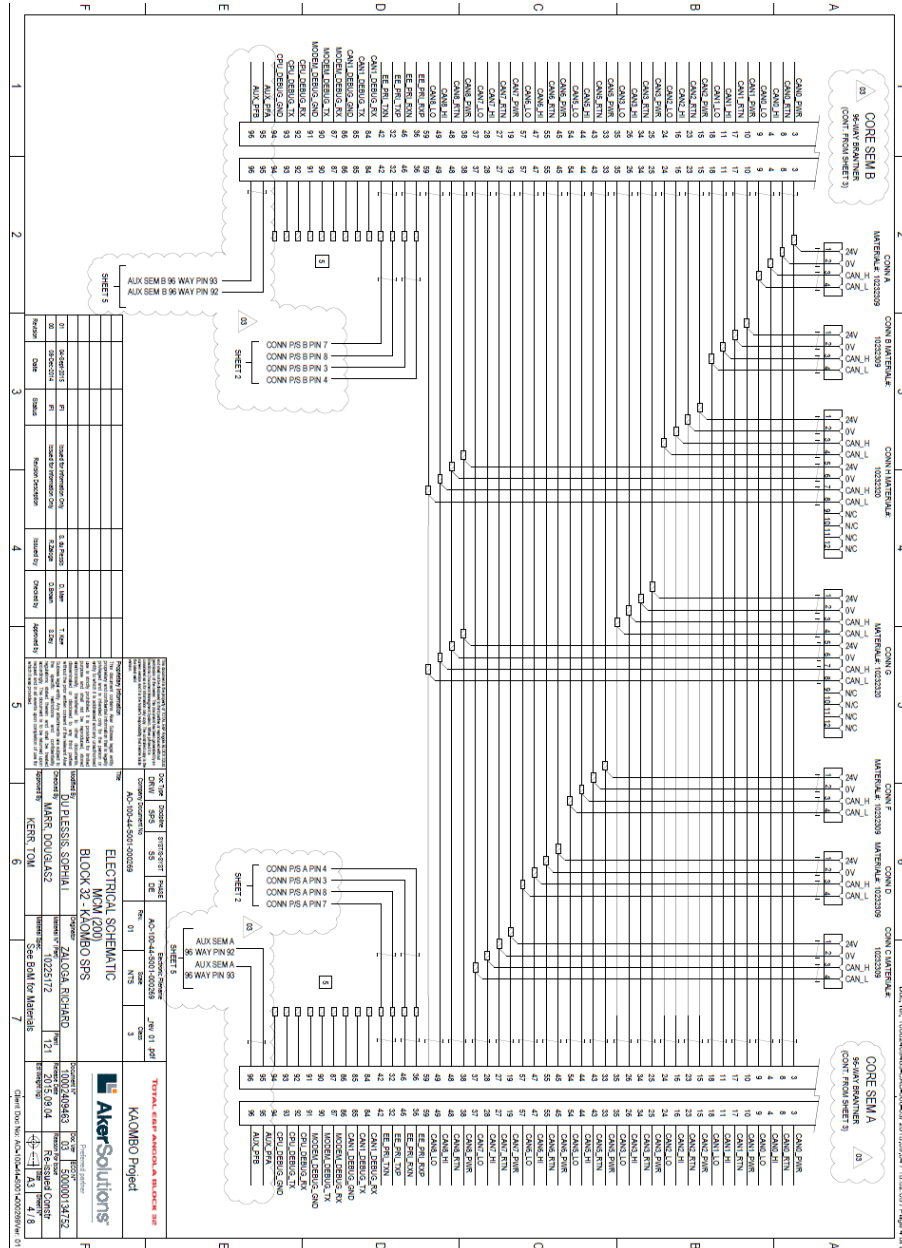
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SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 74 of 315

MCM 4/8 Electrical schematics



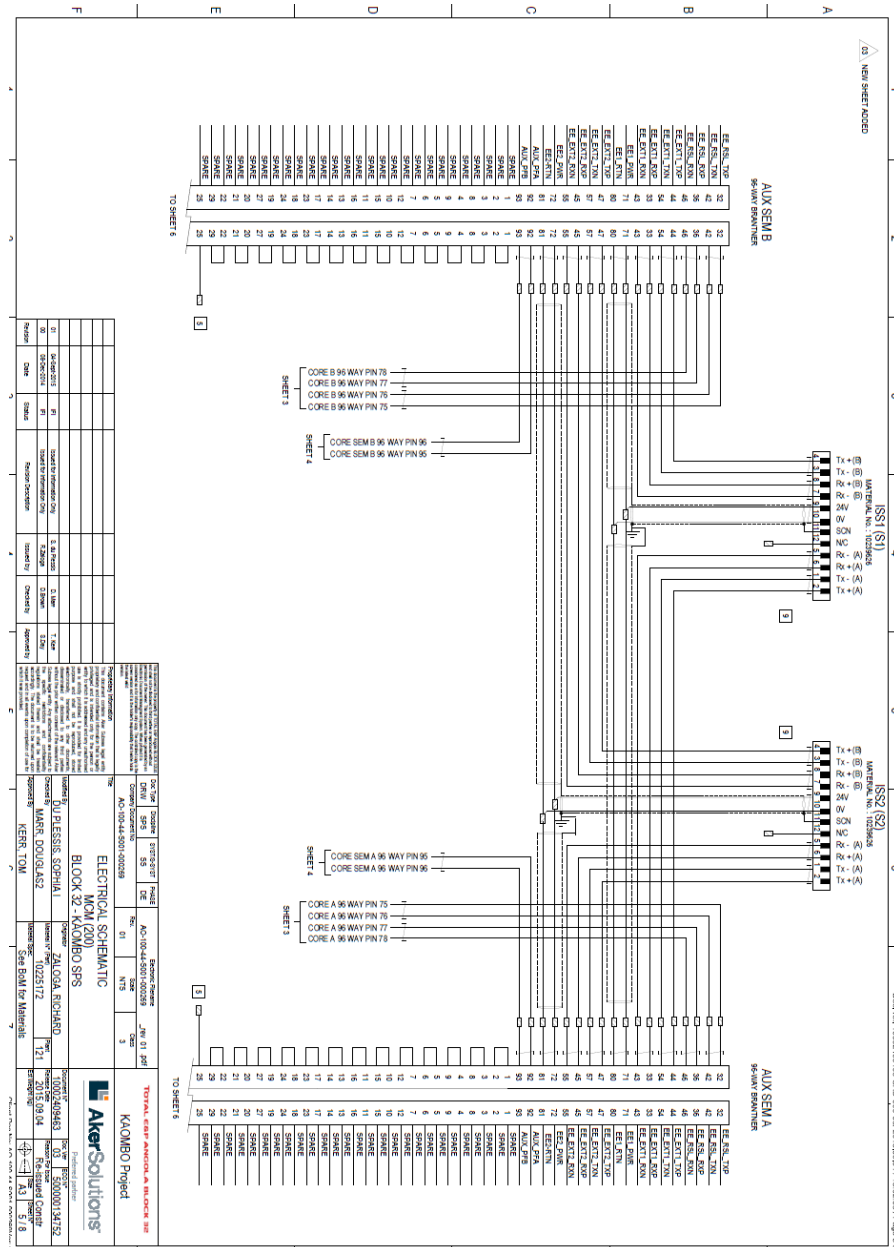
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SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 75 of 315

MCM 5/8 Electrical schematics



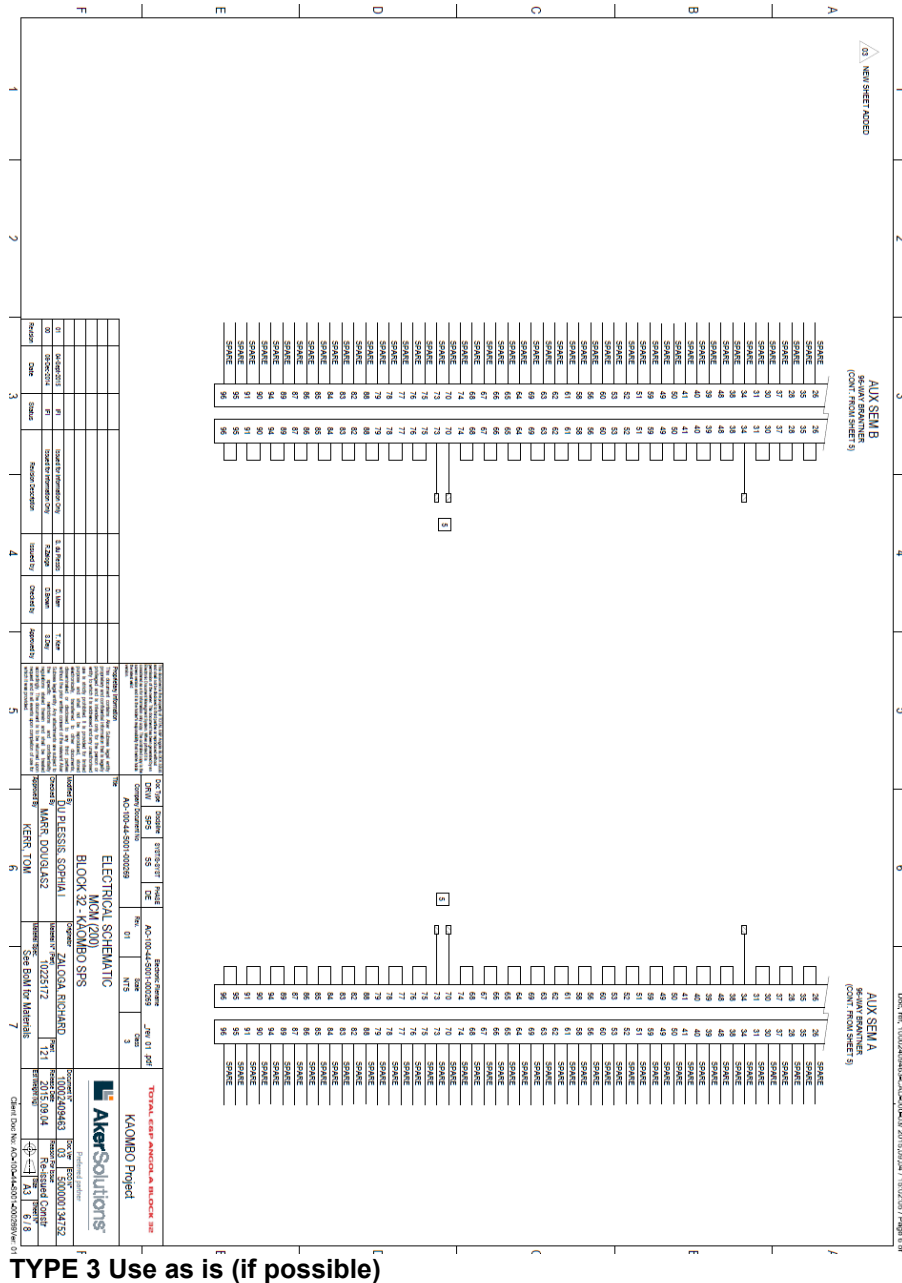
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SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 76 of 315

MCM 6/8 Electrical schematics

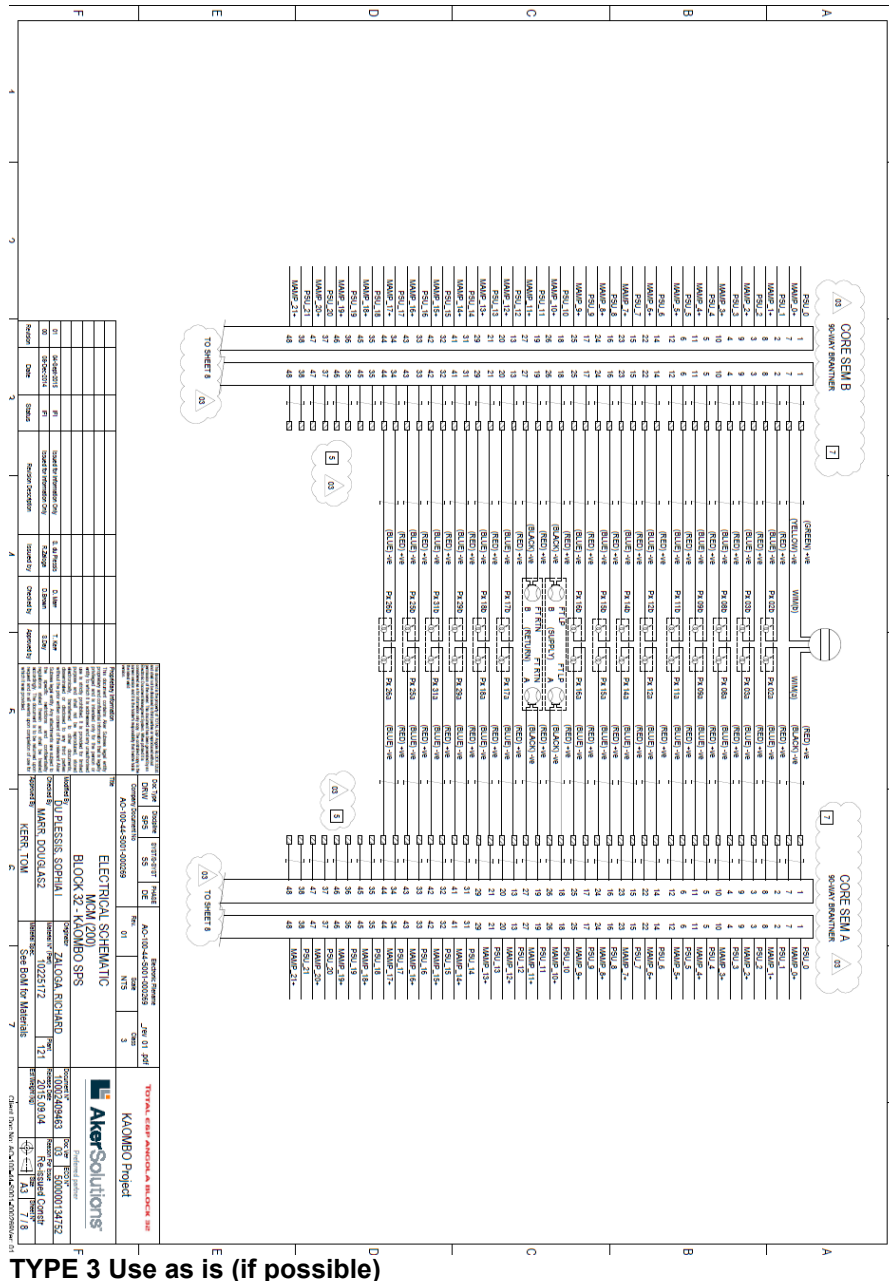


SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 77 of 315

MCM 7/8 Electrical schematics



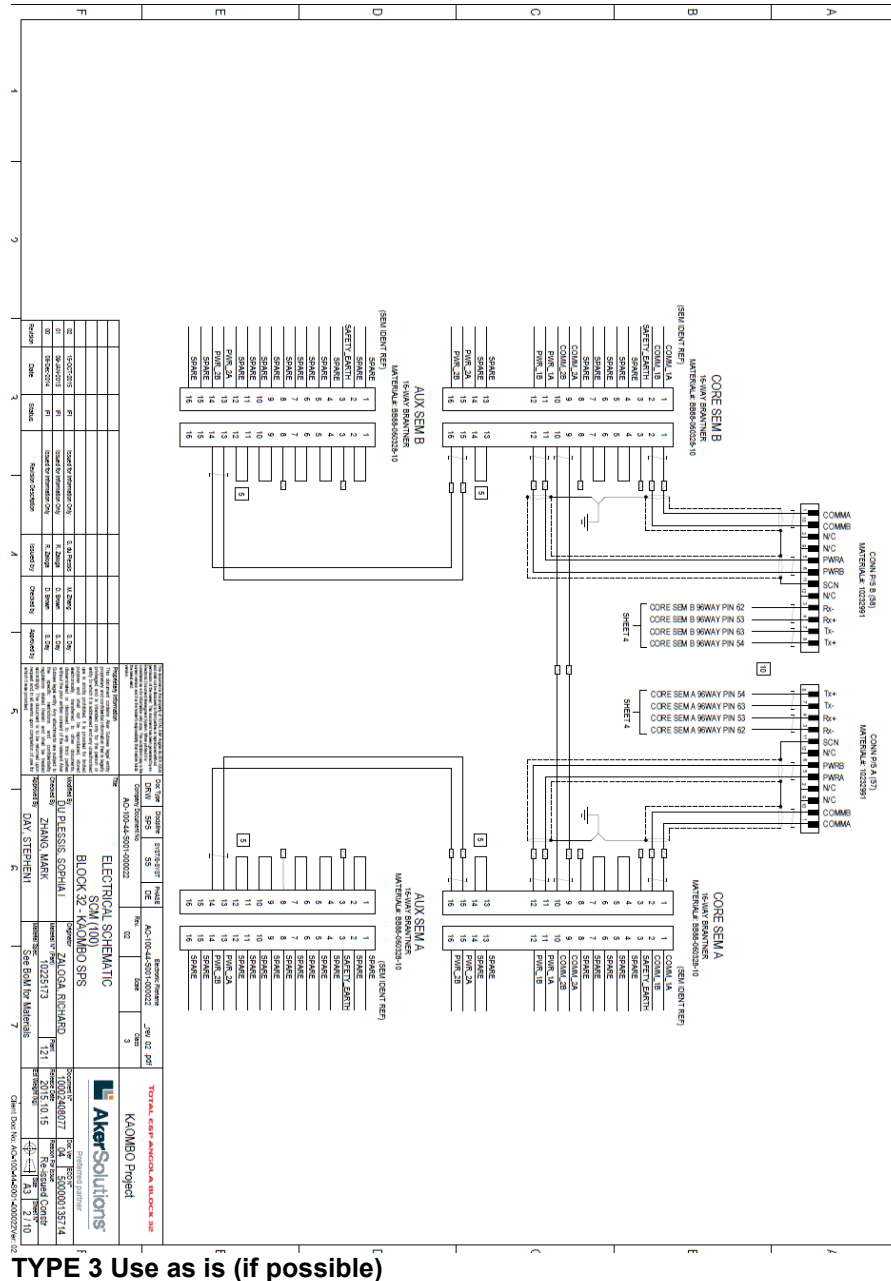
TYPE 3 Use as is (if possible)

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 80 of 315

2/10 Electrical Schematic

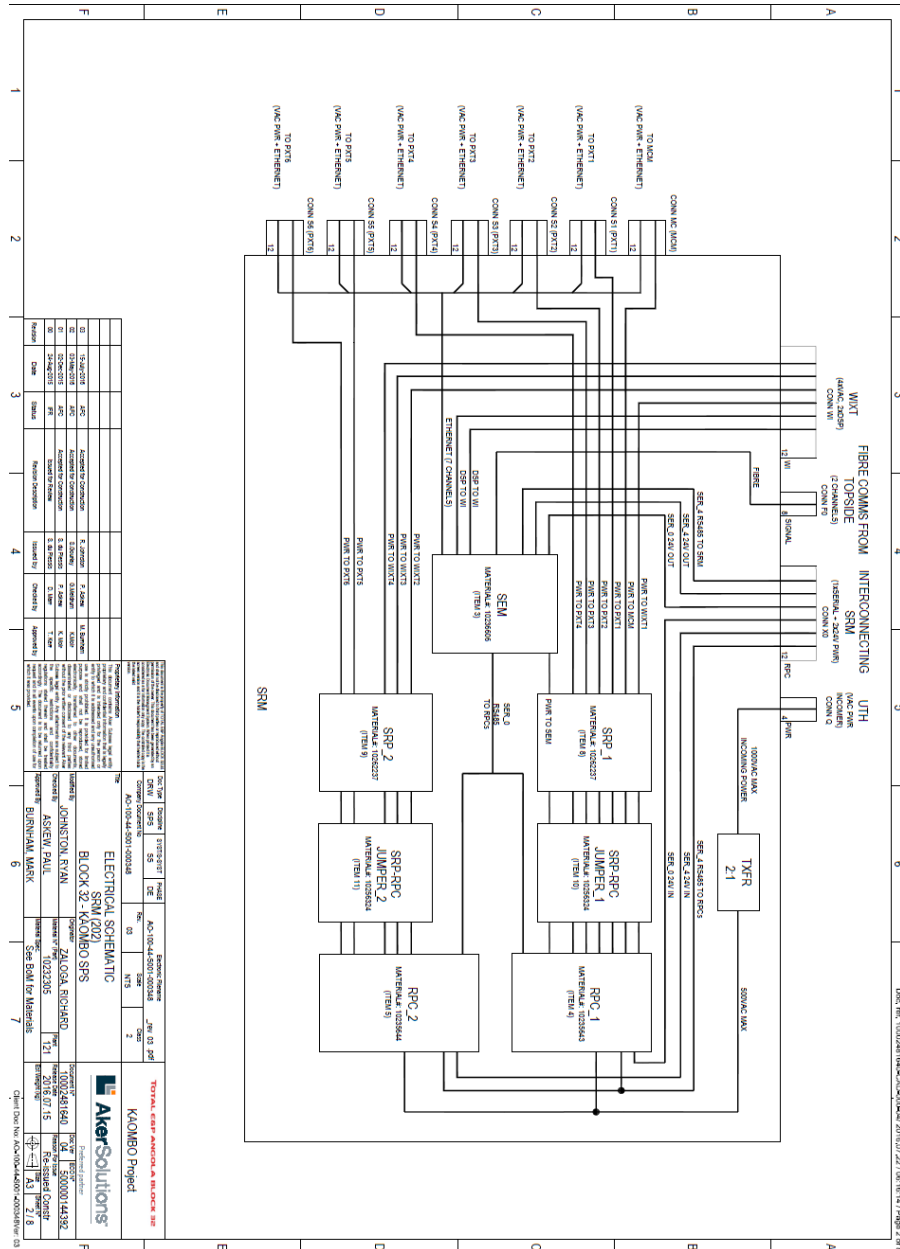


SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 90 of 315

2/8 Electrical schematics



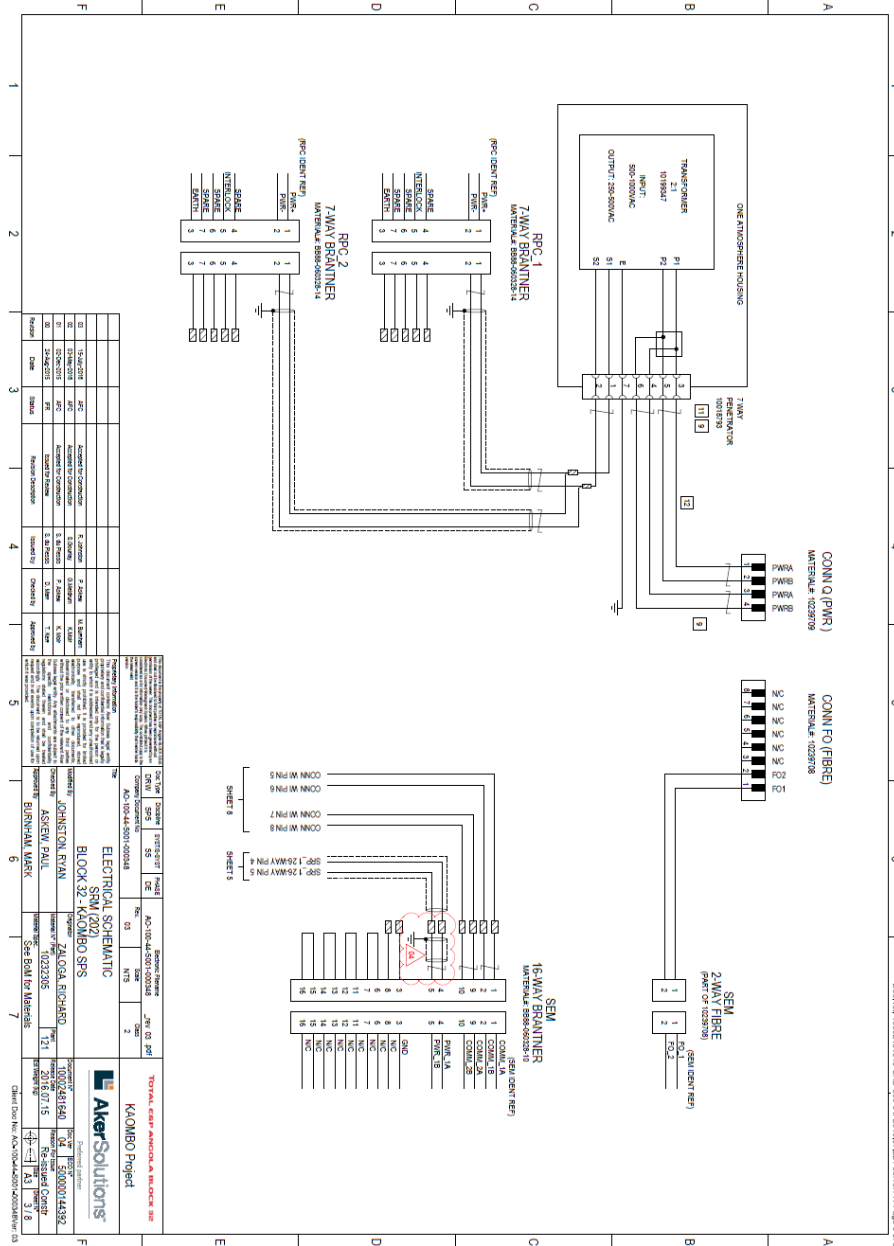
TYPE 3 Use as is (if possible)

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 91 of 315

3/8 Electrical schematics



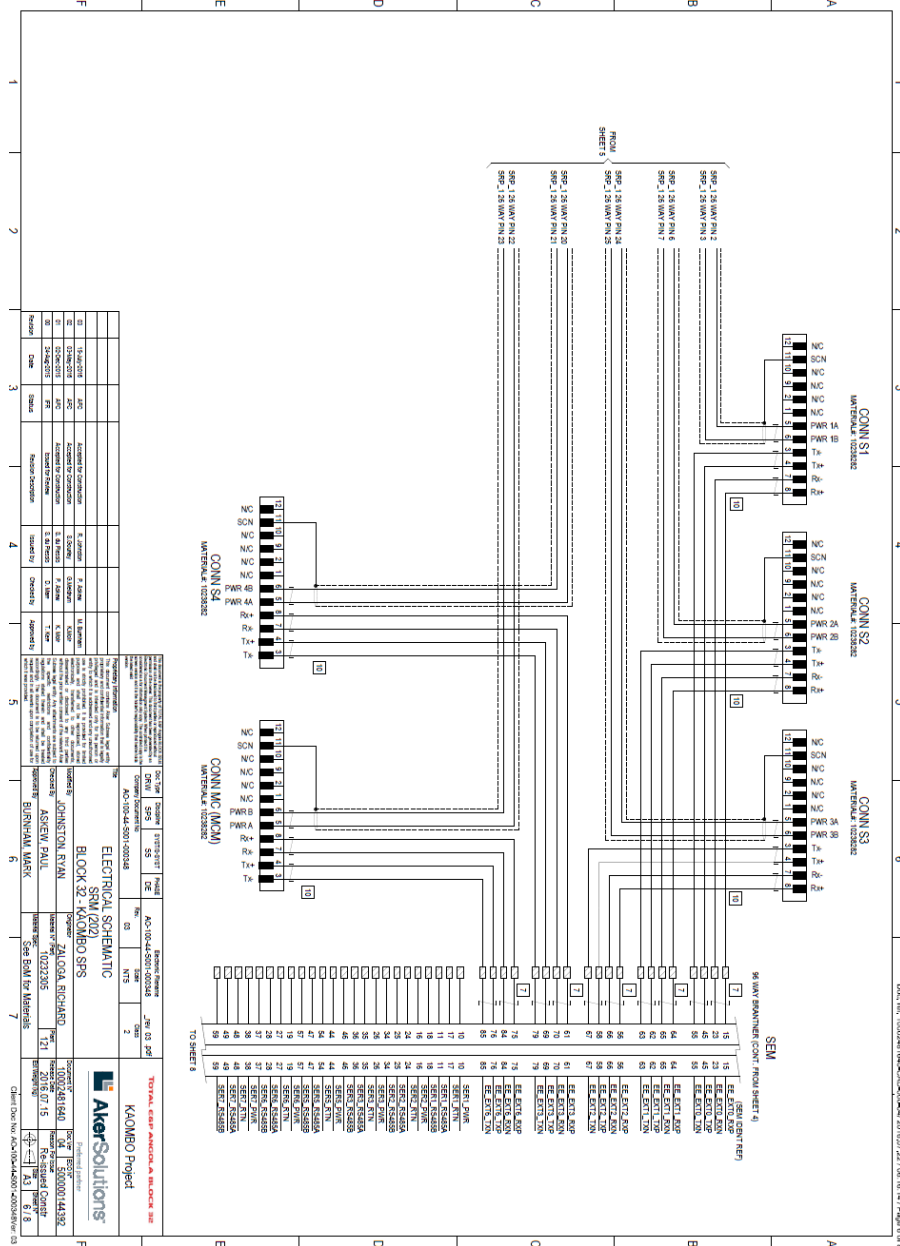
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SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 94 of 315

6/8 Electrical schematics

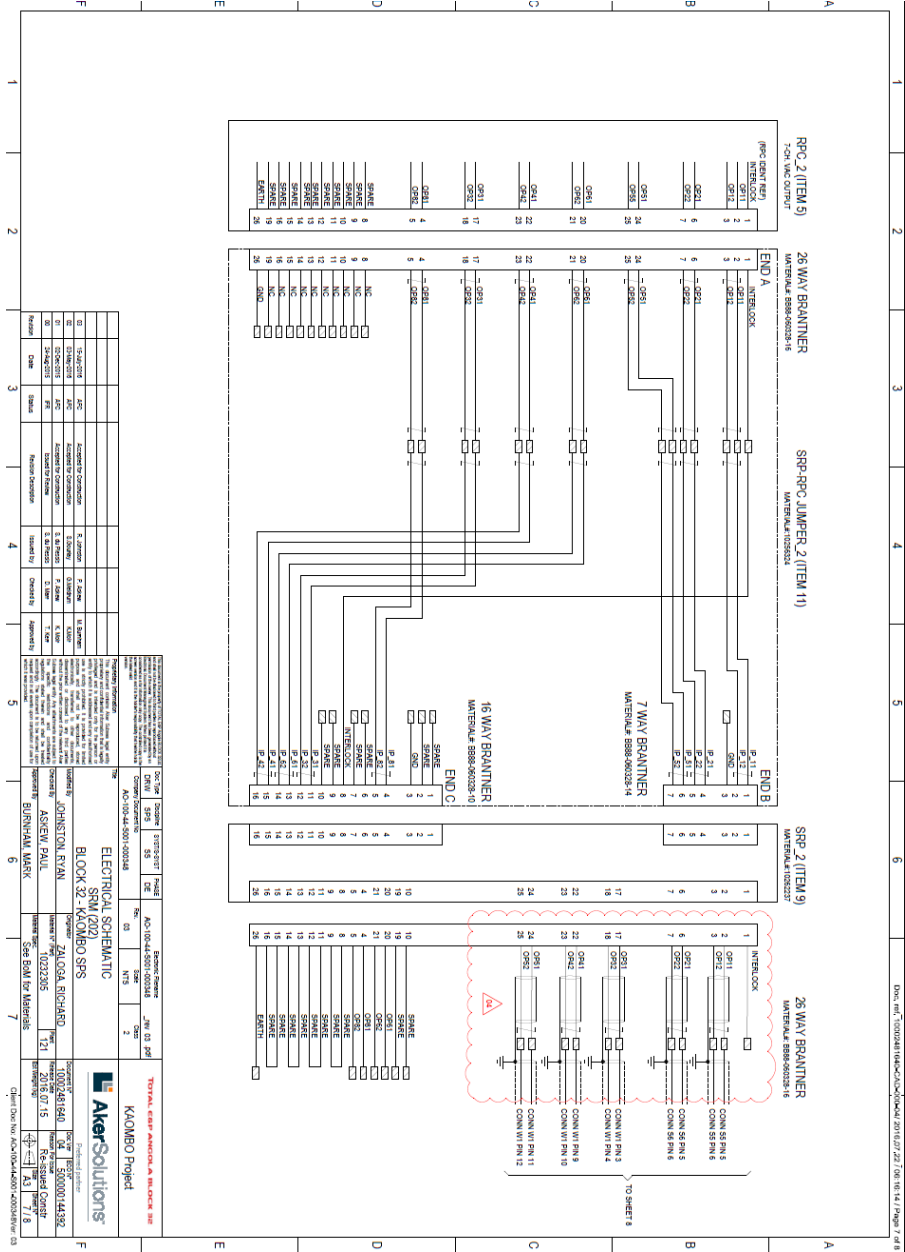


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BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 95 of 315

7/8 Electrical schematics



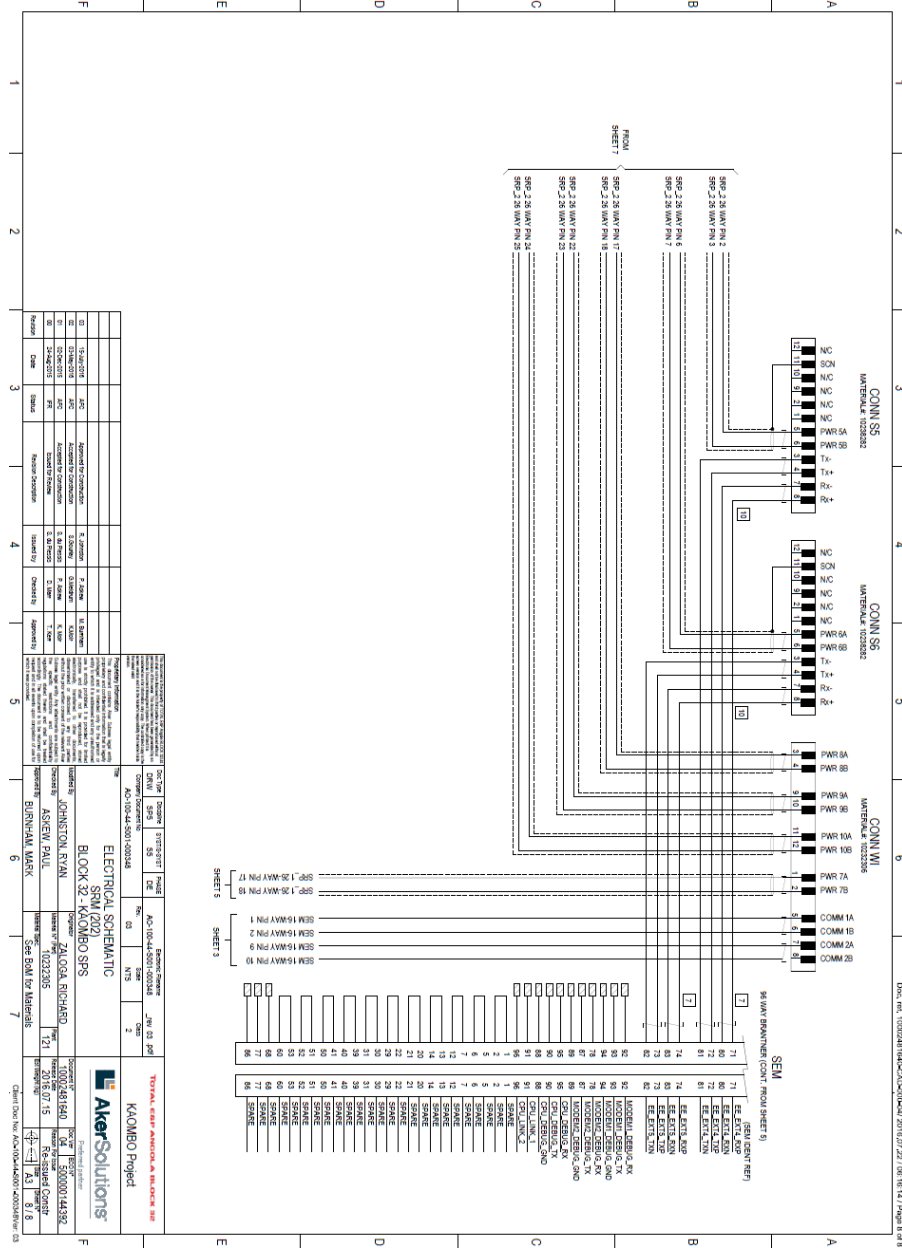
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SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 96 of 315

8/8 Electrical schematics



TYPE 3 Use as is (if possible)

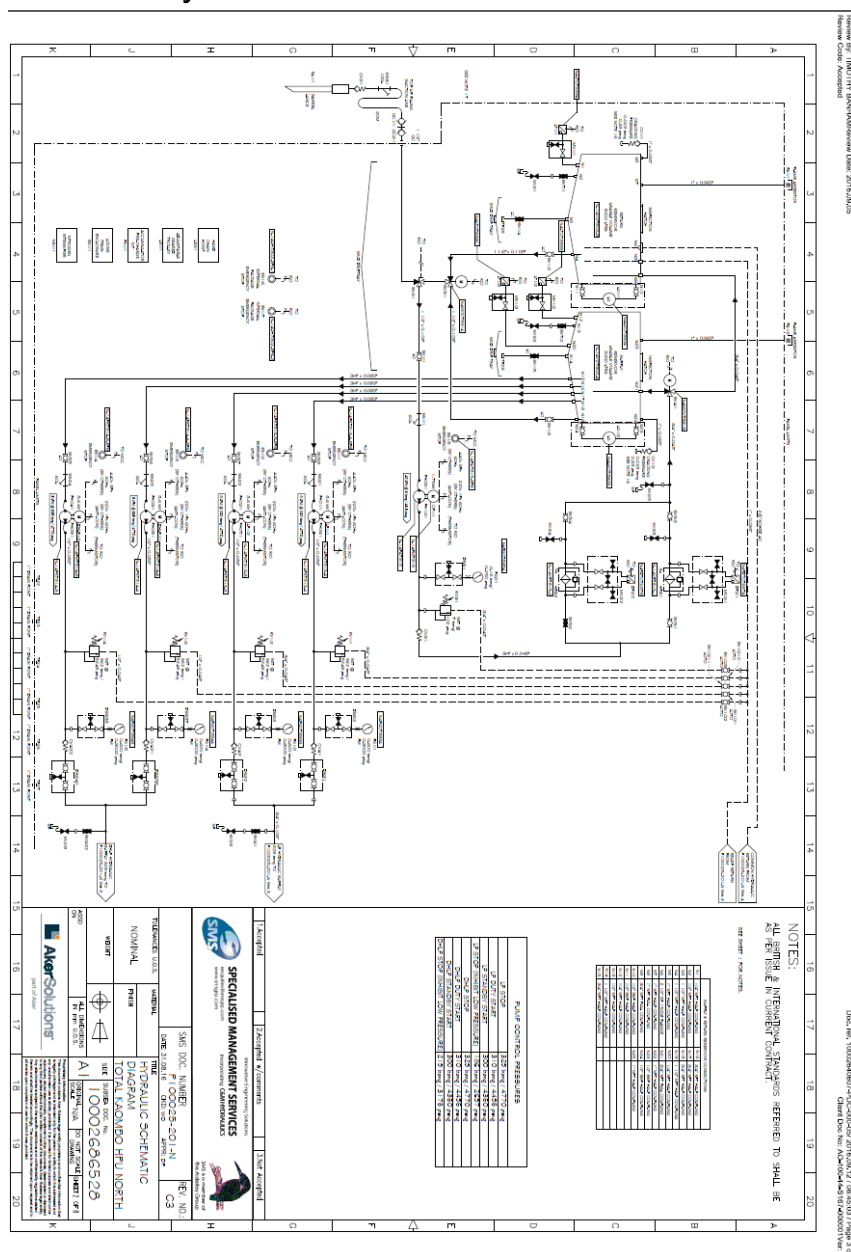
SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 97 of 315

2.11 HPU Hydraulic Schematic

2.11.1 HPU Hydraulic Schematic North



HPU Hydraulic Schematic North	10002640607	AO-100-44-S167-000001	10232644
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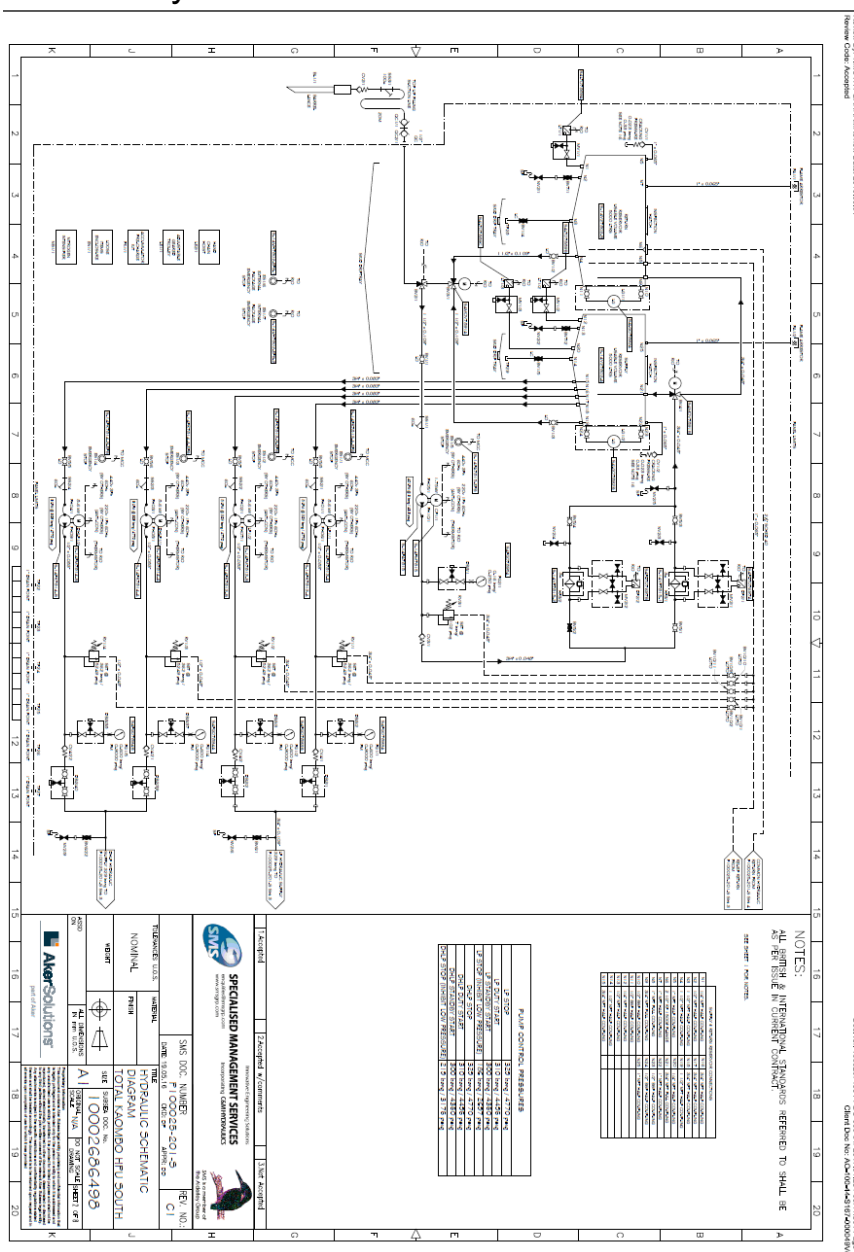
TYPE 3 Use as is (if possible)

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 98 of 315

2.11.2 HPU hydraulic Schematic South



HPU Hydraulic Schematic South	10002674994	AO-100-44-S167-000049	10232645
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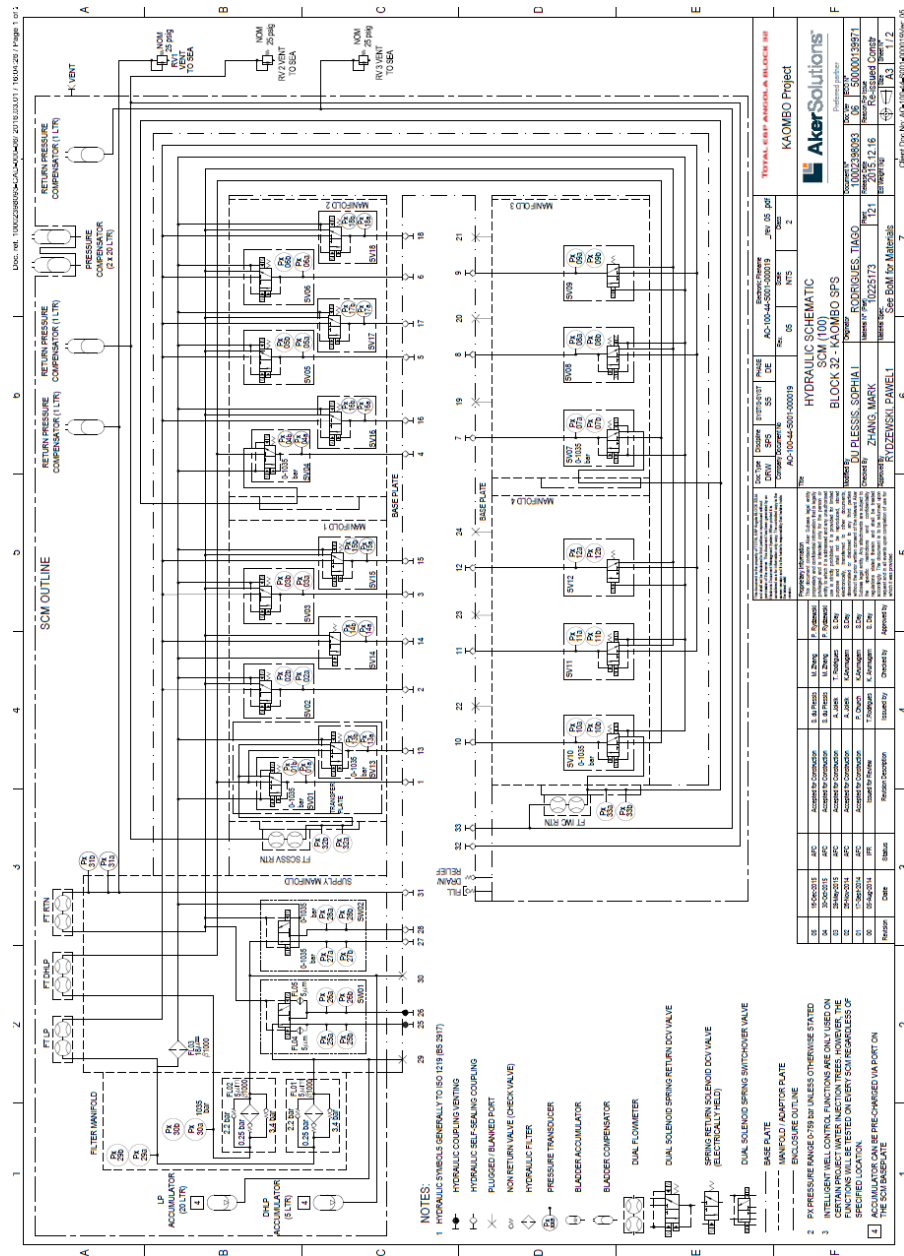
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SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 100 of 315

2.13 SCM Hydraulic schematic



SCM Hydraulic Schematic	10002398093	AO-100-44-S001-000019	10225173
TYPE 3 Use as is (if possible)			

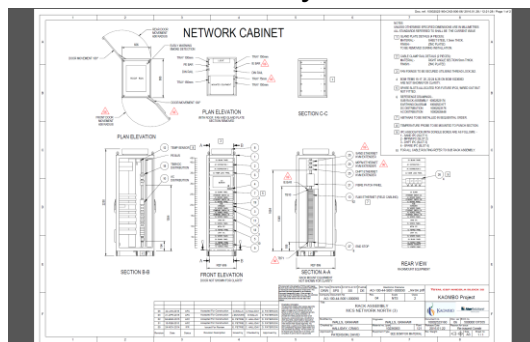
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Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 101 of 315

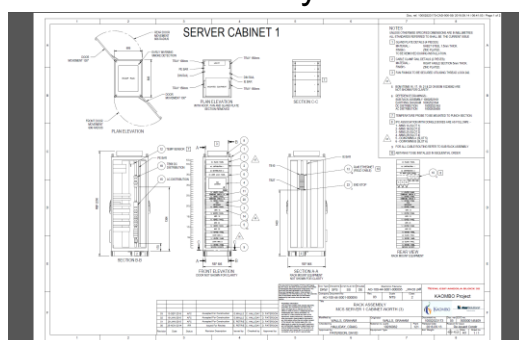
2.14 Rack assembly DRAWINGS

2.14.1 Rack assembly Master Control Station (MCS) Network Cabinet



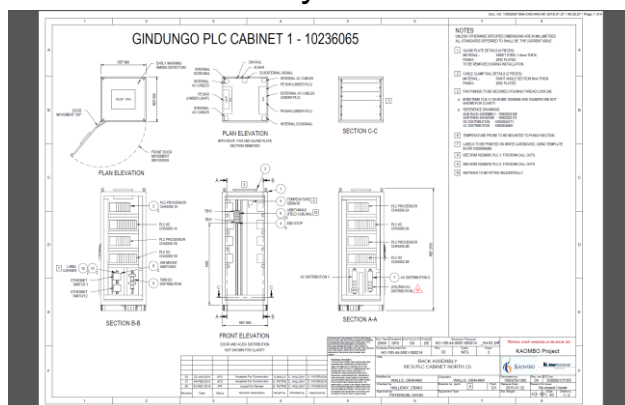
MCS Network Cabinet North	10002523160	AO-100-44-S001-000090	10236063
MCS Network Cabinet South	10002675361	AO-100-44-S001-000272	10236111

2.14.2 Rack assembly MCS Server 1 Cabinet



MCS Server 1 Cabinet North	10002523173	AO-100-44-S001-000095	10236062
MCS Server 1 Cabinet South	10002675363	AO-100-44-S001-000276	10236110

2.14.3 Rack assembly MCS PLC Cabinet 1



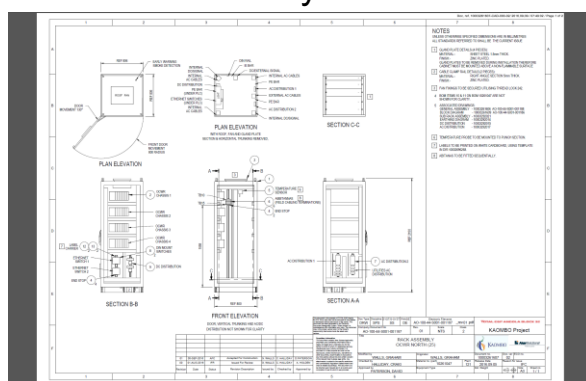
SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
 Version: 05 - Re-issued Constr
 Issue date: 2017.11.17
 Page: 102 of 315

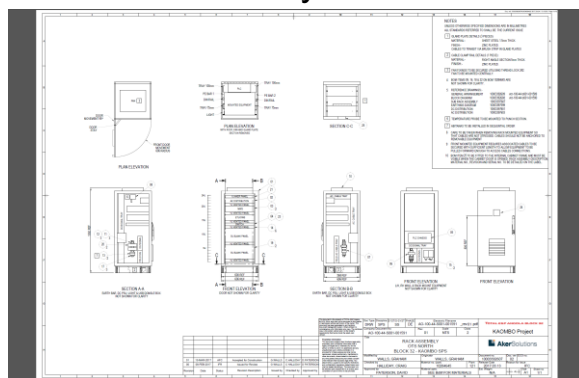
MCS PLC Cabinet 1&2 North Gindungo	10002561306	AO-100-44-S001-000214	N/A
MCS PLC Cabinet 1&2 North Gengibre	10002561309	AO-100-44-S001-000215	N/A
MCS PLC Cabinet 1&2 North Caril	10002561313	AO-100-44-S001-000216	N/A
MCS PLC Cabinet 1&2 South Louro	10002561317	AO-100-44-S001-000217	N/A
MCS PLC Cabinet 1&2 South Mostarda	10002561321	AO-100-44-S001-000218	N/A
MCS PLC Cabinet 1&2 South Canela	10002561326	AO-100-44-S001-000219	N/A

2.14.4 Rack assembly Overall Control of Wells and Risers (OCWR)



OCWR North	10003261607	AO-100-44-S001-001187	10261047
OCWR South	10003291975	AO-100-44-S001-001184	10277384

2.14.5 Rack assembly OTS



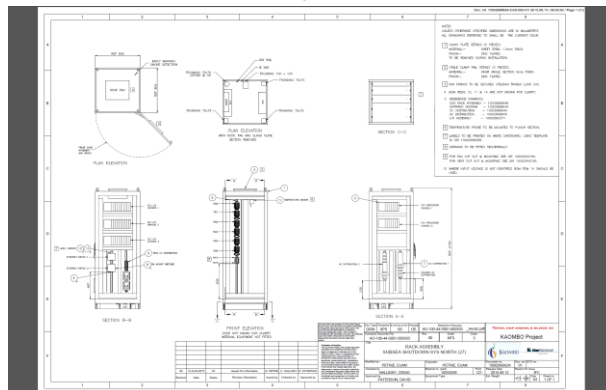
OTS North	10003392607	AO-100-44-S001-001591	10284645
OTS South	10003392614	AO-100-44-S001-001587	10284648

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

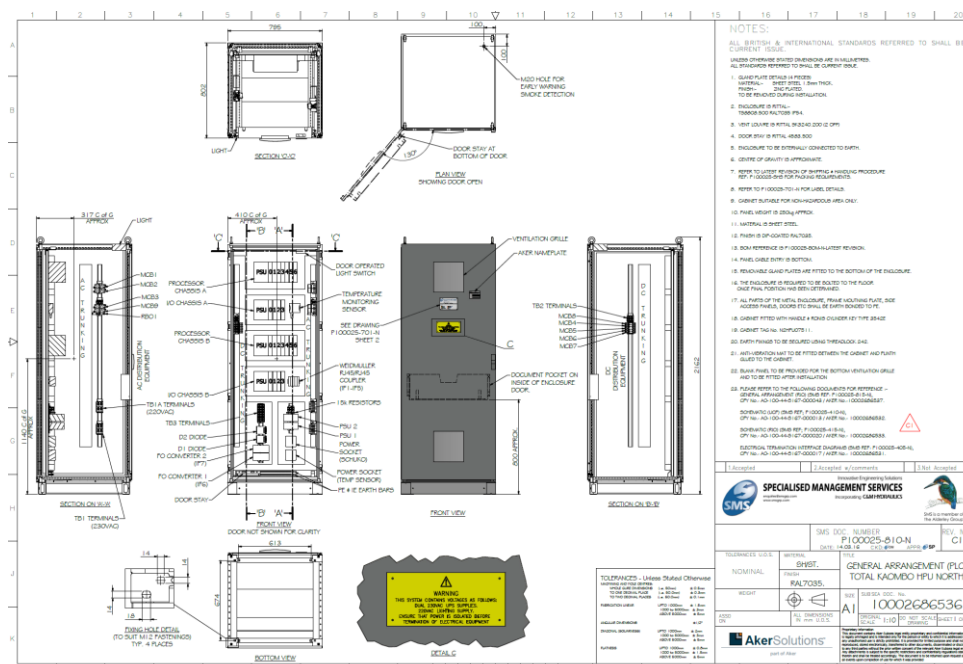
Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 103 of 315

2.14.6 Rack assembly Subsea Shutdown System



Subsea Shutdown System North	10002868624	AO-100-44-S001-000333	10255258
Subsea Shutdown System South	10002868636	AO-100-44-S001-000332	10256910

2.14.7 Rack assembly HPU UCP Cabinet



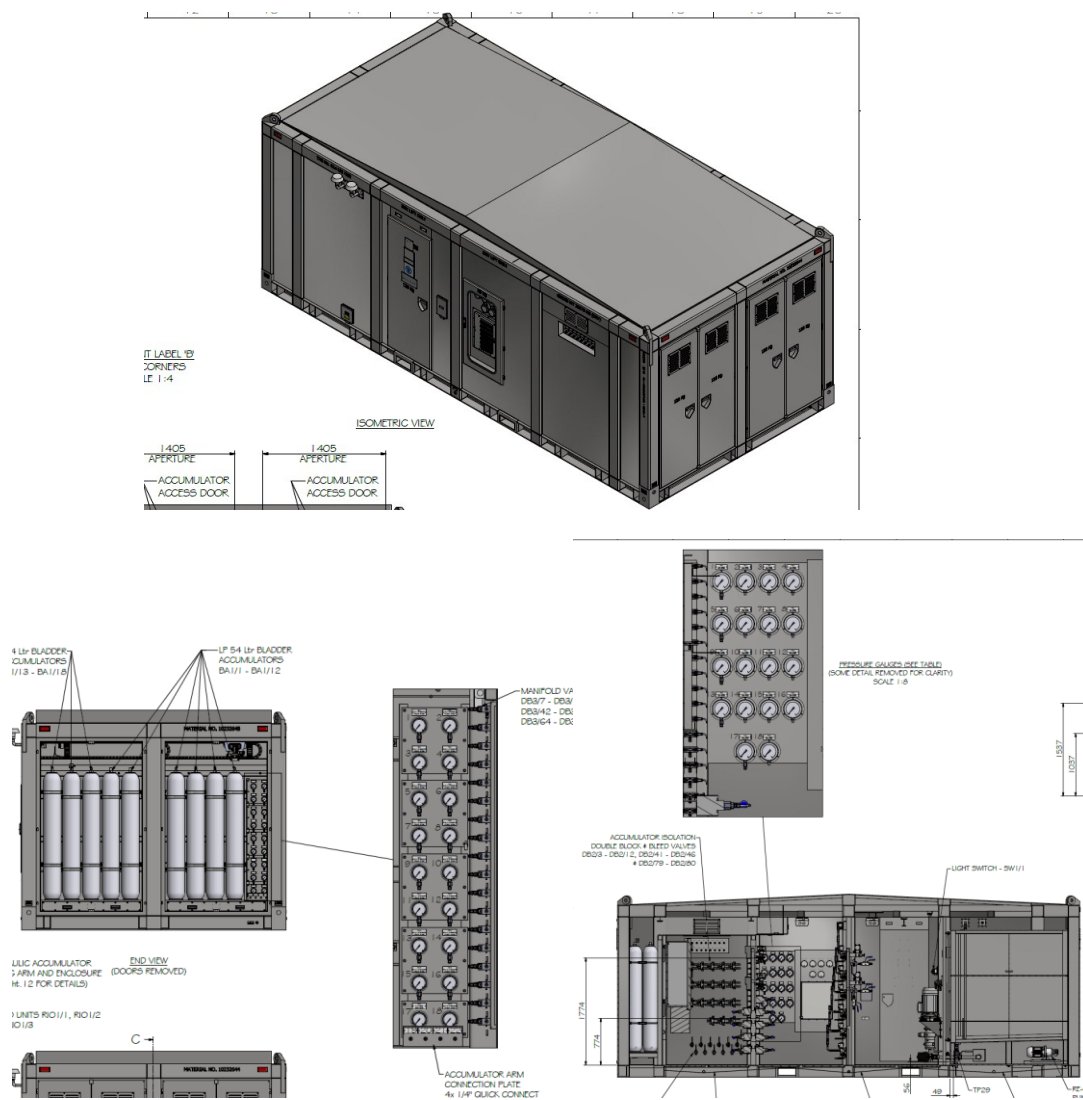
HPU UCP Cabinet North	10002674982	AO-100-44-S167-000016	
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SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 104 of 315

2.15HPU



SPS HANDBOOK TABLE OF CONTENT

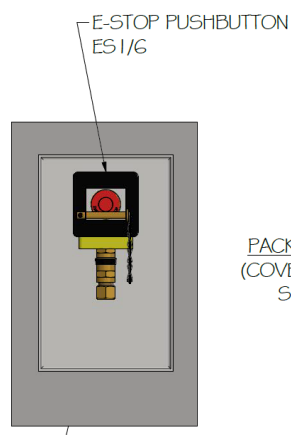
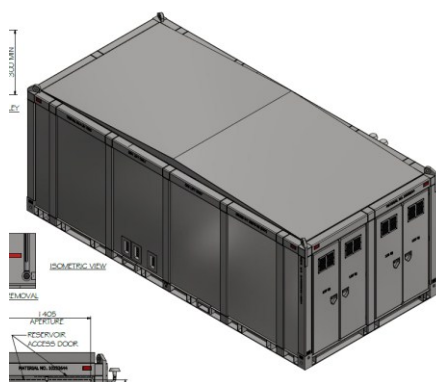
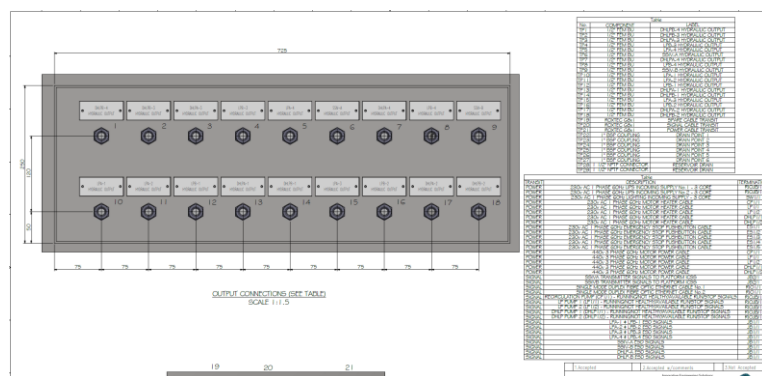
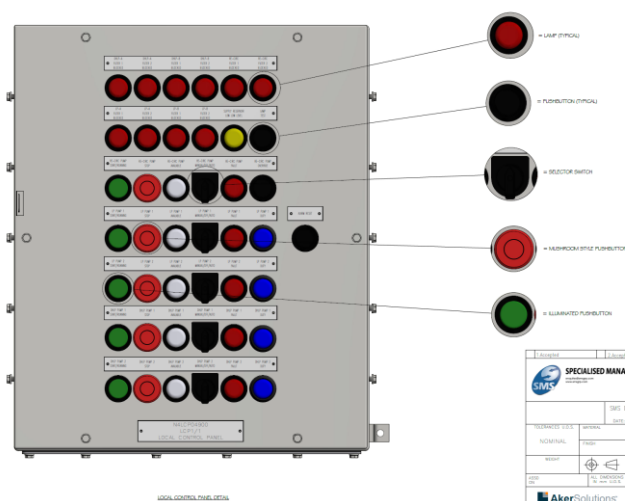
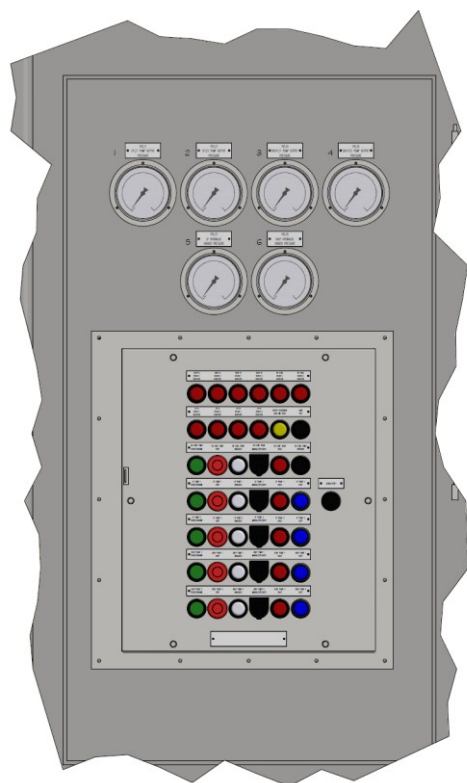
BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000

Version: 05 - Re-issued Constr

Issue date: 2017.11.17

Page: 105 of 315



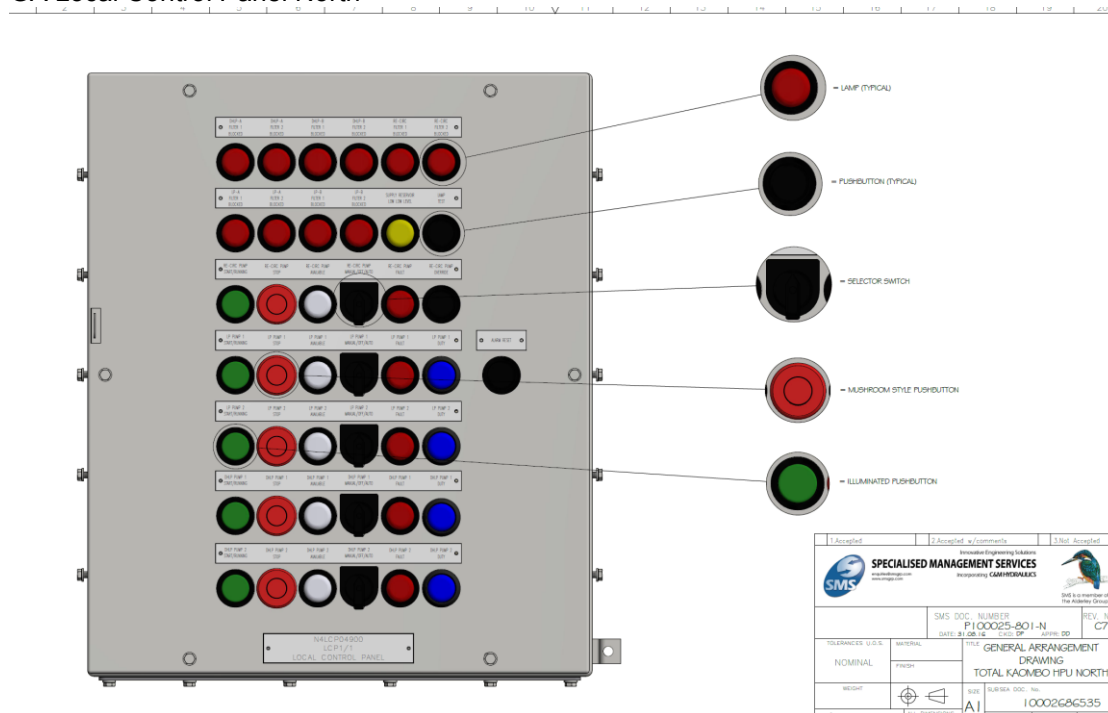
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SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
 Version: 05 - Re-issued Constr
 Issue date: 2017.11.17
 Page: 106 of 315

GA Local Control Panel North



HPU North GA	10002523060	AO-100-44-S167-000002	10232644
HPU South GA	10002856214	AO-100-44-S167-000052	10232645

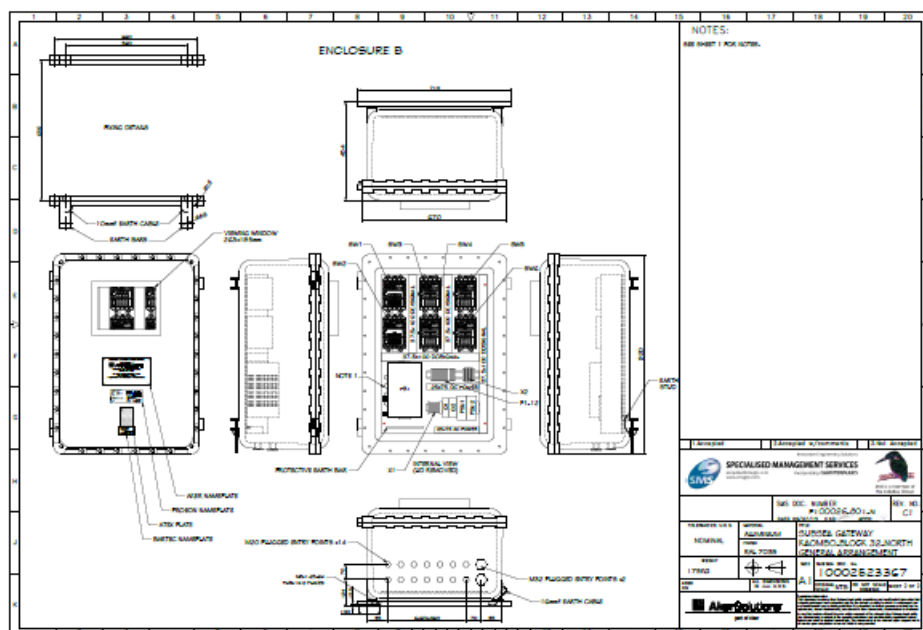
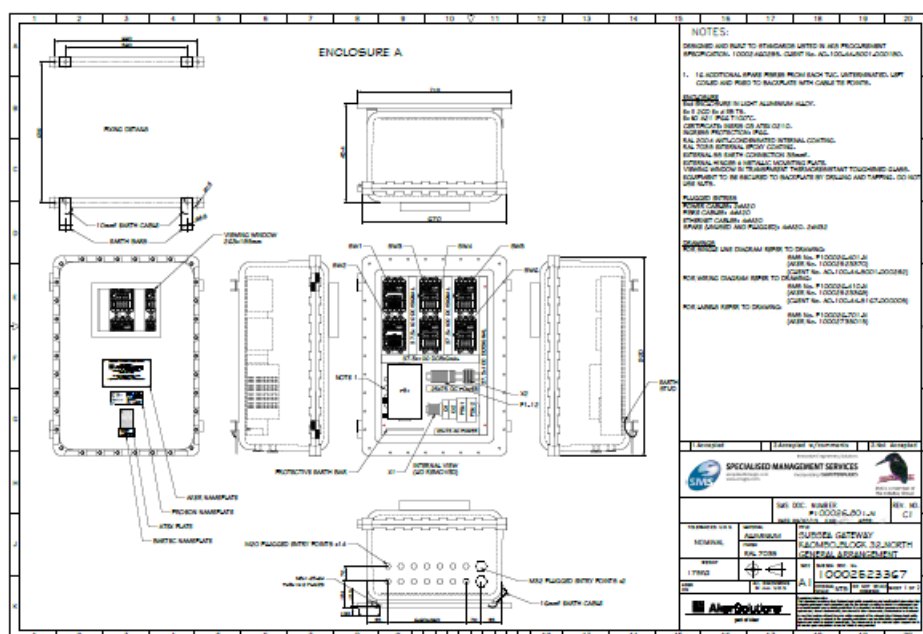
Discuss setup with x-vision for this section.

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 107 of 315

2.16 Subsea Gateways



Subsea Gateways GA North	10002523367	AO-100-44-S167-000003	10233086
Subsea Gateways GA South	10002735053	AO-100-44-S001-000280	10241906

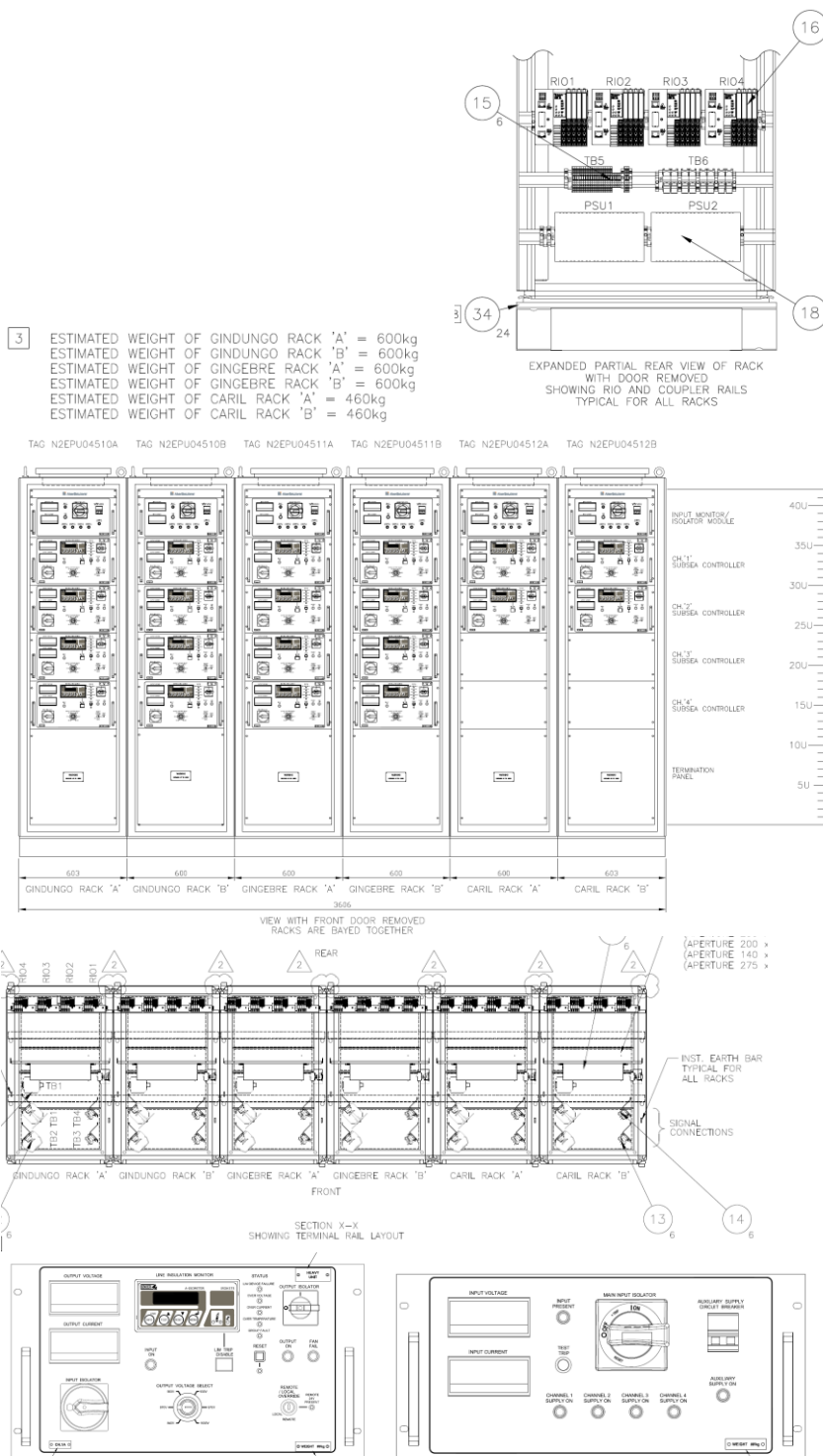
TYPE 3 Use as is (if possible)

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 108 of 315

2.17 Electric Power Unit (EPU)



EPU North GA

10002523009

AO-100-44-S201-000006

10230910

TYPE 3 Use as is (if possible)

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 109 of 315

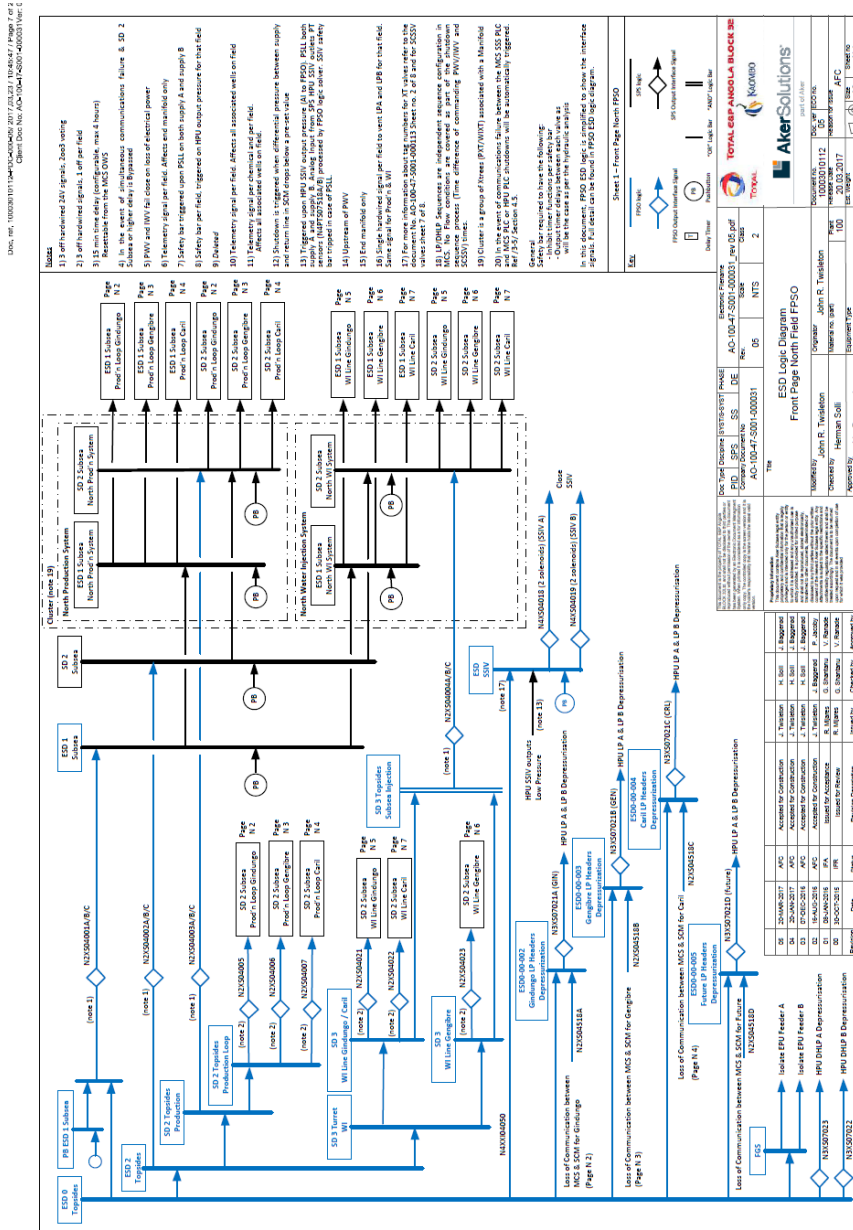
2.18 Emergency Shutdown Diagram (ESD)

2.18.1 Emergency shutdown logic diagram North

HOLD; feasibility of inclusion in handbook pending draft example from sub-supplier

ESD Logic Diagram	10003010112	AO-100-44-S001-000031	NA
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1/11

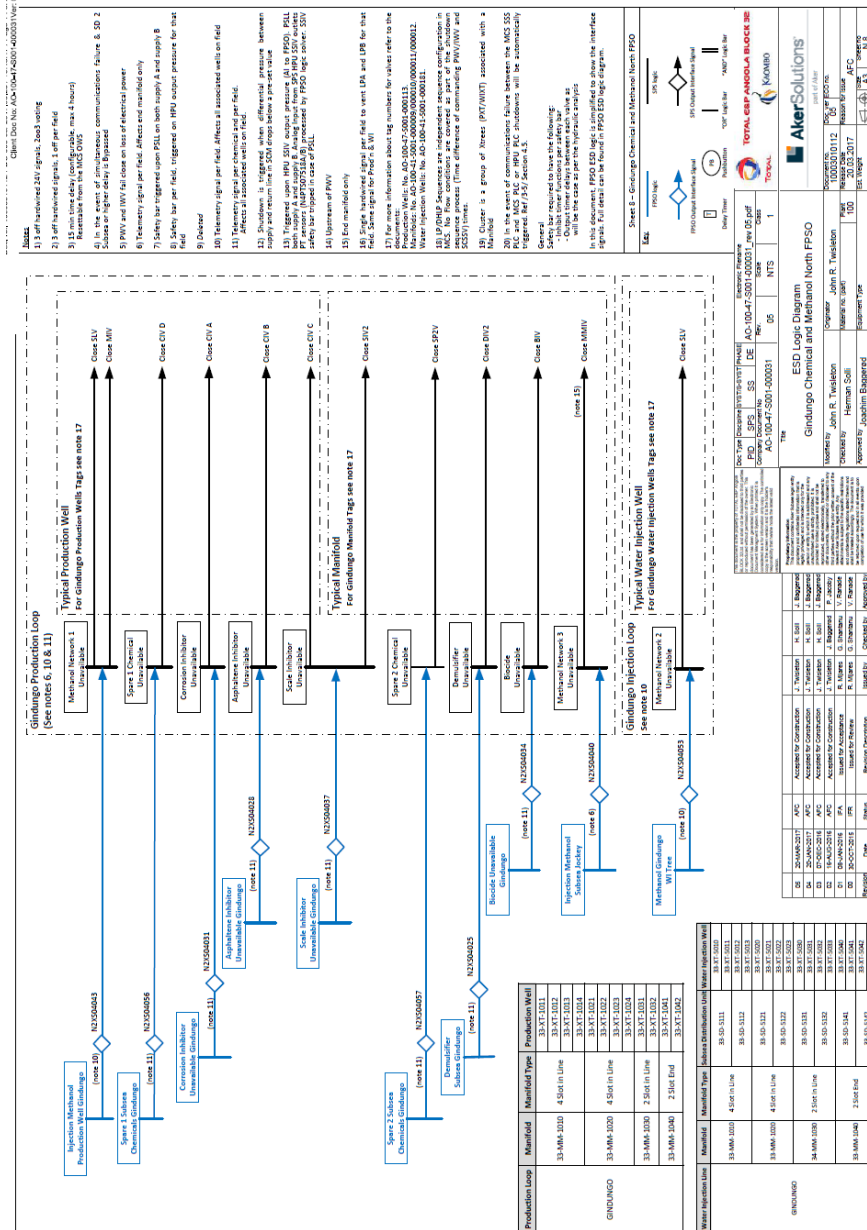


SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 116 of 315

8

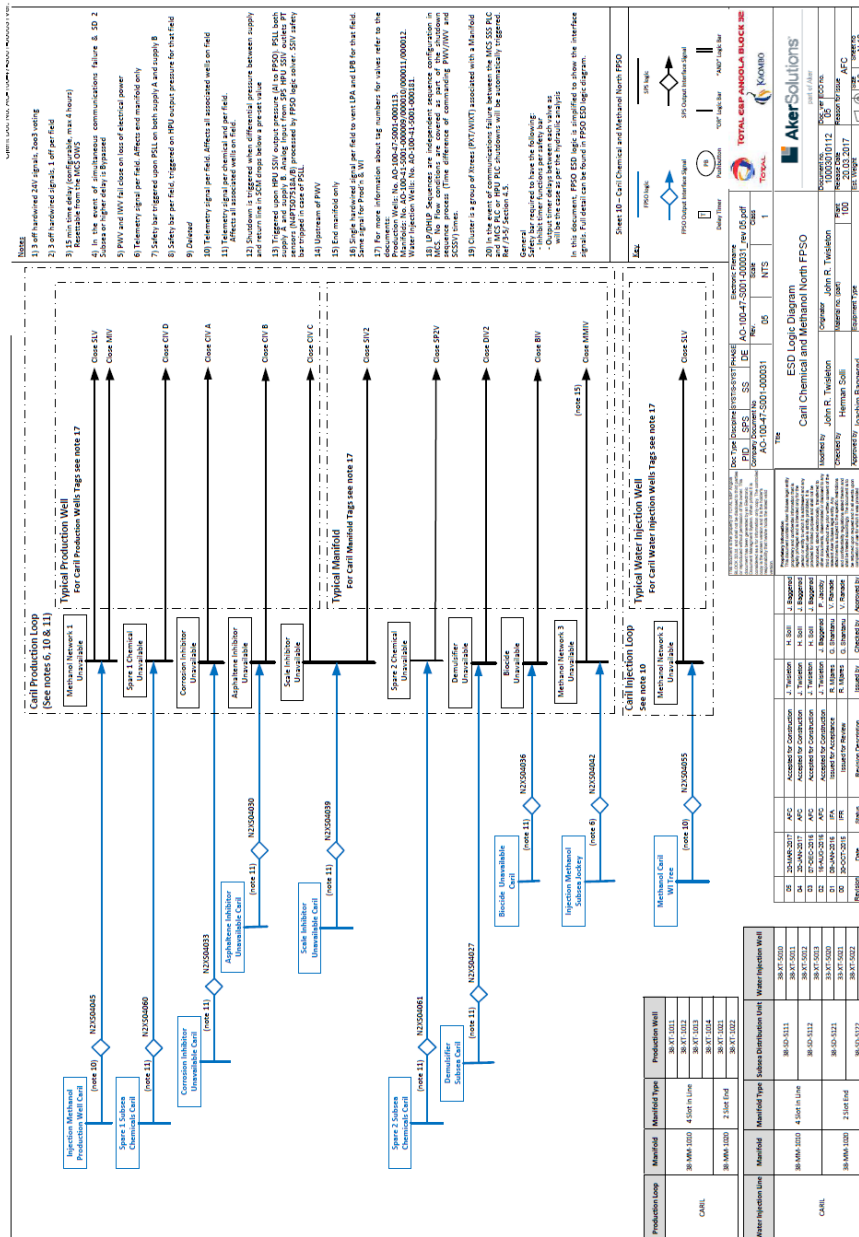


SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 118 of 315

10

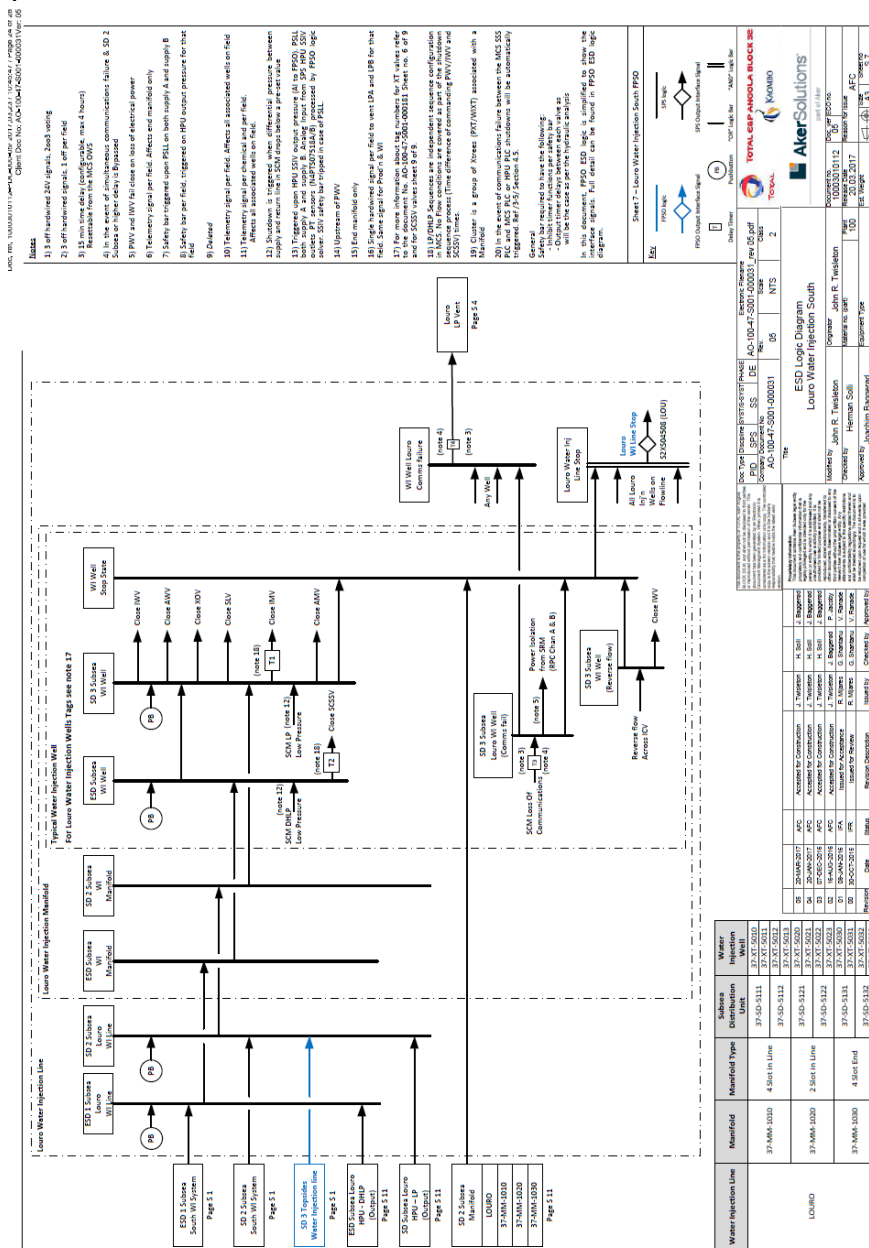


SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 126 of 315

7



Client Doc No: AO-100-40-S001-000185 Ver: 05

ESD

13. Offshore 250 signals, 2500 setting

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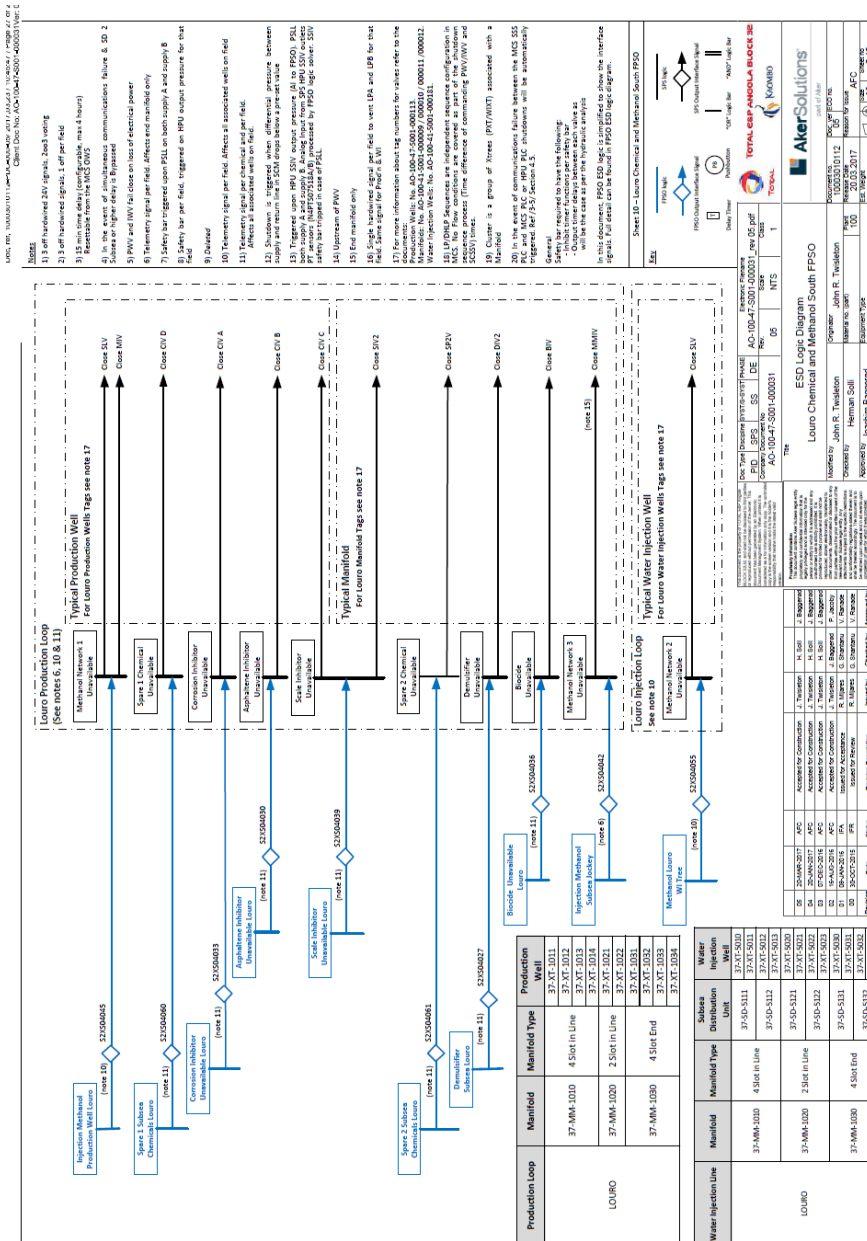
13. Offshore 250 signals, 2500 setting

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 129 of 315

10



SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document:	10002504361-PDC-000
Version:	05 - Re-issued Constr
Issue date:	2017.11.17
Page:	131 of 315

3 WELLHEAD SYSTEM

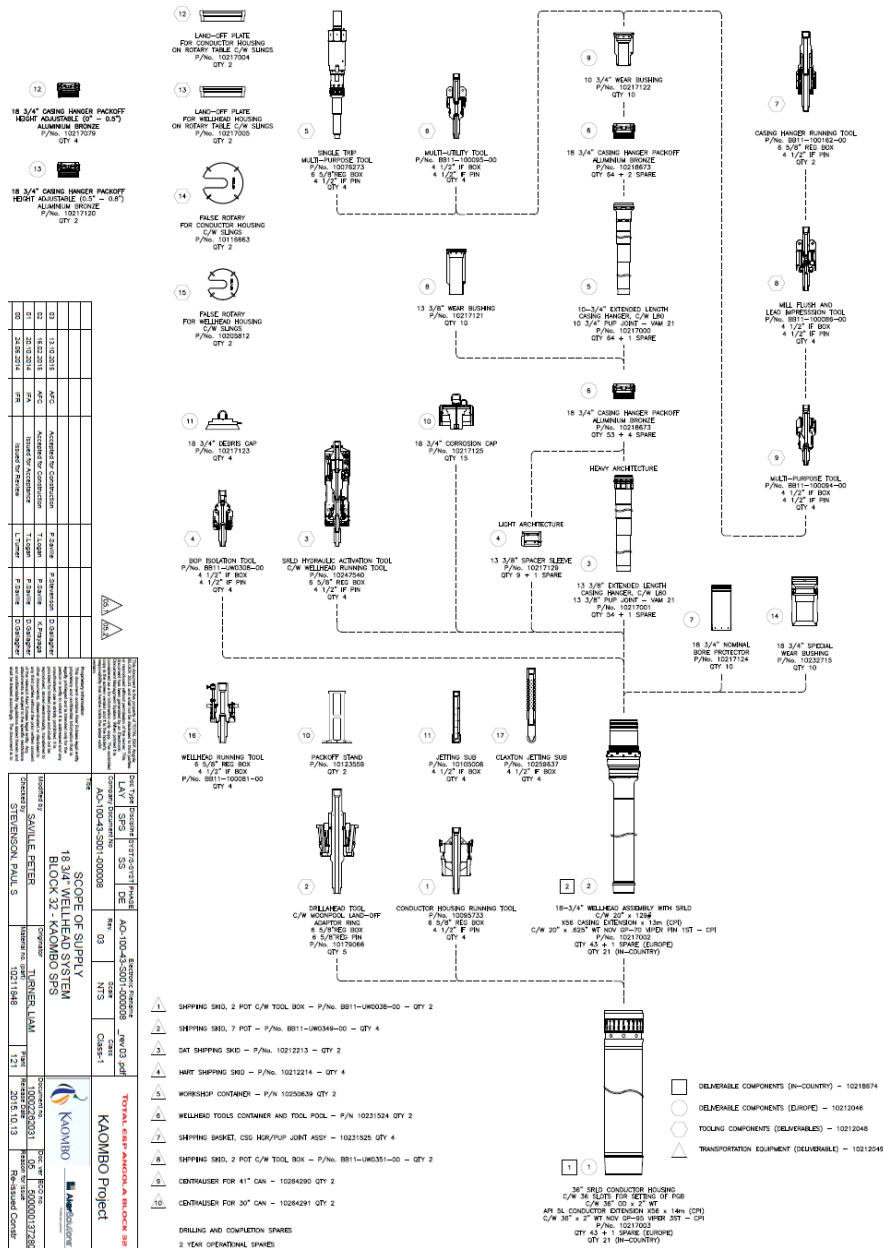
3.1 Reference List

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 132 of 315

3.2 Wellhead Scope of Supply



Wellhead SOS	10002262031	AO-100-43-S001-000008	N/A
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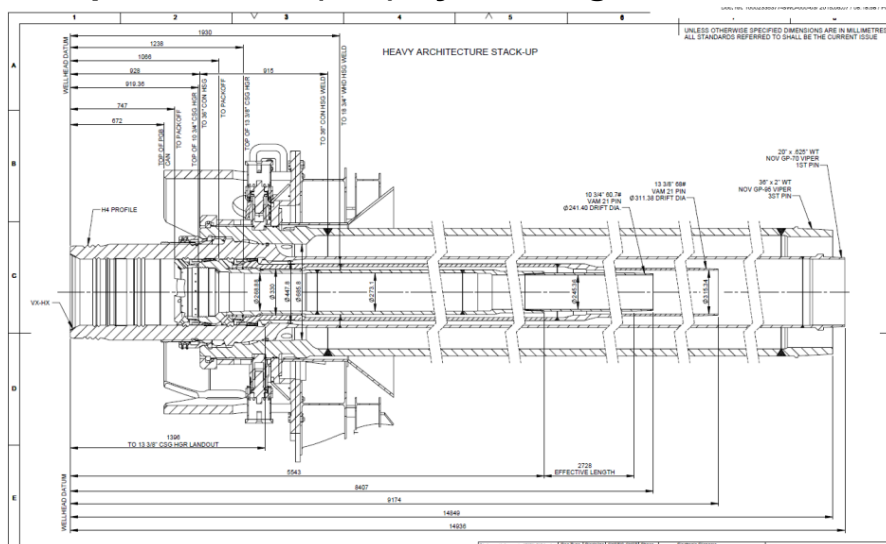
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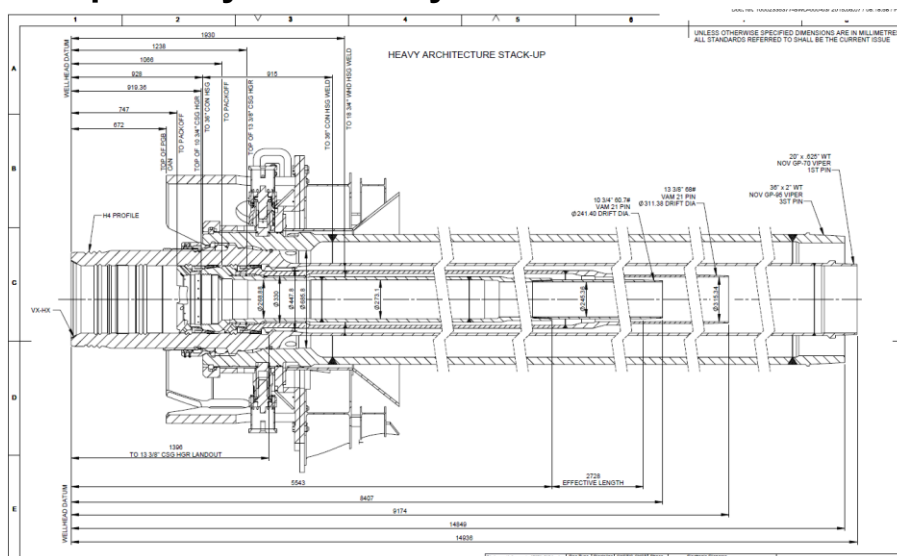
Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 133 of 315

3.3 Stack-Up Well Head (WH) System Light Architecture



Wellhead System Light architecture	10002335377	AO-100-43-S001-000830	N/A
TYPE 3 Use as is (if possible)			

3.4 Stack-Up WH System Heavy Architecture



Wellhead System heavy architecture	10002335377	AO-100-43-S001-000830	N/A
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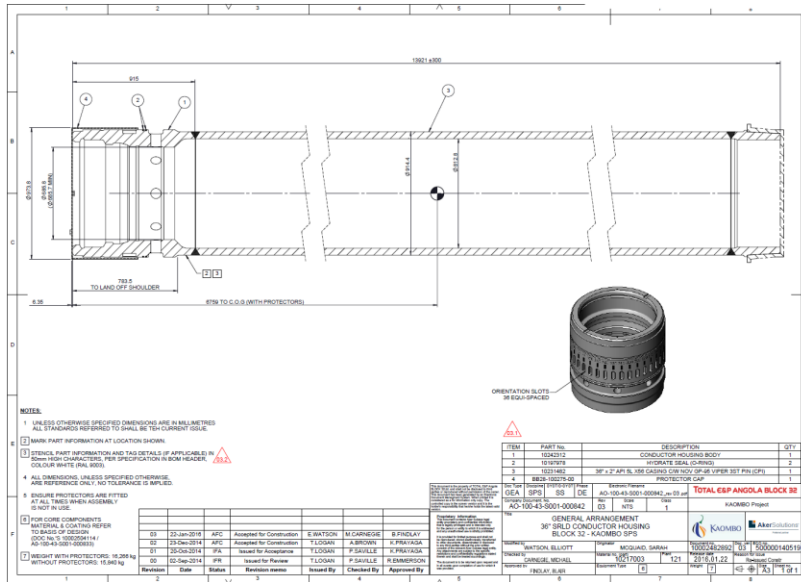
SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 134 of 315

3.5 Wellhead system components

3.5.1 36" Conductor Housing



36" SRLD Conductor Housing

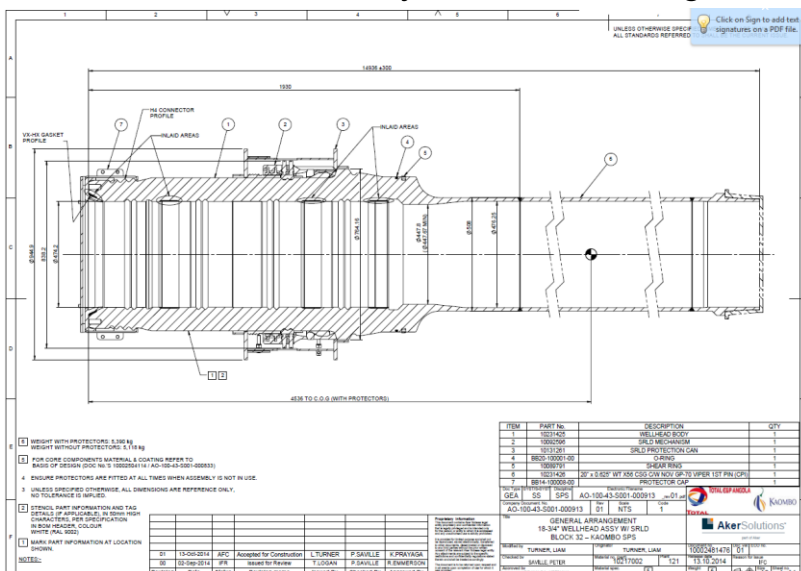
10002482892

AO-100-43-S001-000842

10217003

TYPE 3 Use as is (if possible)

3.5.2 18-3/4 "Wellhead assembly with Slimline Rigid Lockdown (SRLD)

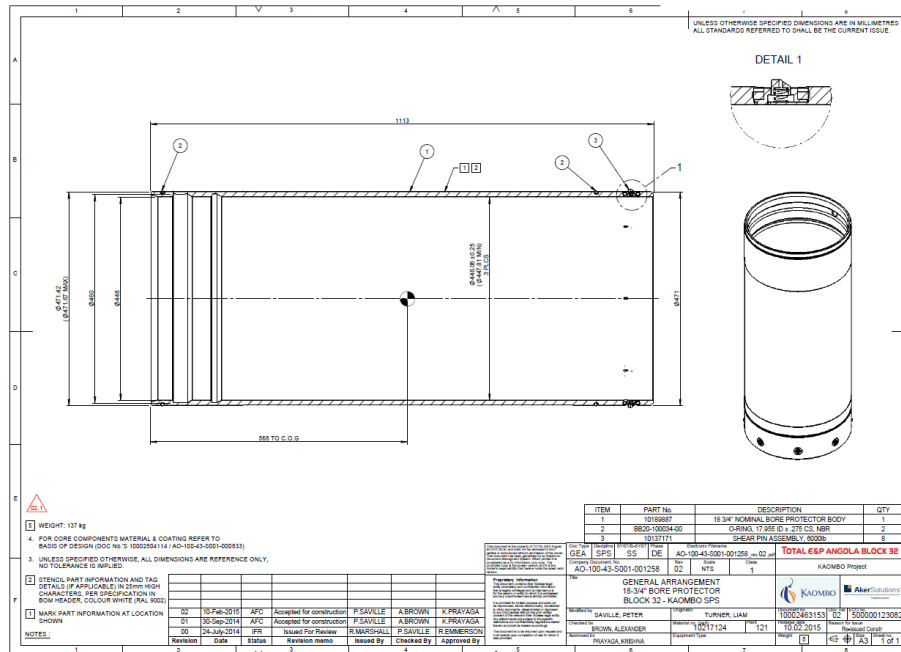


SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 135 of 315

3.5.3 18 3/4 Bore protector



18 3/4" Bore Protector

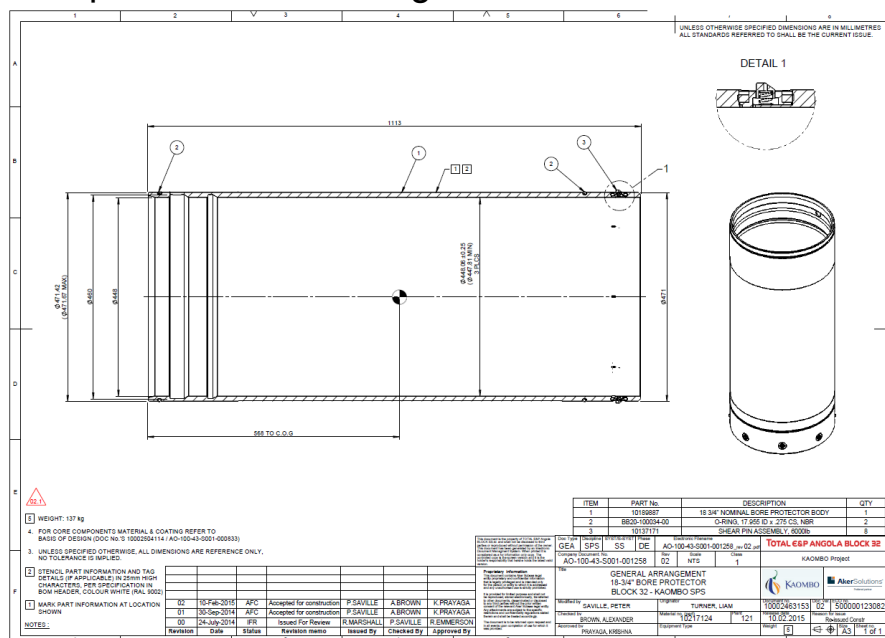
10002463153

AO-100-43-S001-001258

10217124

TYPE 3 Use as is (if possible)

3.5.4 18 3/4 Special Wear Bushing



18 3/4" Special Wear Bushing

10002497266

AO-100-40-S001-000192

10232715

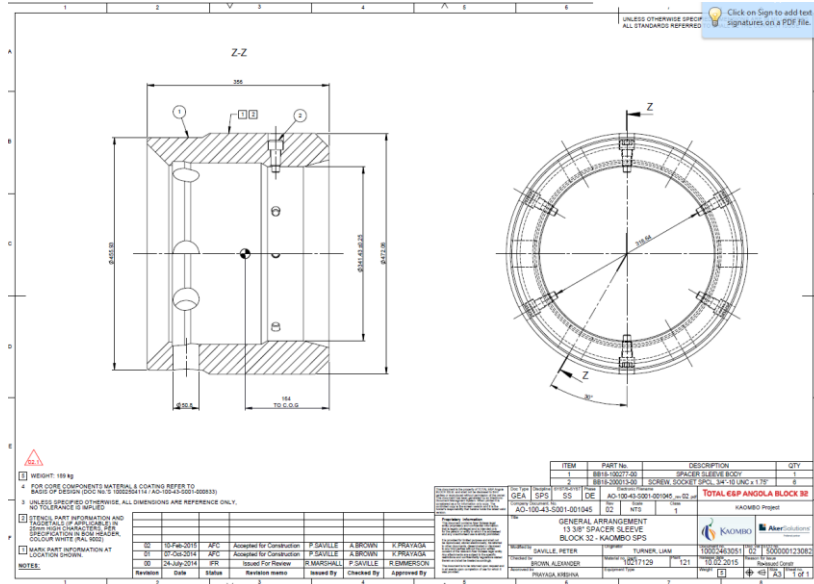
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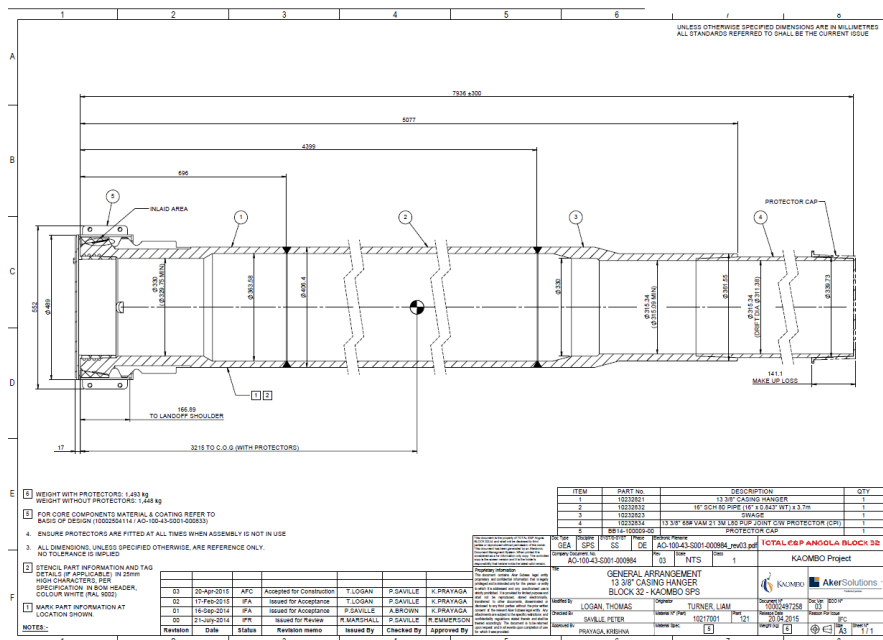
Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 136 of 315

3.5.5 13 3/8" Spacer sleeve



13 3/8 Spacer sleeve	10002463051	AO-100-43-S001-001045	10217129
TYPE 3 Use as is (if possible)			

3.5.6 13 3/8" Casing Hanger



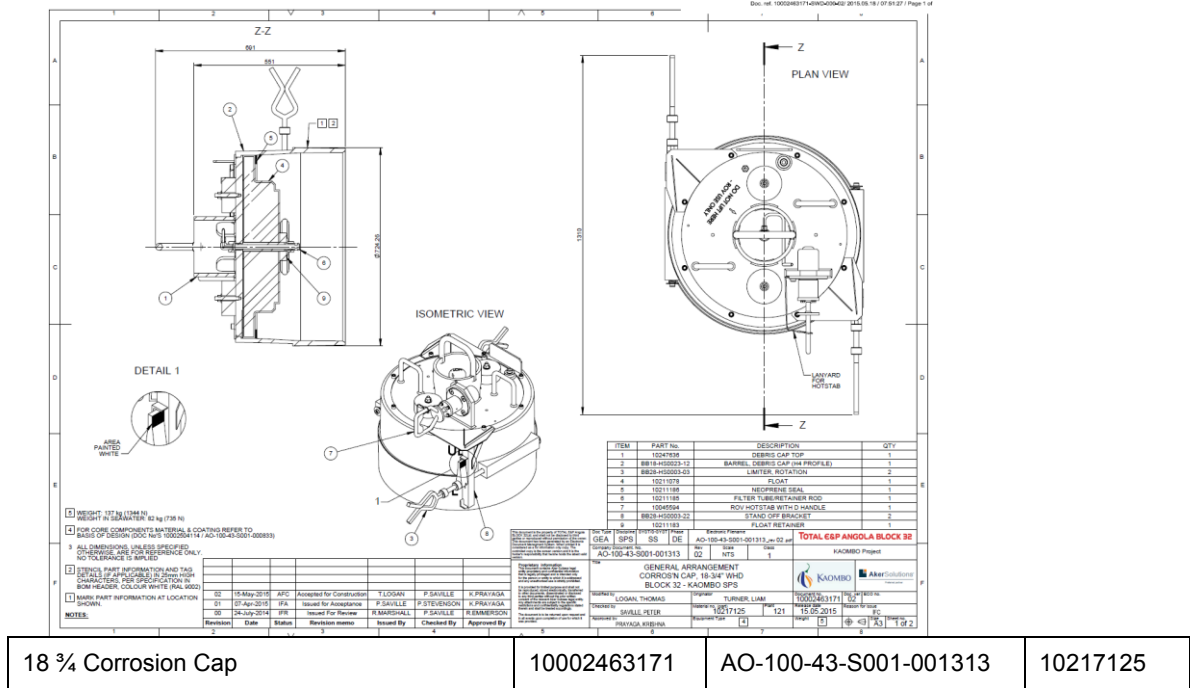
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TYPE 3 Use as is (if possible)			

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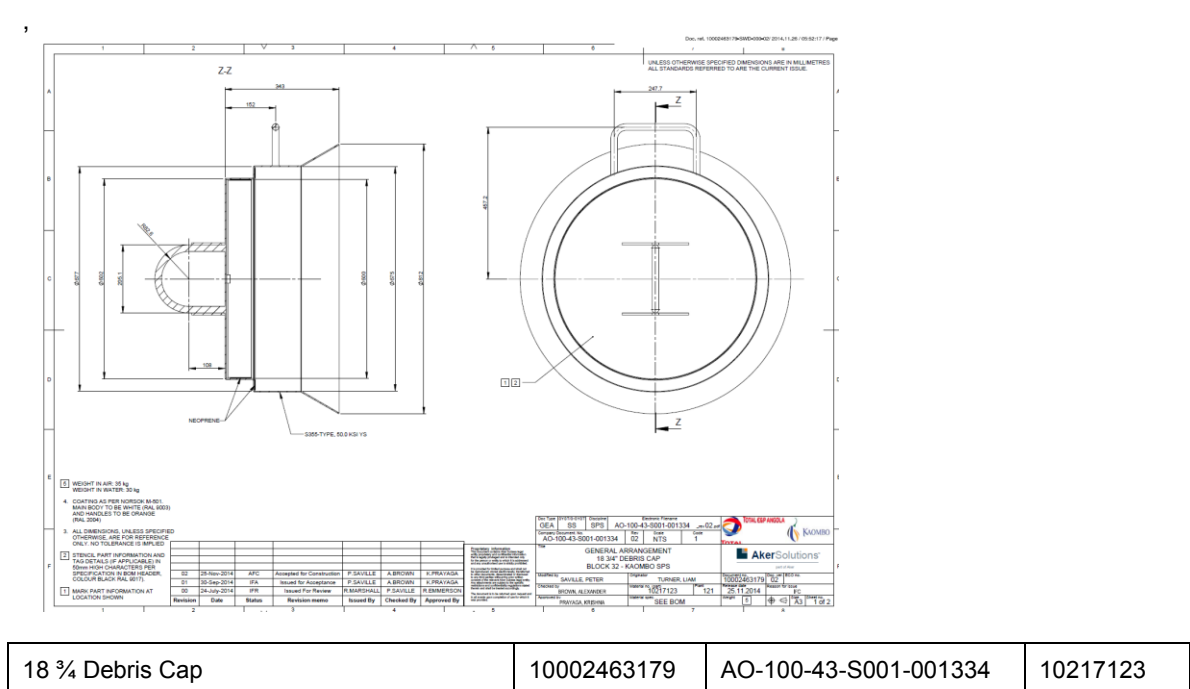
BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 137 of 315

3.5.7 18 ¾ Corrosion Cap



3.5.8 18 ¾ Debris Cap

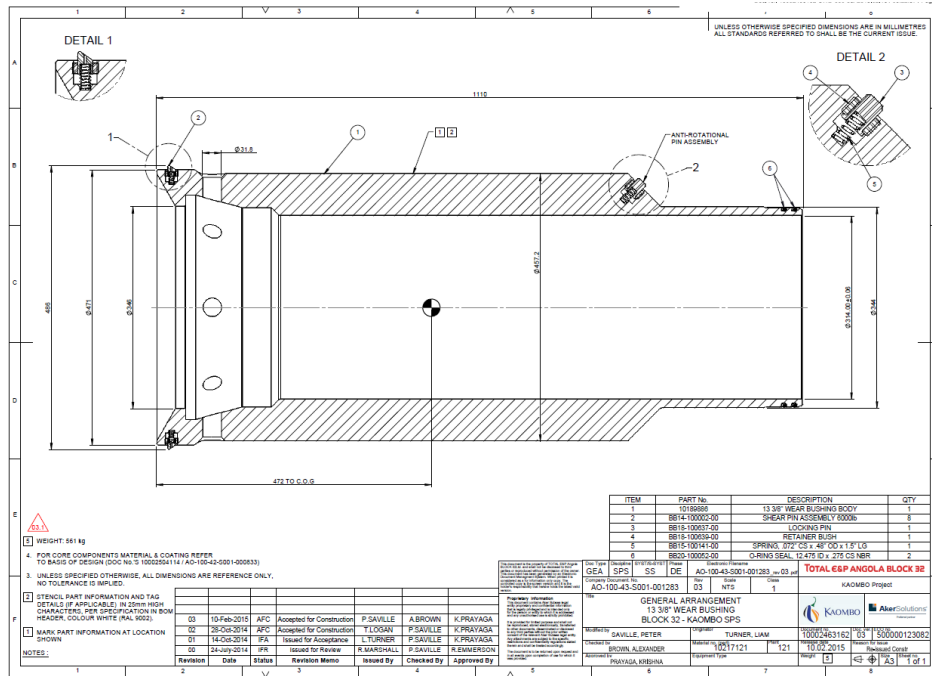


SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 139 of 315

3.5.11 13 3/8 Wear Bushing



13 3/8 Wear Bushing

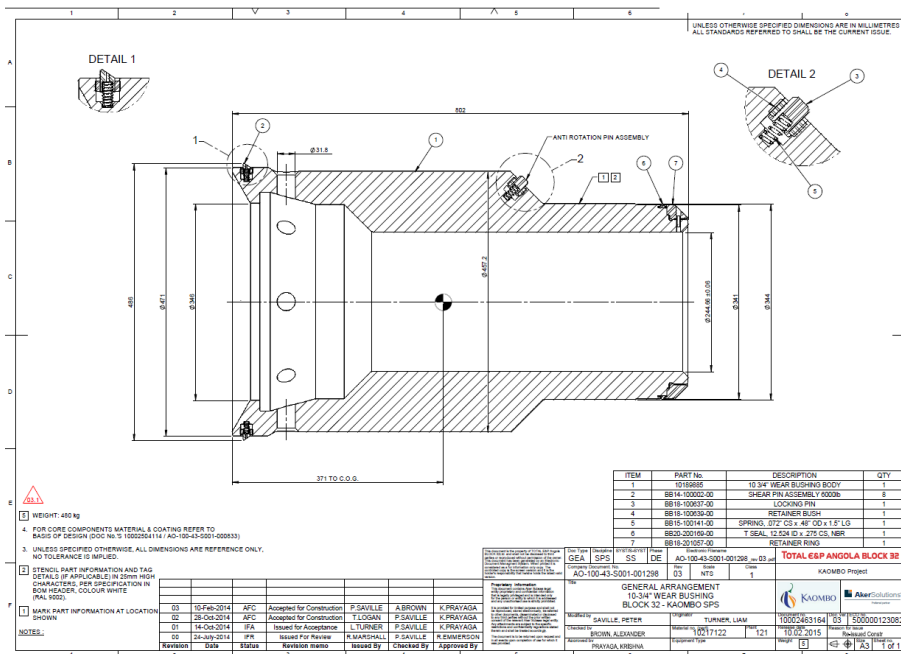
10002463162

AO-100-43-S001-001283

10217121

TYPE 3 Use as is (if possible)

3.5.12 10 3/4" Wear Bushing



10 3/4" Wear Bushing

10002463164

AO-100-43-S001-001298

10217122

TYPE 3 Use as is (if possible)

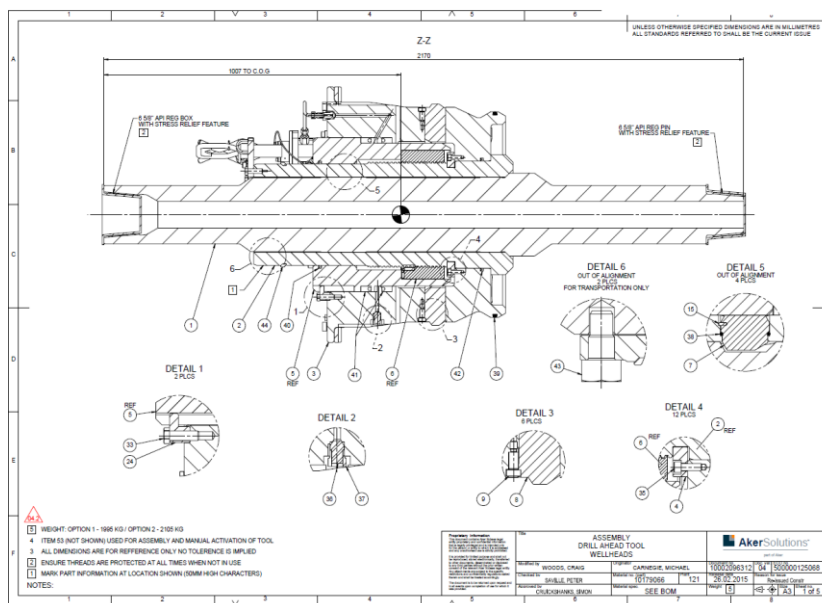
SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 140 of 315

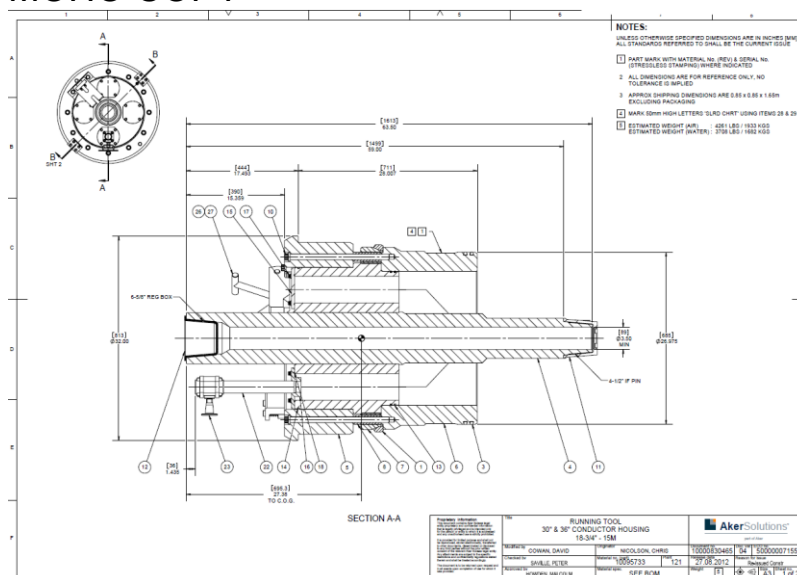
3.6 Wellhead tools

3.6.1 Drill Ahead Tool



GA, Drillahead Tool	10002515041	AO-100-43-S001-001399	10179066
TYPE 3 Use as is (if possible)			

3.6.2 Conductor Housing Running Tool (RT) MOHO COPY



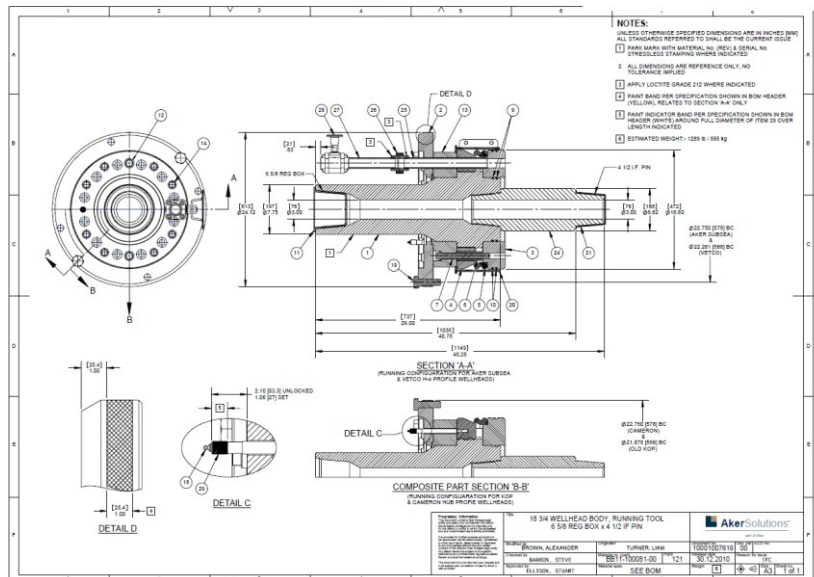
Conductor Housing RT	10002515030	AO-100-43-S001-001388	10095733
TYPE 3 Use as is (if possible)			

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 141 of 315

3.6.3 18 ¾ Wellhead Running Tool



18 ¾ Wellhead RT

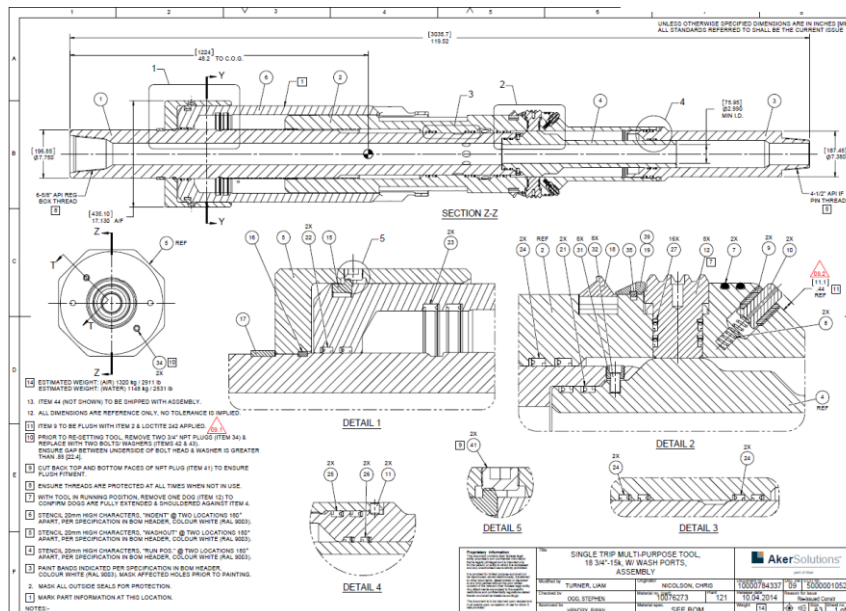
10002515050

AO-100-43-S001-001408

BB11-100081-00

TYPE 3 Use as is (if possible)

3.6.4 Single Trip Multi-Purpose Tool (STMPT) MOHO COPY



Single Trip Multi-Purpose Tool

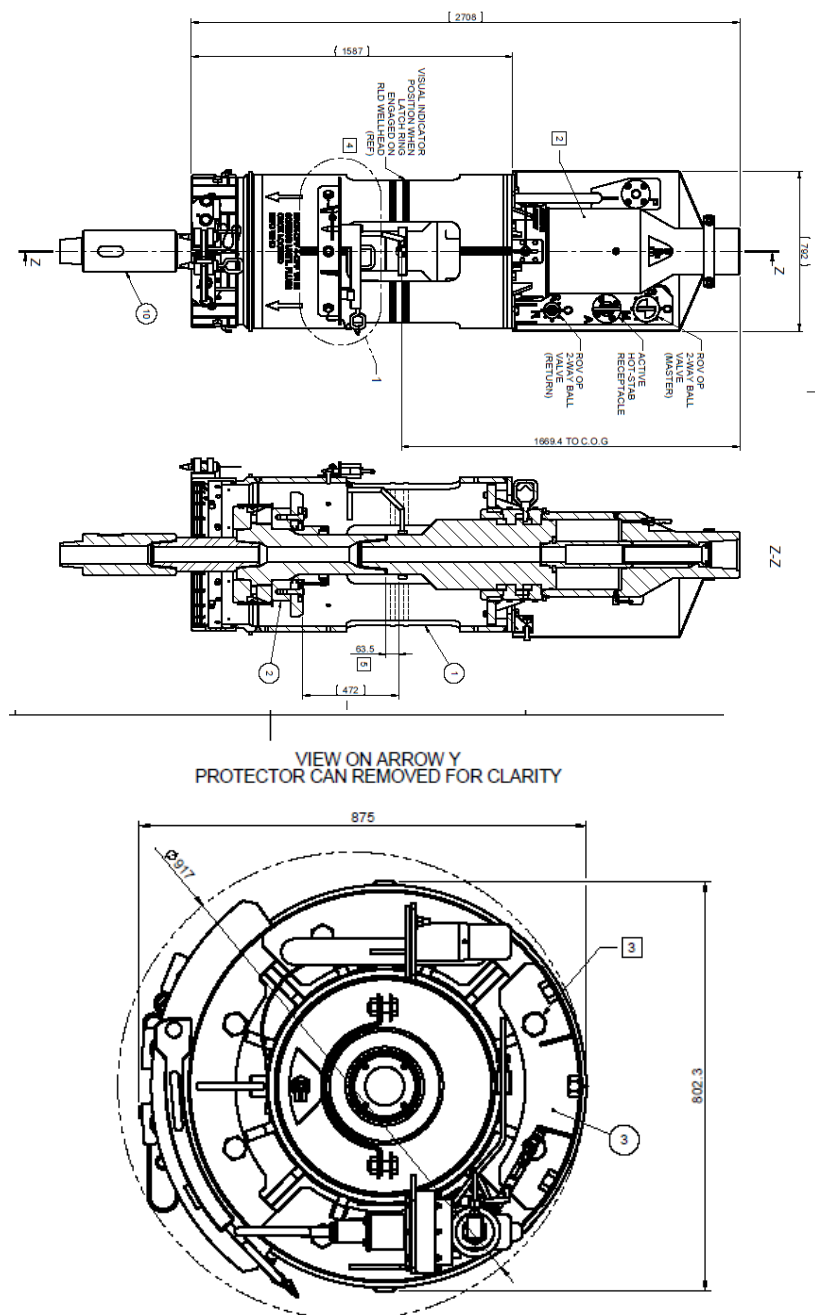
10002515074

AO-100-43-S001-001432

10076273

TYPE 3 Use as is (if possible)

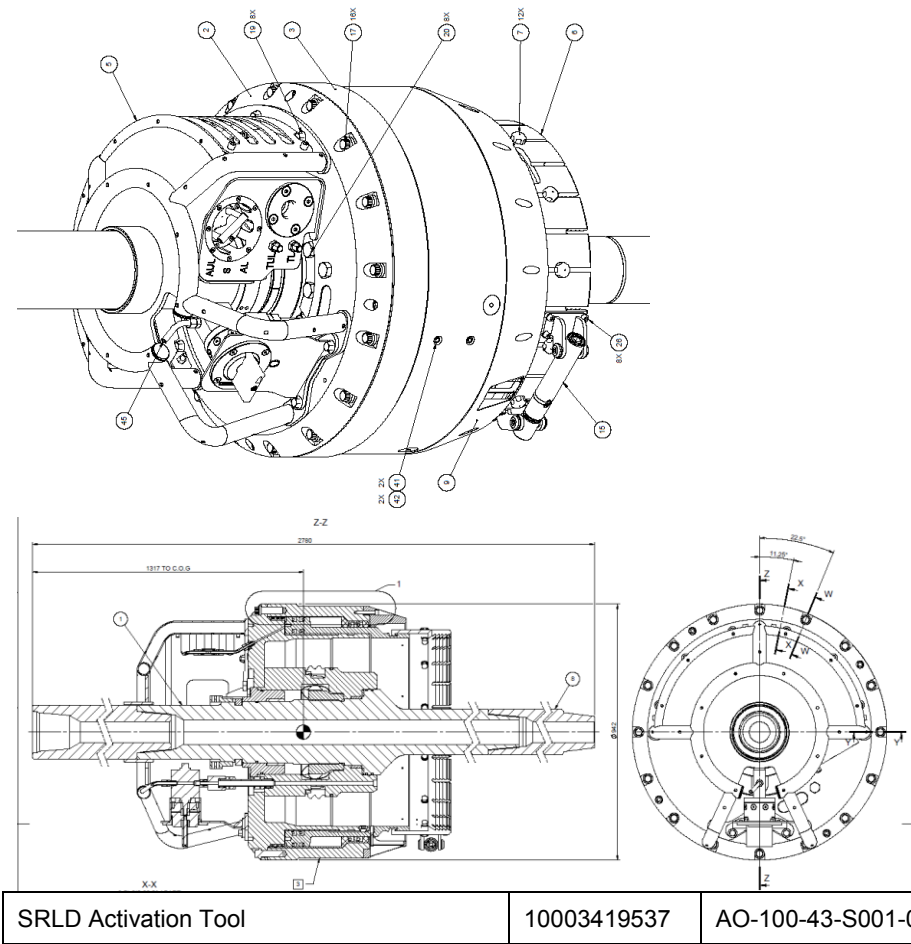
3.6.5 Hydraulic Activated Running Tool (HART) tool



GA SRLD HYDRAULIC ACTIVATION TOOL	10002515058	AO-100-43-S001-001416	10247540
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TYPE 2A Colour screenshot solidworks ISO VIEW + drawing as is

3.6.6 SRLD Activation Tool



SRLD Activation Tool	10003419537	AO-100-43-S001-002545	10251072
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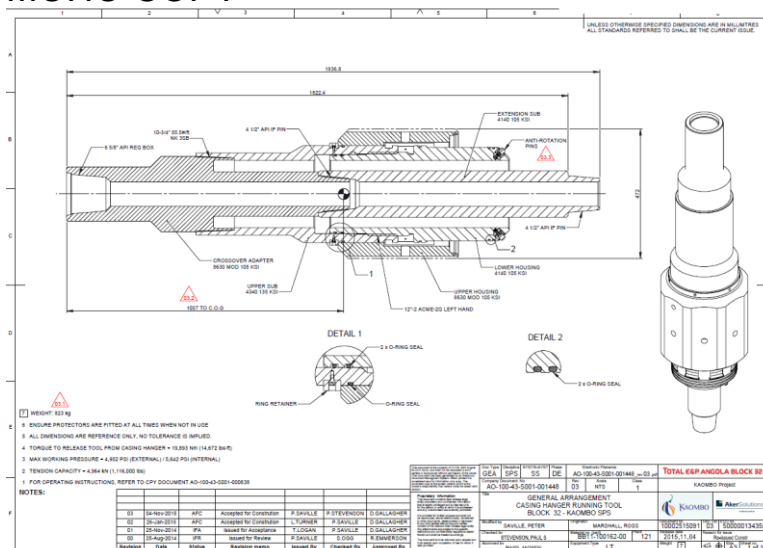
TYPE 2A Colour screenshot solidworks ISO VIEW + drawing as is

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 144 of 315

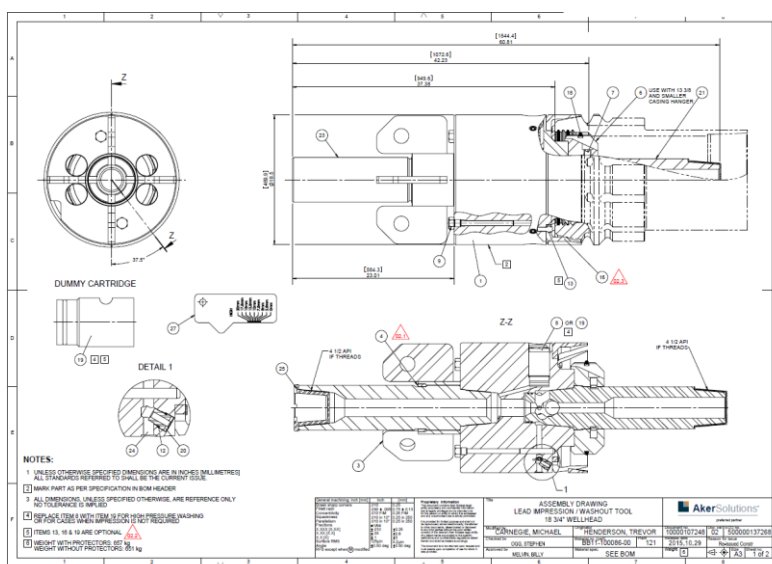
3.6.7 Casing Hanger RT MOHO COPY



Casing Hanger RT	10002515091	AO-100-43-S001-001448	BB11-100162-00
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TYPE 3 Use as is (if possible)

3.6.8 Lead impression/Washout Tool MOHO COPY



Lead Impression/Washout Tool	10002515098	AO-100-43-S001-001454	BB11-100086-00
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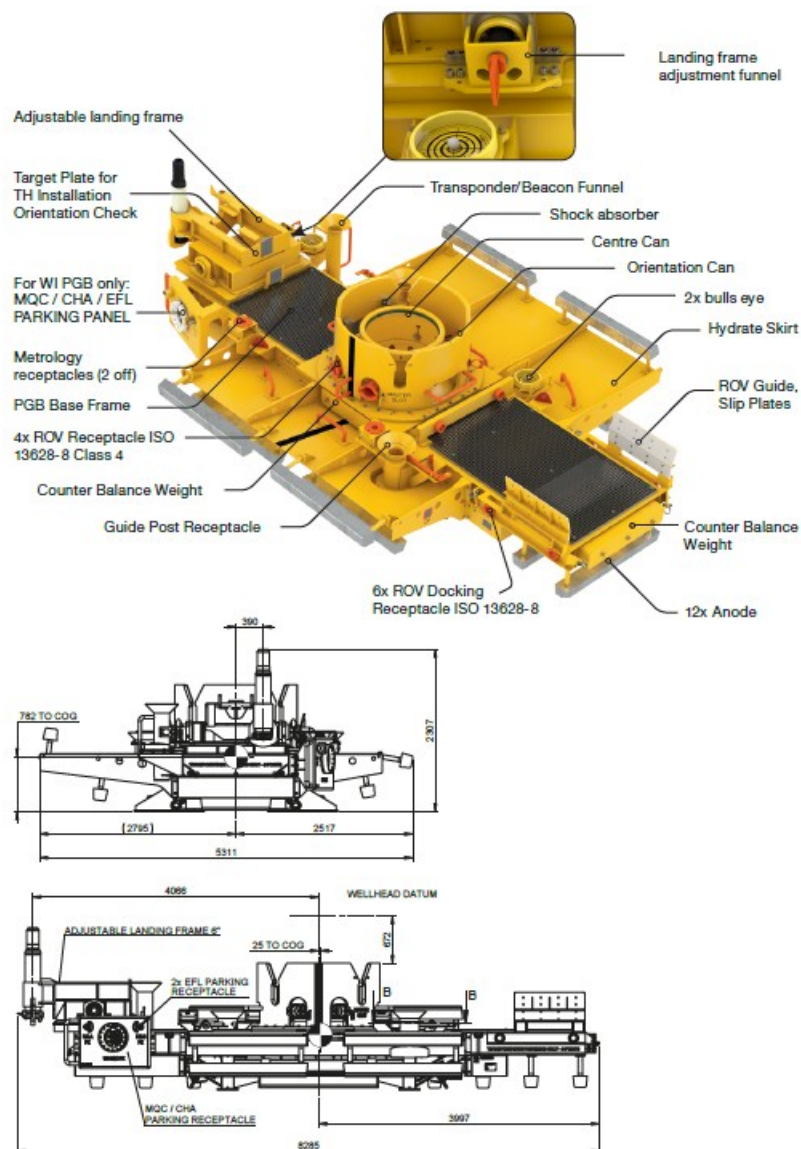
TYPE 3 Use as is (if possible)

SPS HANDBOOK TABLE OF CONTENT	Document:	10002504361-PDC-000
	Version:	05 - Re-issued Constr
	Issue date:	2017.11.17
BLOCK 32 - KAOMBO SPS	Page:	145 of 315

4 PRODUCTION GUIDE BASE (PGB) SYSTEM

4.1 Reference List

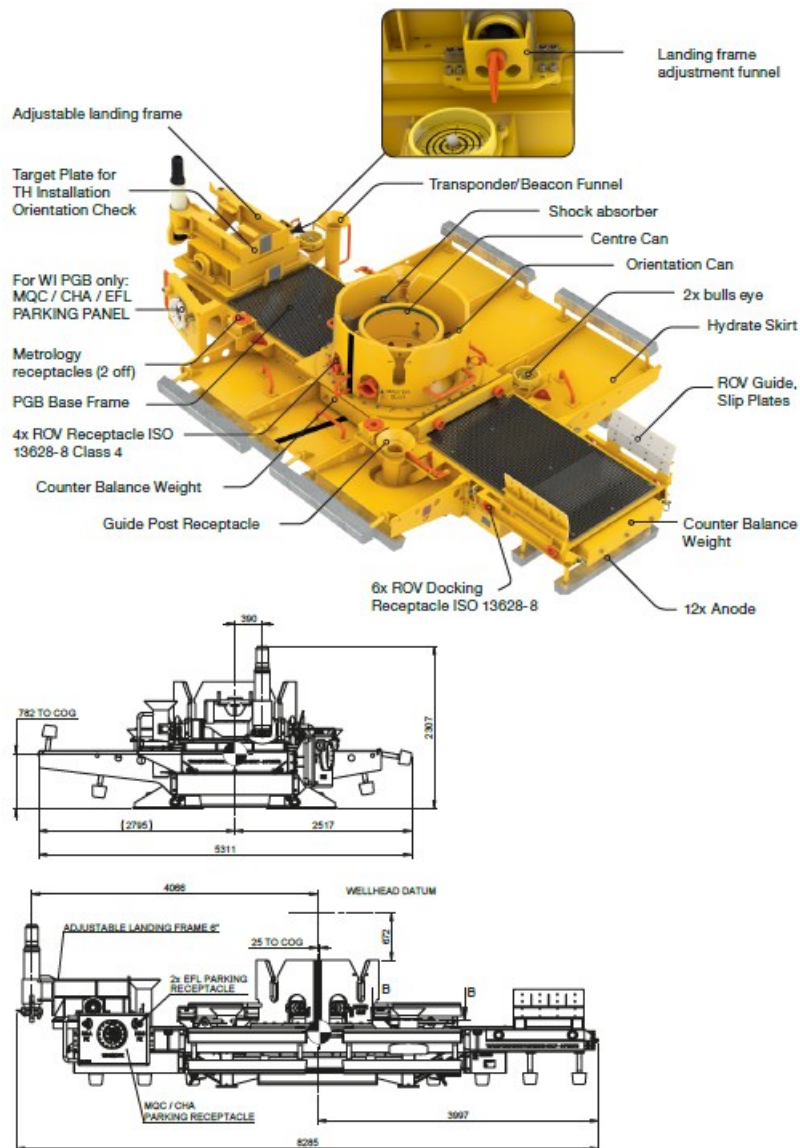
4.3 Production PGB



TYPE 1A Glossy 3-D rendering quality + drawing as is

GA PGB PRODUCTION,	10002512466	AO-100-43-S001-000125	10239337
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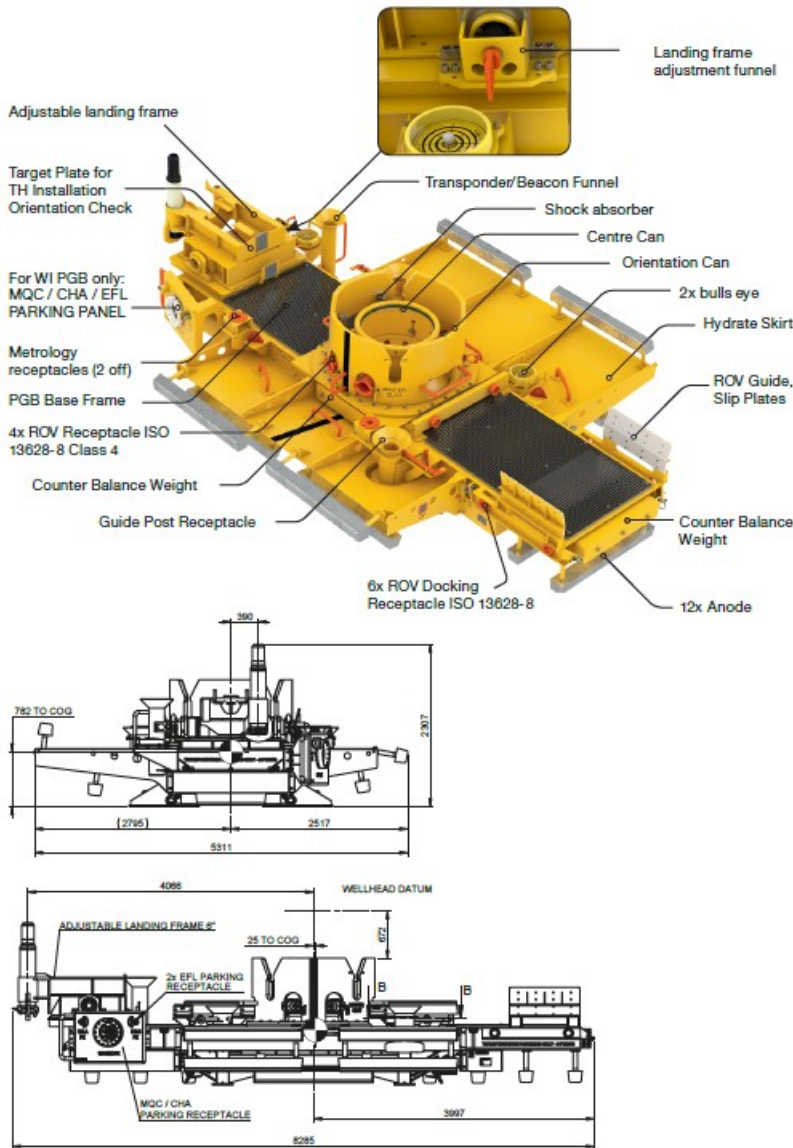
4.4 WI PGB



TYPE 1A Glossy 3-D rendering quality + drawing as is

GA PGB WI	10002668997	AO-100-43-S001-001574	10239383
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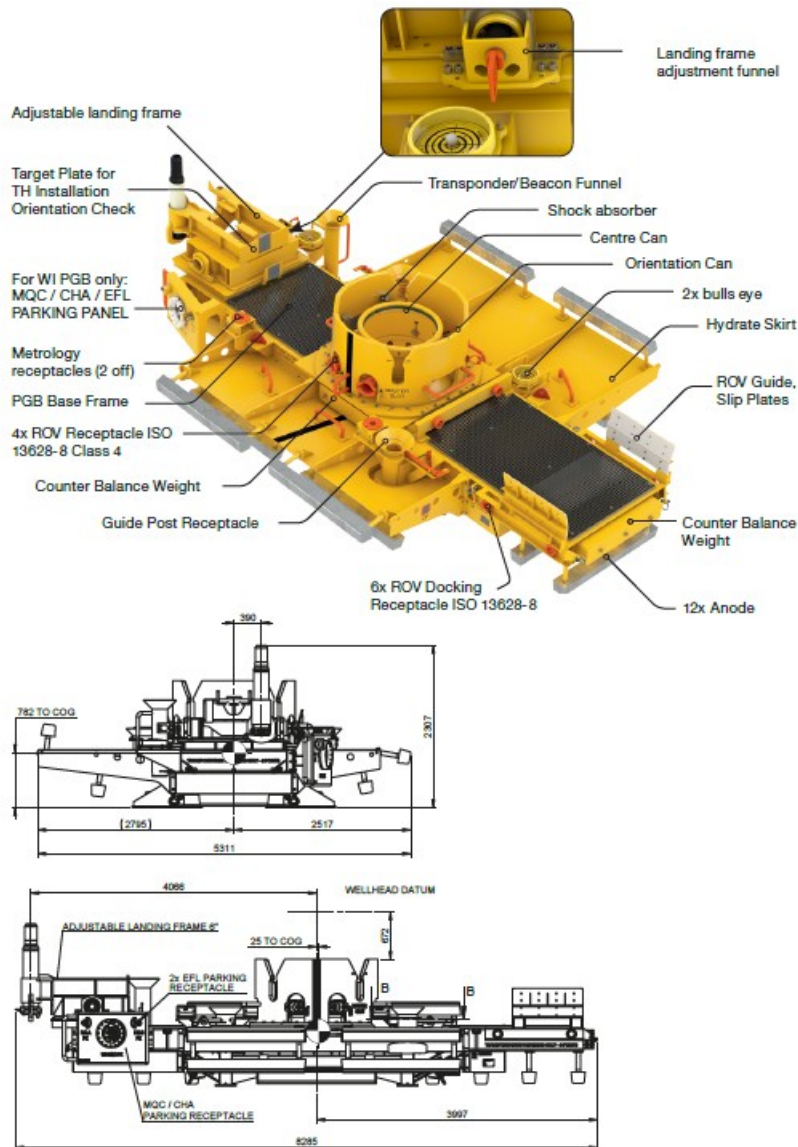
4.5 Production PGB IN COUNTRY



TYPE 1A Glossy 3-D rendering quality + drawing as is

GA PGB PRODUCTION, IN COUNTRY	10002816845	AO-100-43-S001-001666	10251055
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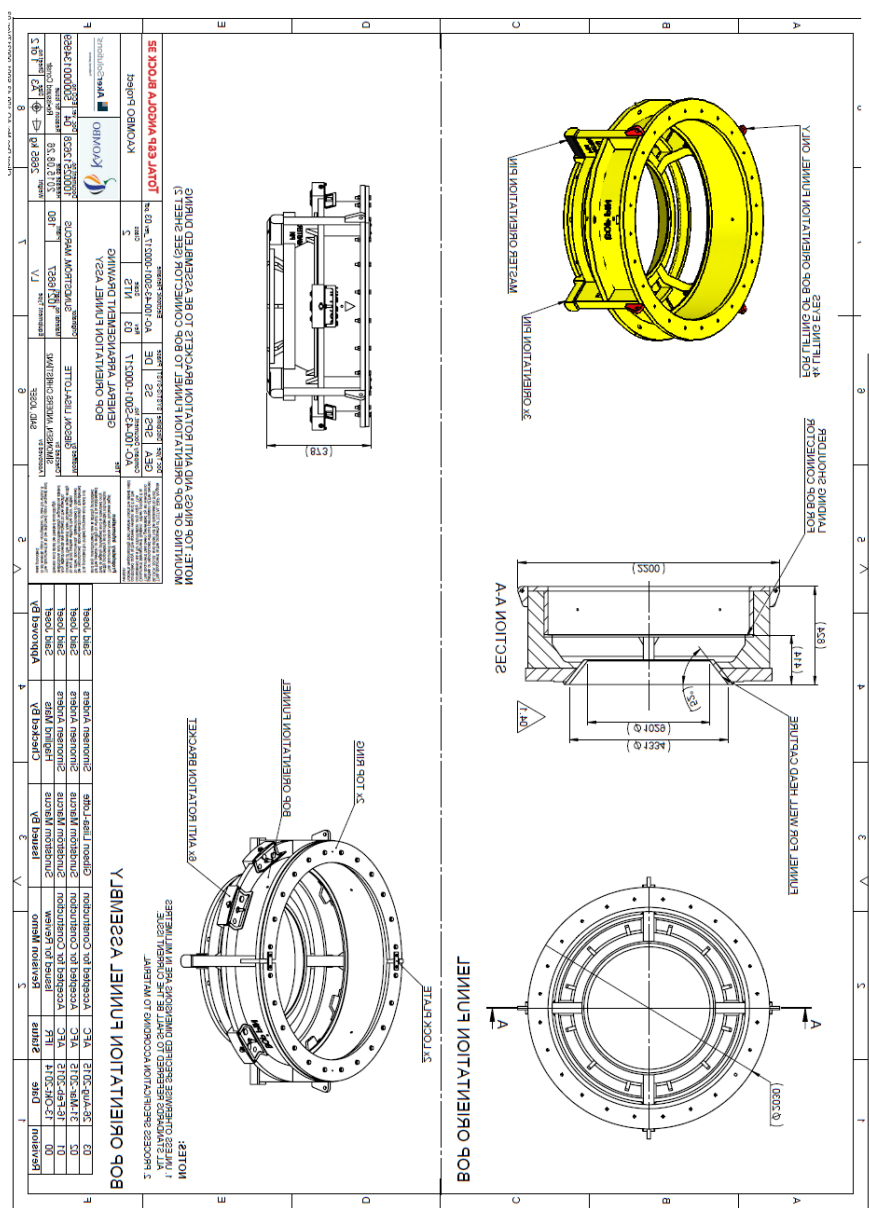
4.6 WI PGB IN COUNTRY



TYPE 1A Glossy 3-D rendering quality + drawing as is

GA PGB WI IN COUNTRY	10002816848	AO-100-43-S001-001665	10251056
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4.8 Blowout Preventer (BOP) Orientation funnel



TYPE 2 Colour screenshot solidworks ISO VIEW + drawing as is

GA BOP ORIENTATION FUNNEL	10002512628	AO-100-43-S001-000217	10216857
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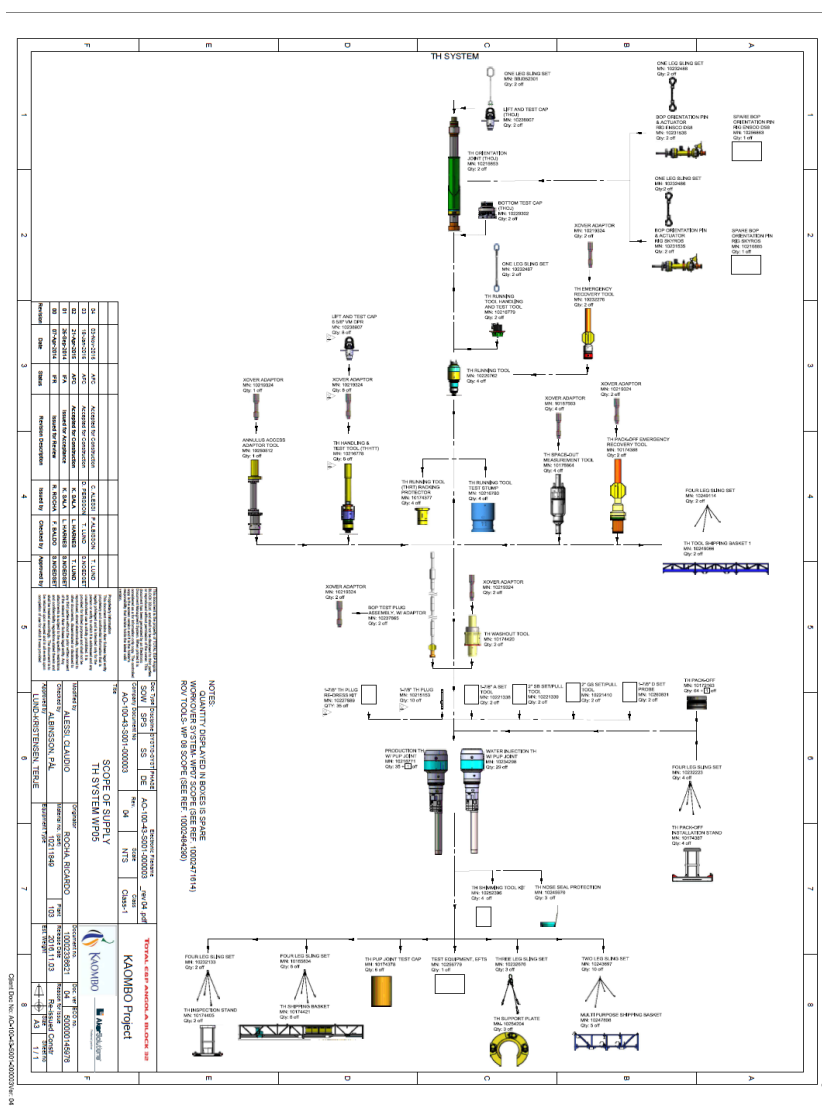
SPS HANDBOOK TABLE OF CONTENT	Document:	10002504361-PDC-000
	Version:	05 - Re-issued Constr
	Issue date:	2017.11.17
BLOCK 32 - KAOMBO SPS	Page:	153 of 315

5 TUBING HANGER (TH) SYSTEM

5.1 Reference List

BLOCK 32 - KAOMBO SPS

5.2.1 Scope of supply



SCOPE OF SUPPLY TH SYSTEM	10002336621	AO-100-43-S001-000003	N/A
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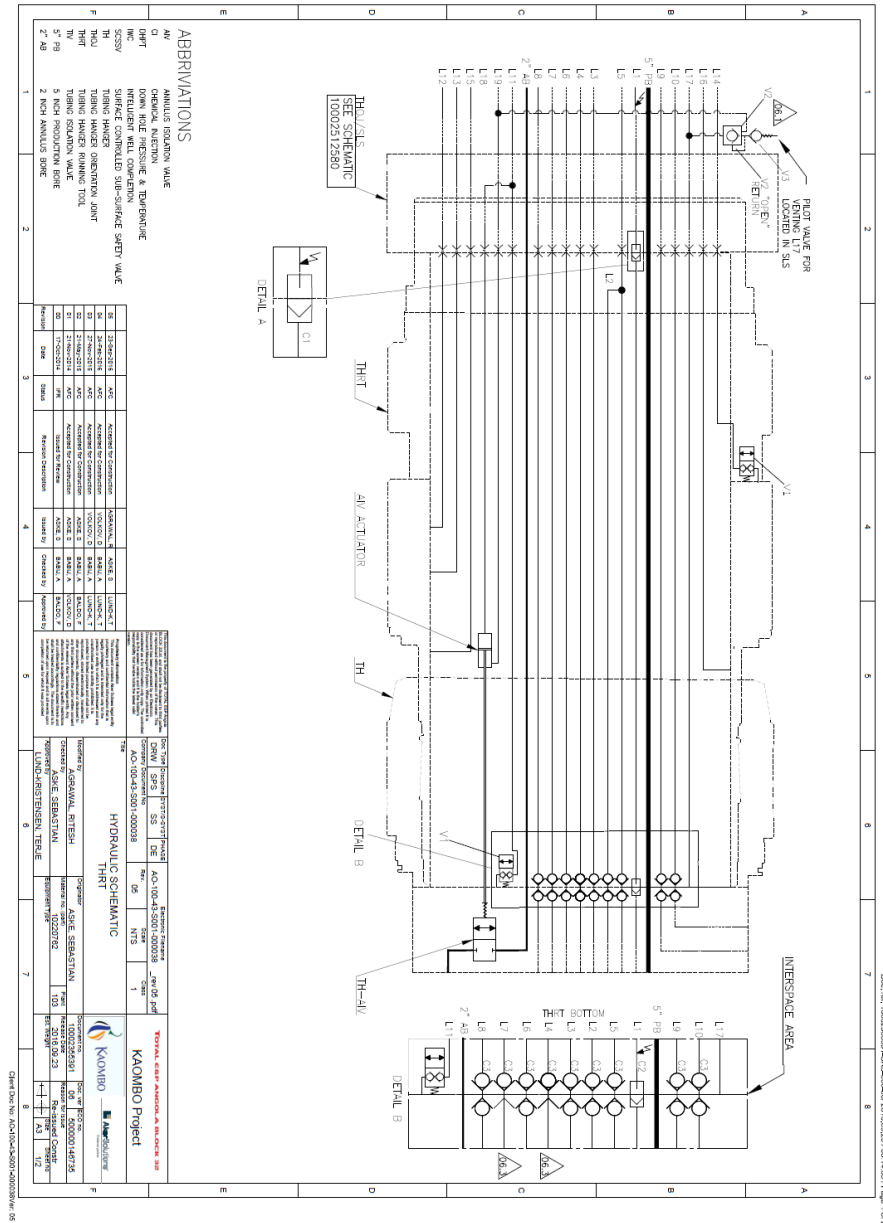
TYPE 3 Use as is (if possible)

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 161 of 315

5.2.6.1 TH Running Tool THRT Hydraulic schematic



THRT Hydraulic Schematic	10002355391	AO-100-43-S001-000038	10220762
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TYPE 3 Use as is (if possible)

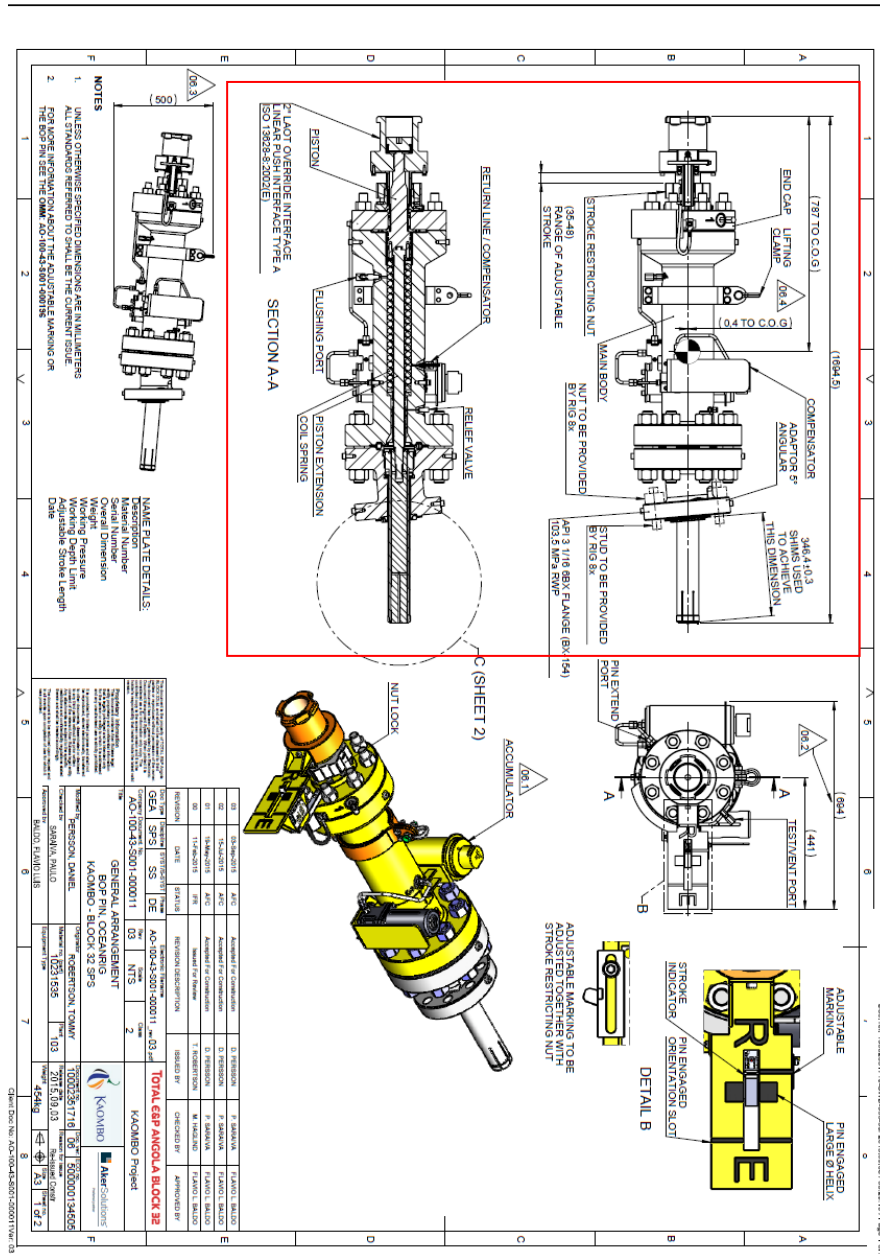
SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 162 of 315

5.2.7 BOP Pin Skyros

Use the two illustrations marked in red.



BOP PIN Oceanrig GA

10002351716

AO-100-43-S001-000011

10231535

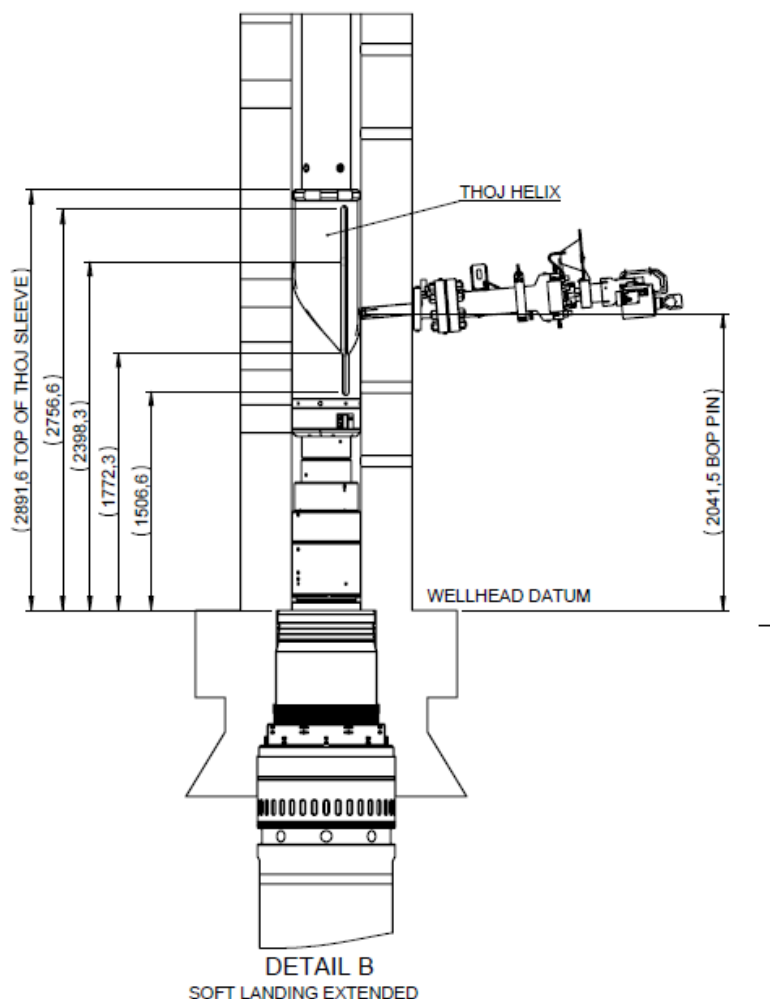
TYPE 3 Use as is (if possible)

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
 Version: 05 - Re-issued Constr
 Issue date: 2017.11.17
 Page: 163 of 315

5.2.7.1 THROT/BOP PIN SKYROS



STACK-UP DRAWING TH/THROT/BOP PIN, RIG-1	10002512795	AO-100-43-S001-000323	10211849
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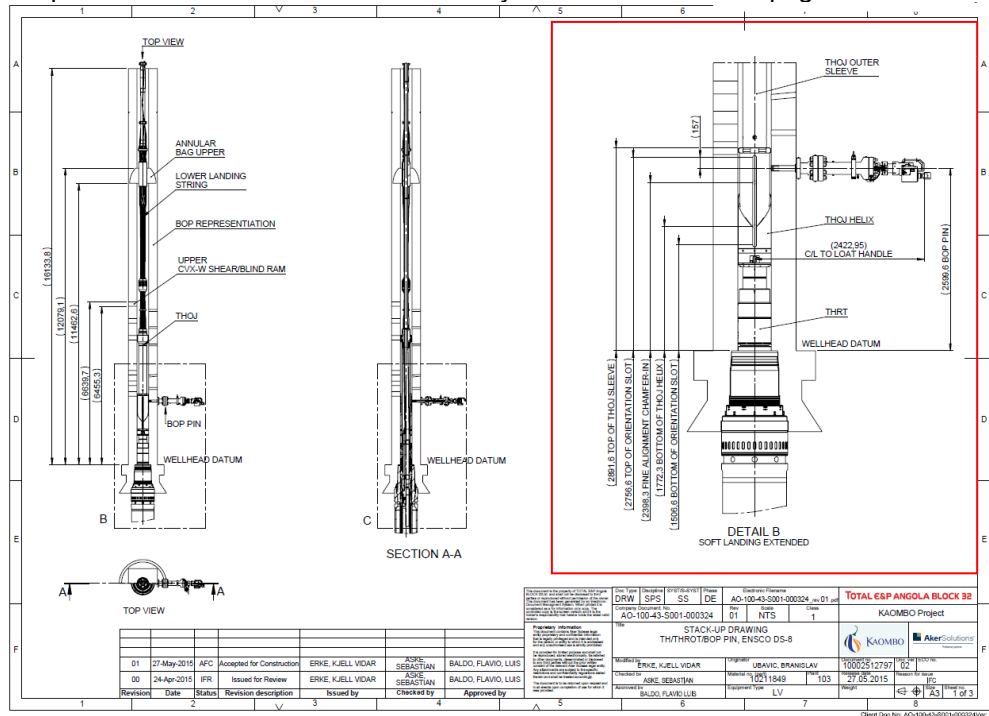
SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 165 of 315

5.2.8.1 THROT/BOP PIN, ENSCO DS-8

Keep the one illustration marked in red. Try to have on the same page as BOP Pin a bove.



THROT/BOP PIN ENSCO DS-8	10002512797	AO-100-43-S001-000324	10216771 10216853 10220762 10231536 10234298
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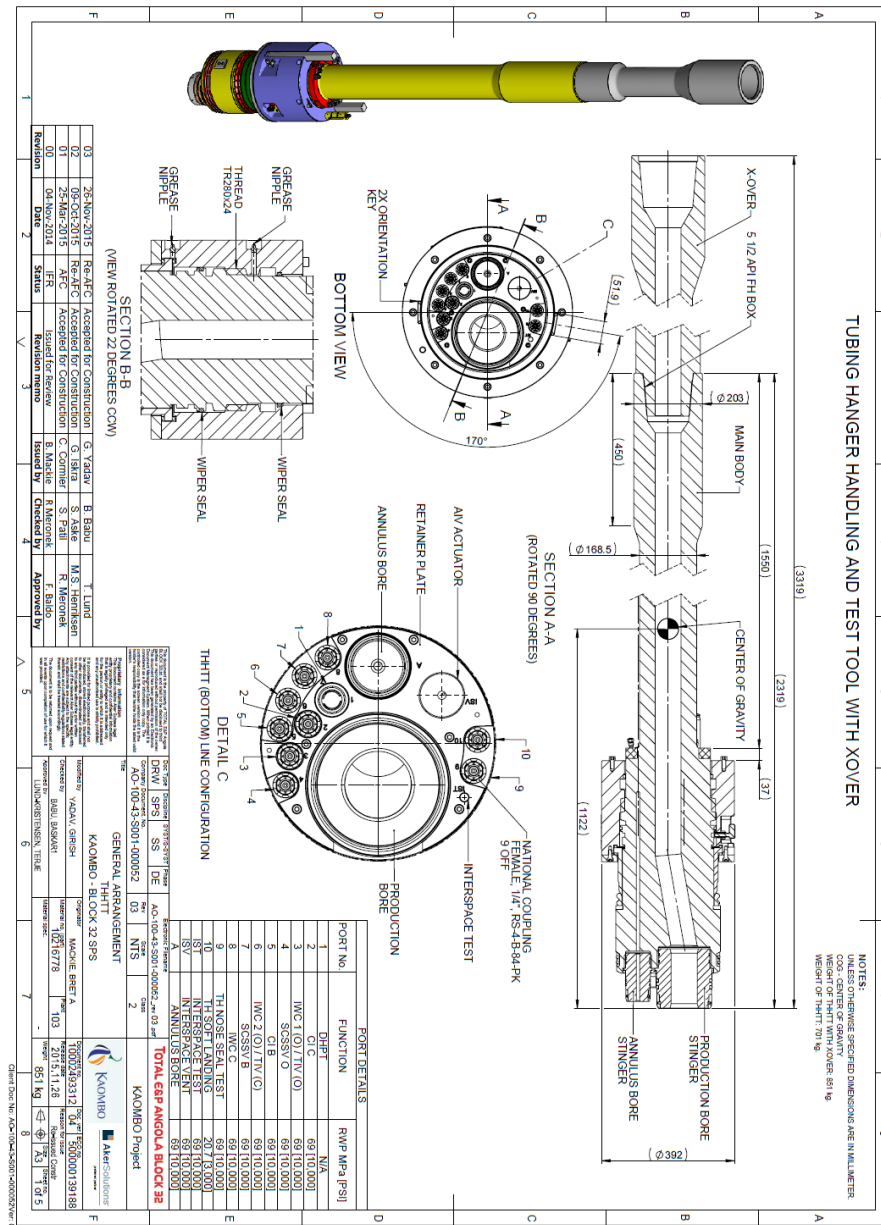
TYPE 3 Use as is (if possible)

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 166 of 315

5.2.9 TH Handling & Test Tool (THHTT)



THHTT GA	10002493312	AO-100-43-S001-000052	10216778
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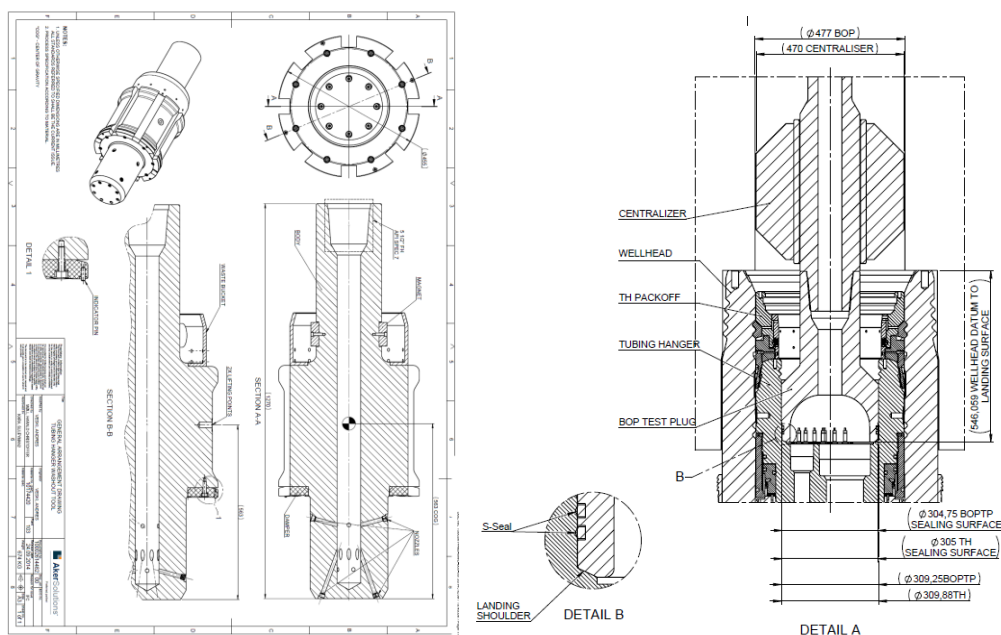
TYPE 3 Use as is (if possible)

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
 Version: 05 - Re-issued Constr
 Issue date: 2017.11.17
 Page: 168 of 315

5.2.11 TH Washout tool + BOP test plug add on same page



TH washout tool	10002512690	AO-100-43-S001-000258	10174420
GA, BOP test plug	10002512676	AO-100-43-S001-000249	10237865

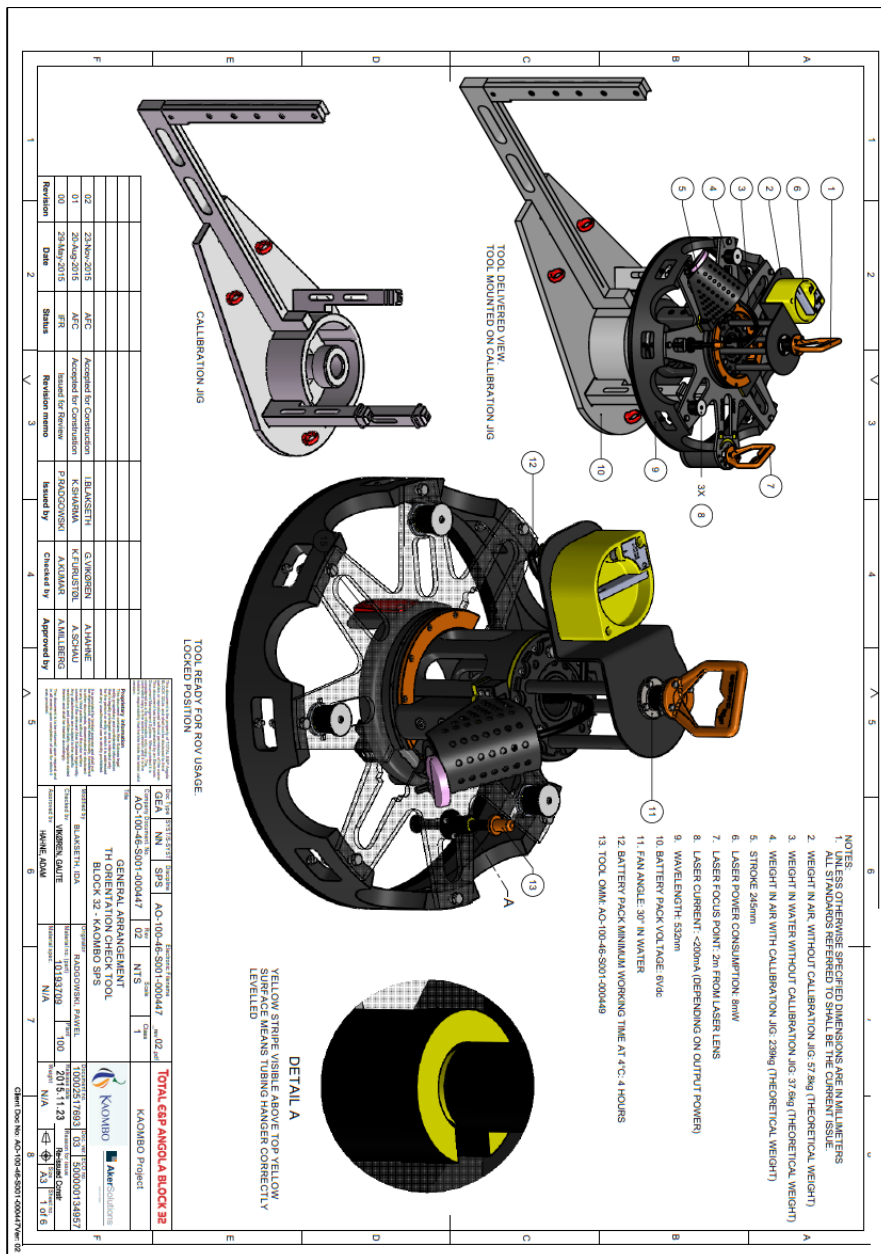
TYPE 5 Drawing as is + colouring

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 169 of 315

5.2.12 TH Orientation Check Elevation Tool (THOECT)



THOECT GA	10002517693	AO-100-46-S001-000447	10193709
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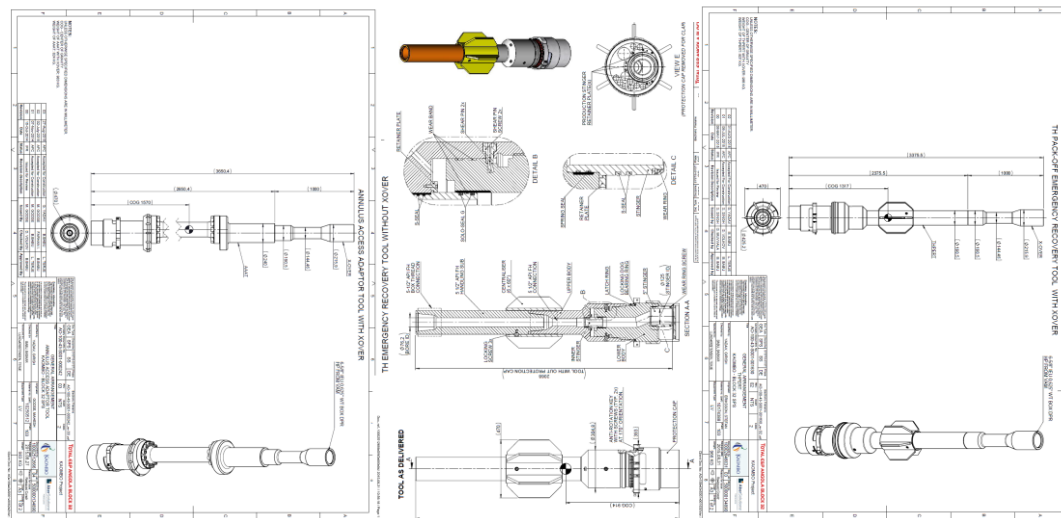
TYPE 3 Use as is (if possible)

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 170 of 315

5.2.13 TH contingency tools (1 page with one drawing per tool)



Annulus Access Adaptor Tool	10002512666	AO-100-43-S001-000242	10250512
STACK-UP TH/AAAT/2" WIRELINE PLUG	10002512805	AO-100-43-S001-000329	
THERT GA	10002512594	AO-100-43-S001-000189	10232276
THPERT GA	10002846831	AO-100-43-S001-001630	10174388

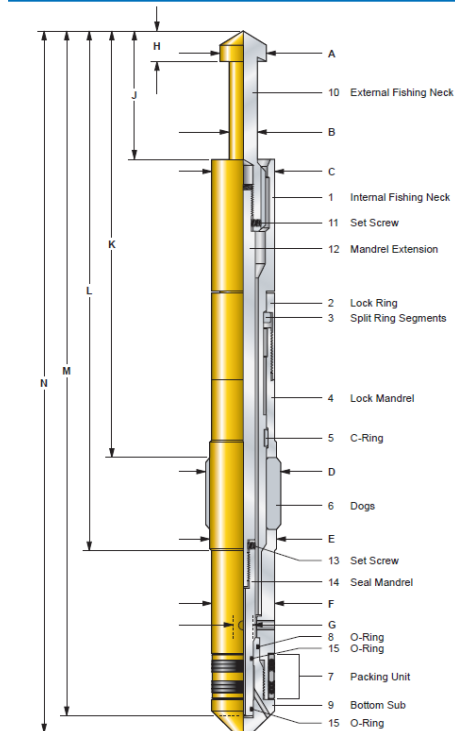
TYPE 5 Drawing as is + colouring

5.2.14 Annulus Wireline Plug

Baker Model "AFH" Short Sur-Set By-Pass Blanking Plug
 with Removable Mandrel



Product No. H83620



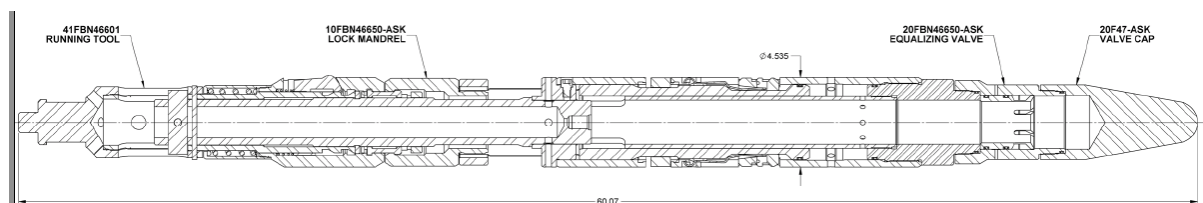
© 2004 Baker Hughes Incorporated, All Rights Reserved.

Drawing No. ABD00016709
 New (14/09/04)

Annulus Wireline Plug	10002960716	N/A	10215153
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TYPE 3 Use as is (if possible)

5.2.15 5" Production Wireline Plug



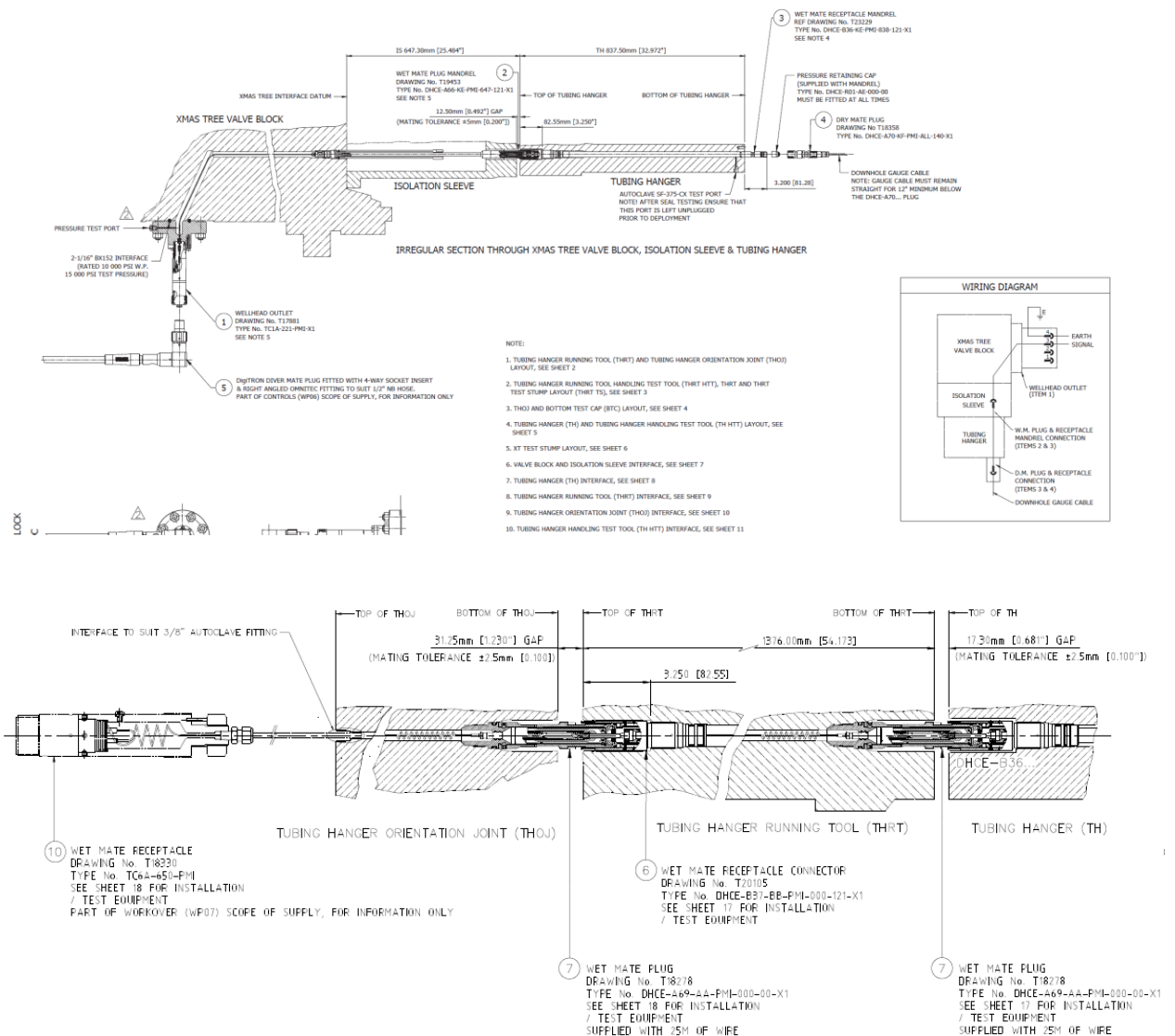
4.665 FBN Lock & Running Tool Drg	N/A	CPI	N/A
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SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 172 of 315

5.3 Electrical Feed through System (EFTS)



Remove dimensions, notes and references to drawings. Keep type No.

SIEMENS SUBSEA CONNECTORS – TRONIC SoS	10002858412	AO-100-40-S192-000016	N/A
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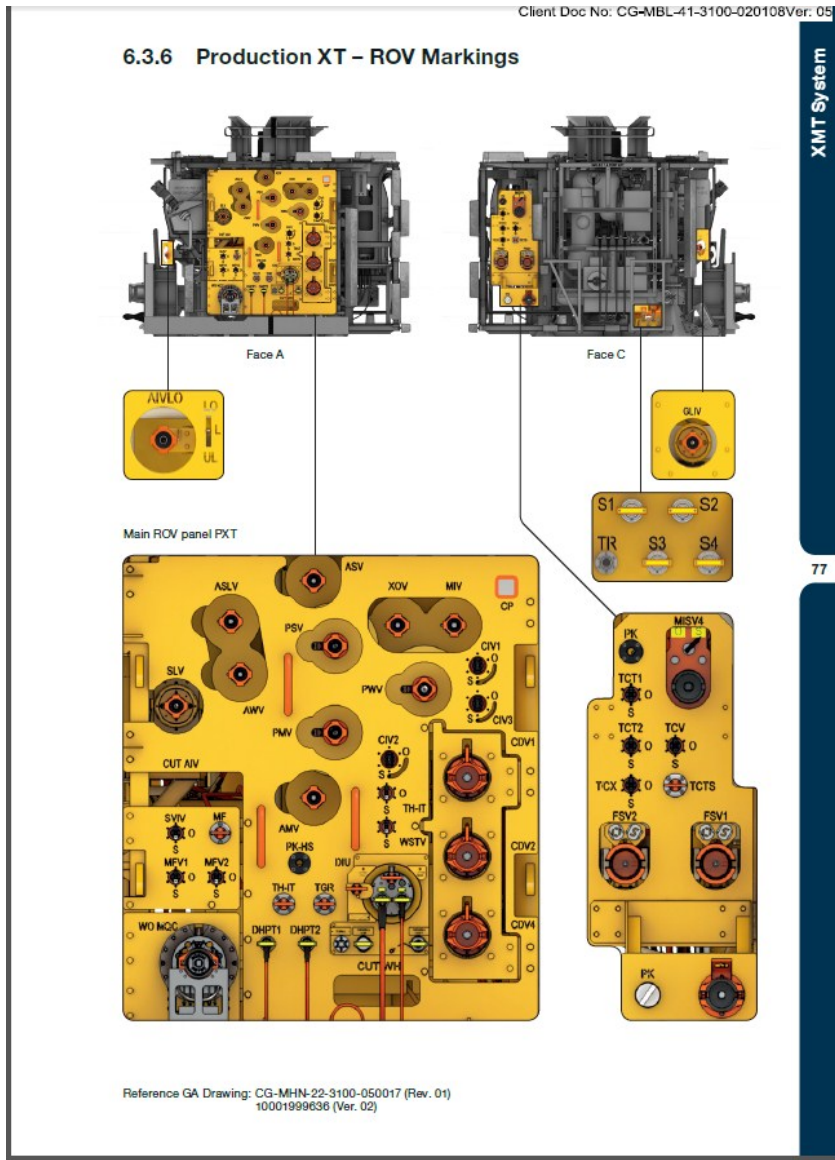
TYPE 3 Use as is (if possible)

SPS HANDBOOK TABLE OF CONTENT	Document:	10002504361-PDC-000
	Version:	05 - Re-issued Constr
	Issue date:	2017.11.17
BLOCK 32 - KAOMBO SPS	Page:	173 of 315

6 VERTICAL SUBSEA TREE (VXT) SYSTEM

6.1 Reference list

6.3.4 Production PVXT Remote Operated Vehicle (ROV) Panel & Markings



PVXT GA	10002238674	AO-100-43-S001-000057	10216746
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TYPE 1B Glossy 3-D rendering quality like example, add roof view

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 179 of 315

6.3.5 Production PVXT Valves

Doc. ref. 10001947480-PDC-000-06/ 2016.02.18 / 11:00:55 / Page 89 of 220
Client Doc No: CG-MBL-41-3100-020108Ver: 05

6.3.5 Production XT Valves

76

Description	Functional Use / ROV Marking	Soft Tag (Ble)	Fail Safe	Material Number	Valve Data Sheet	Valve Type	Actuation	Supplier	Qty for 1 XT
Production XMT									
5-1/8" Valve	PWV, PMV, PSV	K-PWV-P***, K-PMV-P***	FSC	10116148	10001346450	Gate	Hydraulic	AKSO	3
2-1/8" Valve	AMV, XOV, MV, ASV	K-AMV-P***, K-PSLV-P***, K-CMA-P***, N/A	FSC	10109044	10001346427	Gate	Hydraulic	AKSO	4
2-1/8" Valve	AWV, ASLV	K-AWV-P***, K-ASLV-P***	FSC	10108311	10001346427	Gate	Hydraulic	AKSO	2
2-1/8" Valve	GLV, SLV	K-GLV-P***, K-SLV-P***	FSC	10117136	10001346427	Gate	Hydraulic	AKSO	2
2-1/8" Valve	AV	N/A	RU	10191548 (Valve), 10080098 (Actuator)	10003023229	Plug	Hydraulic	AKSO	1
2-1/8" Valve	M3/4	N/A	NA	10180278	CG-MHN-22-3110-689032 (10002716964)	Gate	ROV	PV	1
2" Valve	CDV3	K-RCDA-P***	RU	10182869	CG-MHN-25-3100-960582 (10001958051)	Measuring/Threading Valve	Electric	Cameron	1
1" Valve	FSV1, FSV2	K-FSV1-P***, K-FSV2-P***	FSC	10191900	CG-MHN-22-3110-912049 (10003402655)	Gate	Hydraulic with ROV override	Cameron	2
3/4" Valve	CDV1, CDV2, CDV4	K-RCDC-P***, K-RCDS-P***, K-RCDD-P***	RU	10191740 (CDV1), 10039684 (CDV2), 10162546 (CDV4)	10002205925 / 10002205902 / 10002205987	Measuring/Threading Valve	Electric	Silo Flo	3
1/2" Valve	CV1, CV3	K-CVB-P***, K-CVD1-P***	FSC	10180527	CG-MHN-22-3110-186010 (10002197429)	Rotary Gate w/ Integral Check Valve	Hydraulic with ROV override	Sundley	2
1/2" Valve	CV2	K-CVD2-P***	FSC	10180526	CG-MHN-22-3110-186009 (10002197428)	Rotary Gate w/ Integral Check Valve	Hydraulic with ROV override	Sundley	1
1/2" Valve	SW	N/A	NA	10180525	CG-MHN-22-3110-186008 (10002197427)	Rotary Gate	ROV	Sundley	1
1/2" Valve	TCT1, TCV, TCV, MFV1, MFV2, TCT2	N/A	NA	10180524	CG-MHN-22-3110-186007 (10002197426)	Rotary Gate	ROV	Sundley	6
1/2" Valve	TH-IT, WSTV	N/A	NA	10180523	CG-MHN-22-3110-186006 (10002197425)	Rotary Gate	ROV	Sundley	2

Note: *** is well tagging (for example: PWV41)

Material Number: 10190844 (Master Valve Block), 10191552 (Production Wing Block), 10191586 (Annulus Wing Block), CG-MHN-22-3100-050017 (Rev. 01) 10001959536 (Rev. 02)

Reference GA Drawing:

PXMT GA	10002238674	AO-100-43-S001-000057	10216746
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TYPE 1B Glossy 3-D rendering quality like example

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 180 of 315

6.3.6 Production PVXT Valve torque list

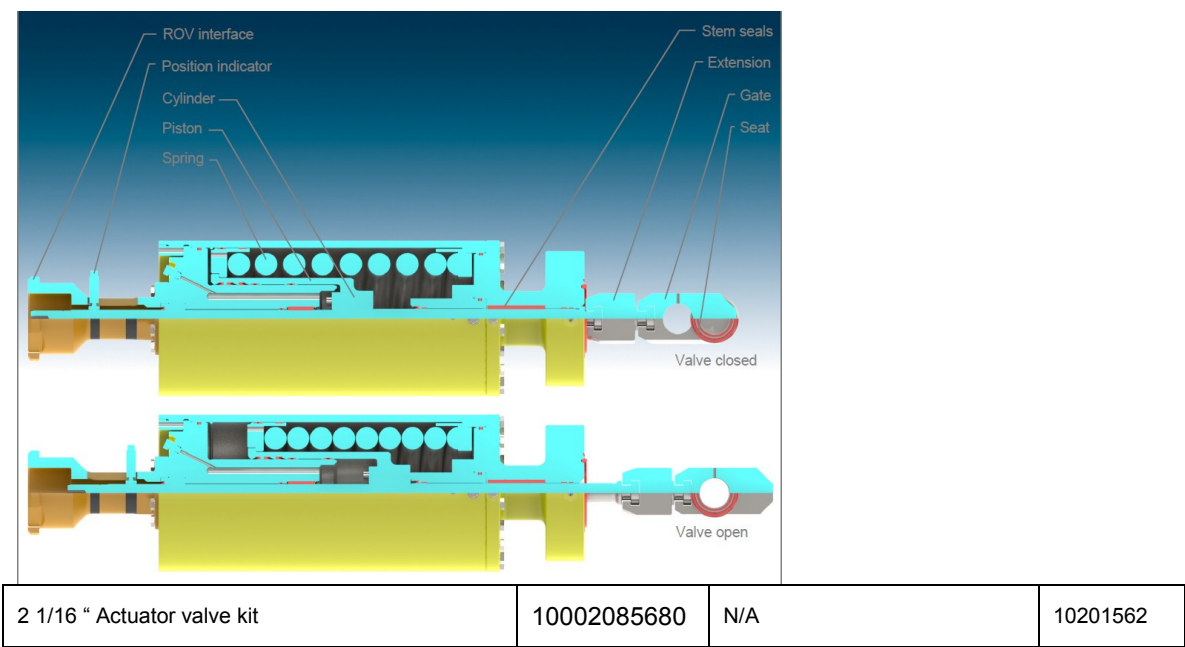
Item No	QTY PVXT	Valve Name	ROV ID	SAP Material Nc.	Normal Valve Size	Valve Type	Actuation	ROV Interface	ROV Tool	Running Torque (Nm)	Break Out Torque (Nm)	Max torque (Nm)	Damage Torque (Nm)	Closing direction (CW if clockwise or CCW if counter-clockwise)	Approx. number of turns to open or close
1	1	Crossover Valve	XOV	10201562	2-1/16"	Gate	HYDROV	ISO 15628-3 Linear Push Type "A"	LAOT & LOT	N/A	N/A	N/A	N/A	N/A	N/A
2	4	Amulus Master Valve	AMV	10201562	2-1/16"	Gate	HYDROV	ISO 15628-3 Linear Push Type "A"	LAOT & LOT	N/A	N/A	N/A	N/A	N/A	N/A
3	3	Amulus Swab Valve	ASV	10201562	2-1/16"	Gate	HYDROV	ISO 15628-3 Linear Push Type "A"	LAOT & LOT	N/A	N/A	N/A	N/A	N/A	N/A
4	4	Methanol Injection Valve	MIV	10201562	2-1/16"	Gate	HYDROV	ISO 15628-3 Linear Push Type "A"	LAOT & LOT	N/A	N/A	N/A	N/A	N/A	N/A
5	1	Amulus Isolation Valve - Lock Out	AMV-LO	10213560			HYDROV	ISO 15628-3 Linear Push Type "A"	LAOT & LOT	N/A	N/A	N/A	N/A	N/A	N/A
6		Production Master Valve	PMV	10218215	5-1/8"	Gate	HYDROV	ISO 15628-3 Linear Push Type "A"	LAOT & LOT	N/A	N/A	N/A	N/A	N/A	N/A
7	3	Production Swab Valve	PSV	10218215	5-1/8"	Gate	HYDROV	ISO 15628-3 Linear Push Type "A"	LAOT & LOT	N/A	N/A	N/A	N/A	N/A	N/A
8		Production Wing Valve	PWV	10218215	5-1/8"	Gate	HYDROV	ISO 15628-3 Linear Push Type "A"	LAOT & LOT	N/A	N/A	N/A	N/A	N/A	N/A
9		Amulus Wing Valve	AMV	10218148	2-1/16"	Gate	HYDROV	ISO 15628-3 Linear Push Type "A"	LAOT & LOT	N/A	N/A	N/A	N/A	N/A	N/A
10	2	Service Line Valve	SLV	10216148	2-1/16"	Gate	HYDROV	ISO 15628-3 Linear Push Type "A"	LAOT & LOT	N/A	N/A	N/A	N/A	N/A	N/A
11	1	Methanol Isolation Valve	MSV	10240127	2-1/16"	Gate	HYDROV	ISO 15628-3 Class 4	Class 4 Torque Tool	1250	1250	2711	3500	CW	4.2
12		Chemical Injection Valve A	CIVA	10243043	1/2"	Gate	HYDROV	ROV Manipulator	Paddle Tool	14	30	300	400	CW	10
13	4	Chemical Injection Valve B	CIVB	10243043	1/2"	Gate	HYDROV	ROV Manipulator	Paddle Tool	14	30	300	400	CW	10
14		Chemical Injection Valve C	CIVC	10243043	1/2"	Gate	HYDROV	ROV Manipulator	Paddle Tool	14	30	300	400	CW	10
15		Chemical Injection Valve D	CIVD	10243043	1/2"	Gate	HYDROV	ROV Manipulator	Paddle Tool	14	30	300	400	CW	10
16		Tubing Hanger - Space Test	TH-IT	10243045	1/2"	Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	1/4
17		Surface Controlled Subsurface Safety Valve - Open	SCSSV B	10243045	1/2"	Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	1/4
18		Surface Controlled Subsurface Safety Valve - Close	SCSSV O	10243045	1/2"	Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	1/4
19		Wellhead Seal Test Valve	WSTV	10243045	1/2"	Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	1/4
20	9	Tree Cap Vent	TCV	10243045	1/2"	Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	1/4
21		Tree Cap Crossover	TCX	10243045	1/2"	Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	1/4
22		Tubing Isolation Valve - Open	IMC 1	10243045	1/2"	Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	1/4
23		Tubing Isolation Valve - Close	IMC 2	10243045	1/2"	Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	1/4
24		Intelligent Well Completion - Close	IMC C	10243045	1/2"	Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	1/4
25		Tree Cap Test 1	TCT1	10243046	1/2"	Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	1/4
26	2	Tree Cap Test 2	TCT2	10243046	1/2"	Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	1/4
27		Flow Sampling Valve 1	FSV1	10243047	1"	Gate	ROV	ISO 15628-3 Class 4	Class 4 Torque Tool	180	180	270	350	CW	3.3
28	2	Flow Sampling Valve 2	FSV2	10243047	1"	Gate	ROV	ISO 15628-3 Class 4	Class 4 Torque Tool	180	180	270	350	CW	3.3

TYPE 3 Use as is (if possible)

VALVE TORQUE LIST	10003313257	AO-100-40-S001-002601	10216746
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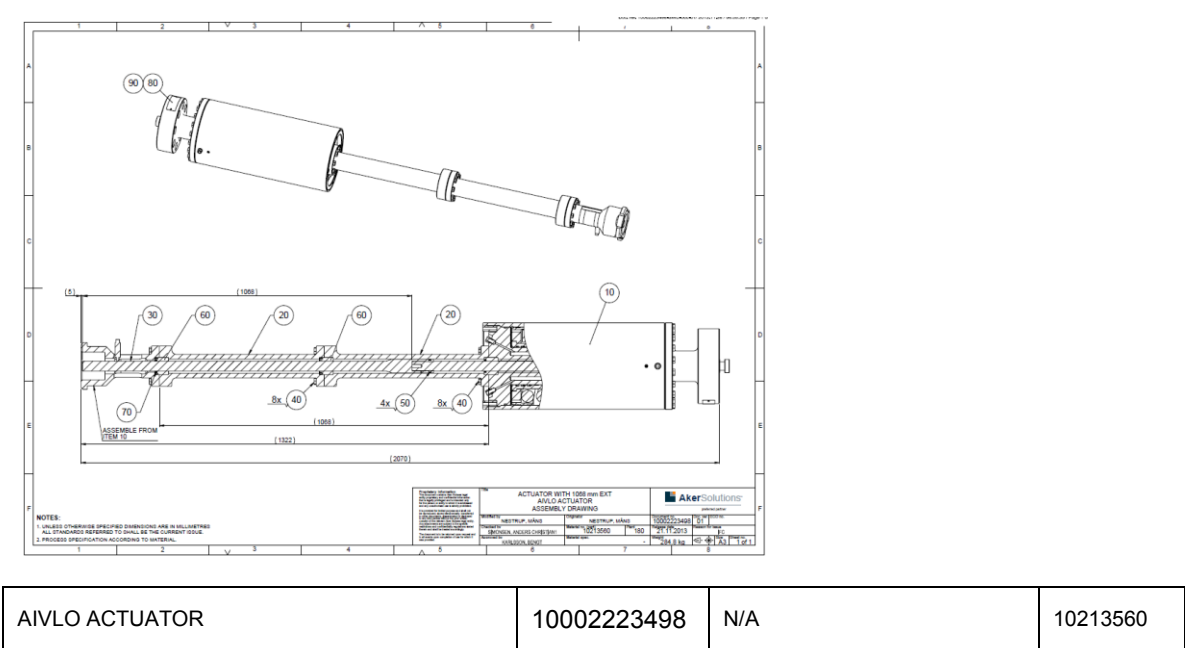
SPS HANDBOOK TABLE OF CONTENT	Document:	10002504361-PDC-000
	Version:	05 - Re-issued Constr
	Issue date:	2017.11.17
	Page:	181 of 315
BLOCK 32 - KAOMBO SPS		

6.3.6.1 Valve cross section 2 1/16” actuator valve



TYPE 5 Drawing as is + colouring

6.3.6.2 Valve cross section AIVLO ACTUATOR



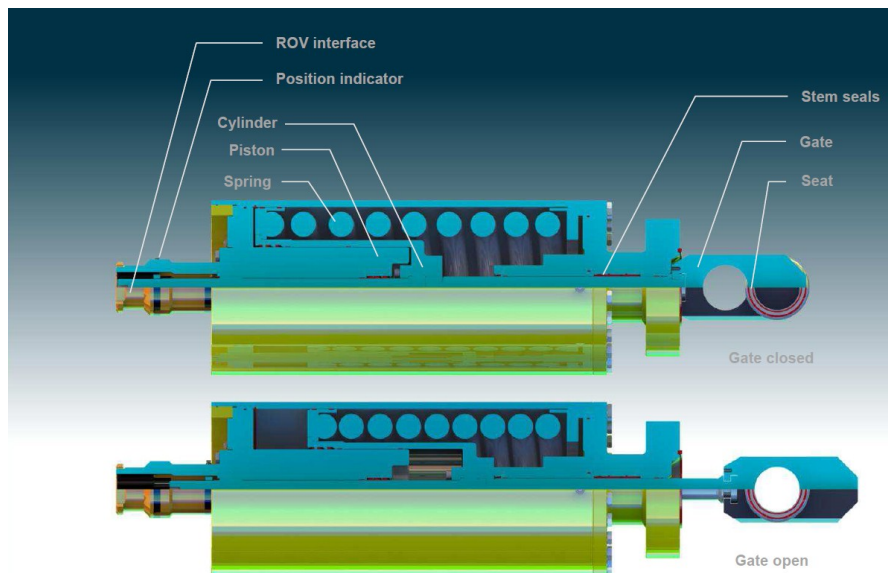
TYPE 5 Drawing as is + colouring

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

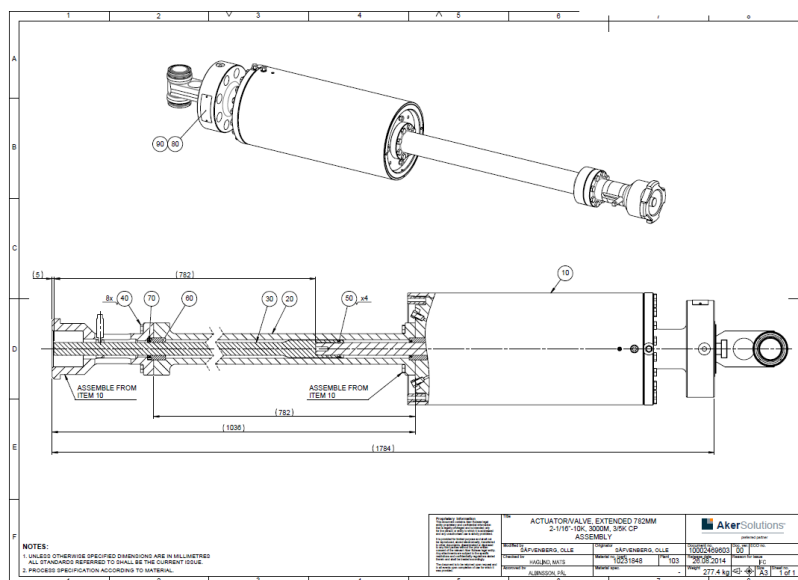
Document: 10002504361-PDC-000
 Version: 05 - Re-issued Constr
 Issue date: 2017.11.17
 Page: 182 of 315

6.3.6.3 Valve cross section 5 1/8" Gate valve



5 1/8" Gate valve	10002667112	N/A	10219215
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6.3.6.4 Valve cross section 2-1/16" – 10k Actuator valve

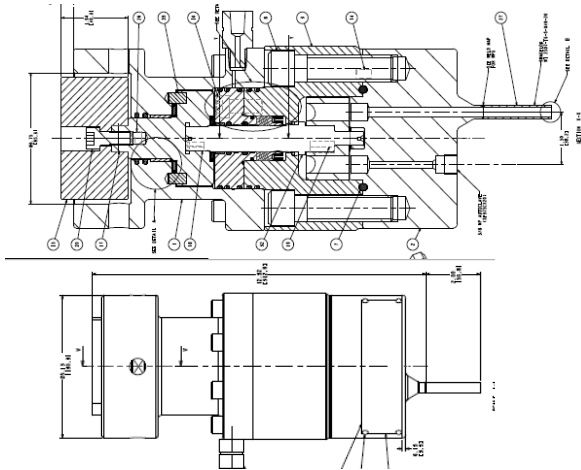


2-1/16" – 10k Actuator valve	10002469603	N/A	10231848
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TYPE 3 Use as is (if possible)

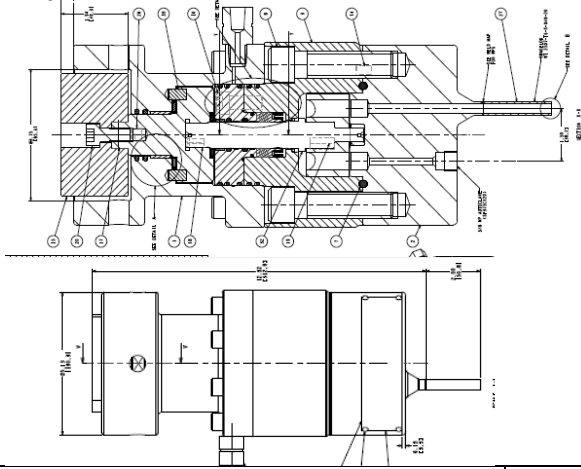
SPS HANDBOOK TABLE OF CONTENT	Document:	10002504361-PDC-000
	Version:	05 - Re-issued Constr
	Issue date:	2017.11.17
	Page:	184 of 315
BLOCK 32 - KAOMBO SPS		

6.3.6.7 Valve cross section 1/2" Rotary gate



1/2" Rotary gate valve	10002860077	AO-100-40-S104-000058	10243045
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Valve cross section 1/2" Rotary gate

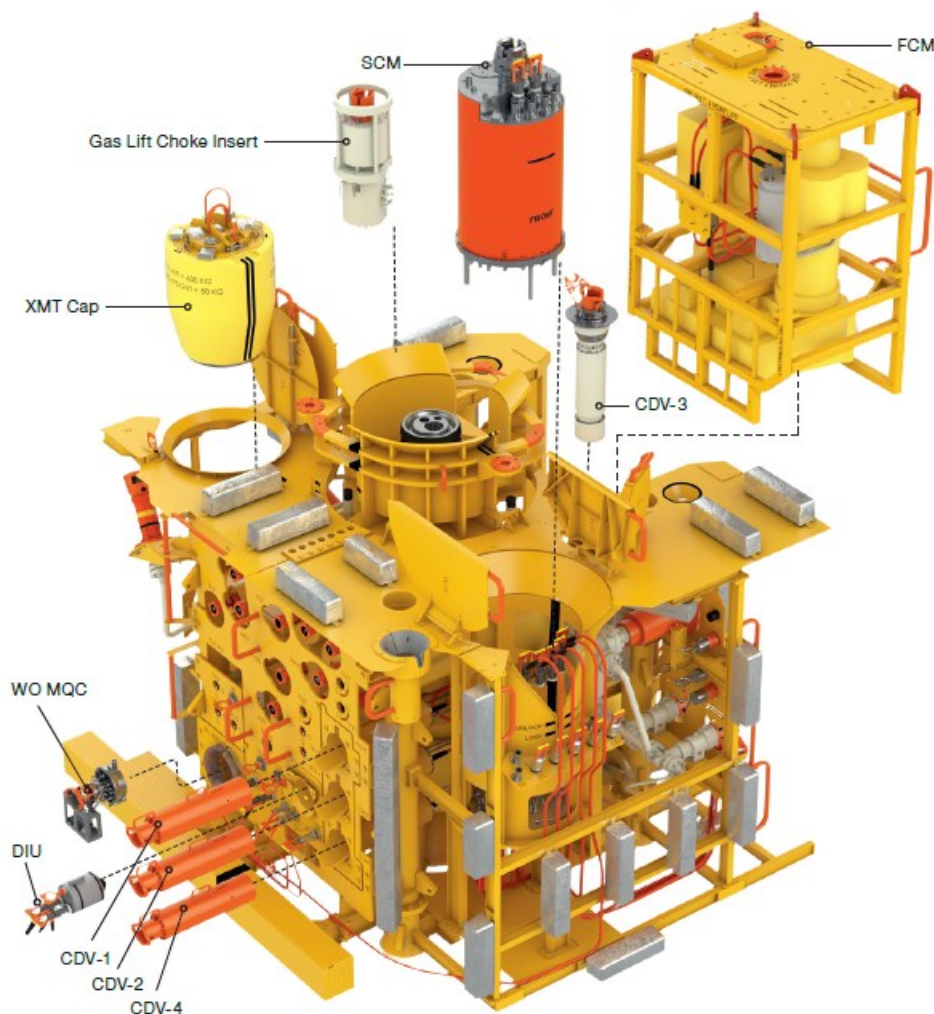


1/2" Rotary gate valve	10002908065	AO-100-40-S104-000117	10243046
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TYPE 3 Use as is (if possible)

6.3.7 Production PVXT Retrievable Components ISO overview

X-vision to create illustration



Retrievable Components				Tools	
Description	Material Number	Est. Weight in Air	Est. Weight in Water	Description	Material Number
Flow Control Module (FCM)	10191325	6500 kg	4600 kg	FCM RT	10193719
CDV-1 (SkoFlo LF CDV)	10197181	110 kg	93 kg	Torque Tool Cl. 4	10193775
CDV-2 (SkoFlo Dummy CDV)	10039684	80 kg	68 kg	Torque Tool Cl. 4	10193775
CDV-3 (Cameron HF CDV)	10182869	330 kg	250 kg	Torque Tool Cl. 4	10193775
CDV-4 (SkoFlo LF CDV)	10162546	72 kg	61 kg	Torque Tool Cl. 4	10193775
Subsea Control Module (SCM)	10189793	2136 kg	1816 kg	SCM RT	10193761
Gas Lift Choke Insert	10183526	335 kg	285 kg	Choke Insert RT	10193721
XMT Cap	10208876	598 kg	50 kg	N/A	N/A
DIU	10189835	70 kg	61 kg	N/A	N/A
WO MQC	10202387	71 kg	61 kg	Torque Tool Cl. 4	10193775

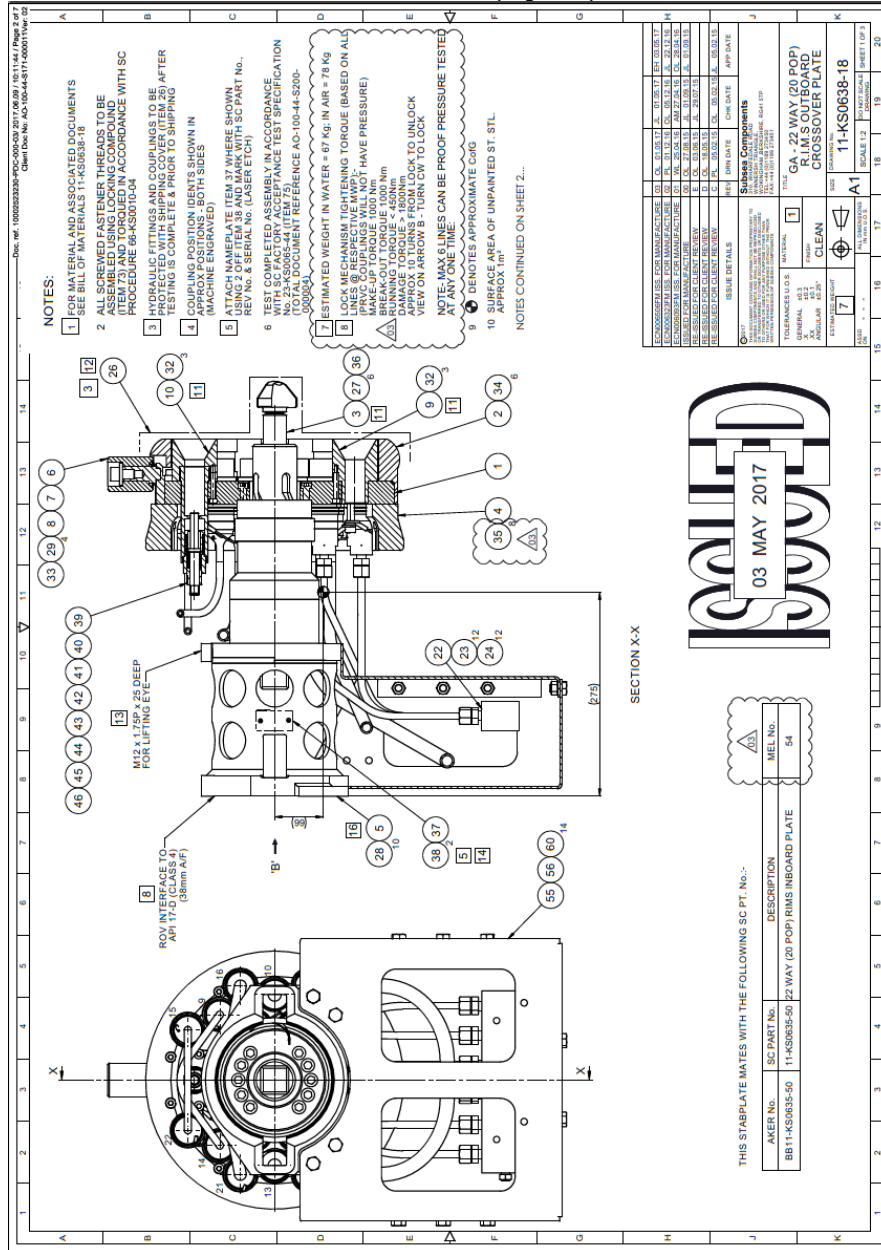
TYPE 1B Glossy 3-D rendering quality like example

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 188 of 315

OUTBOARD X-OVER PLATE RIMS Maintain page as per CPY email.



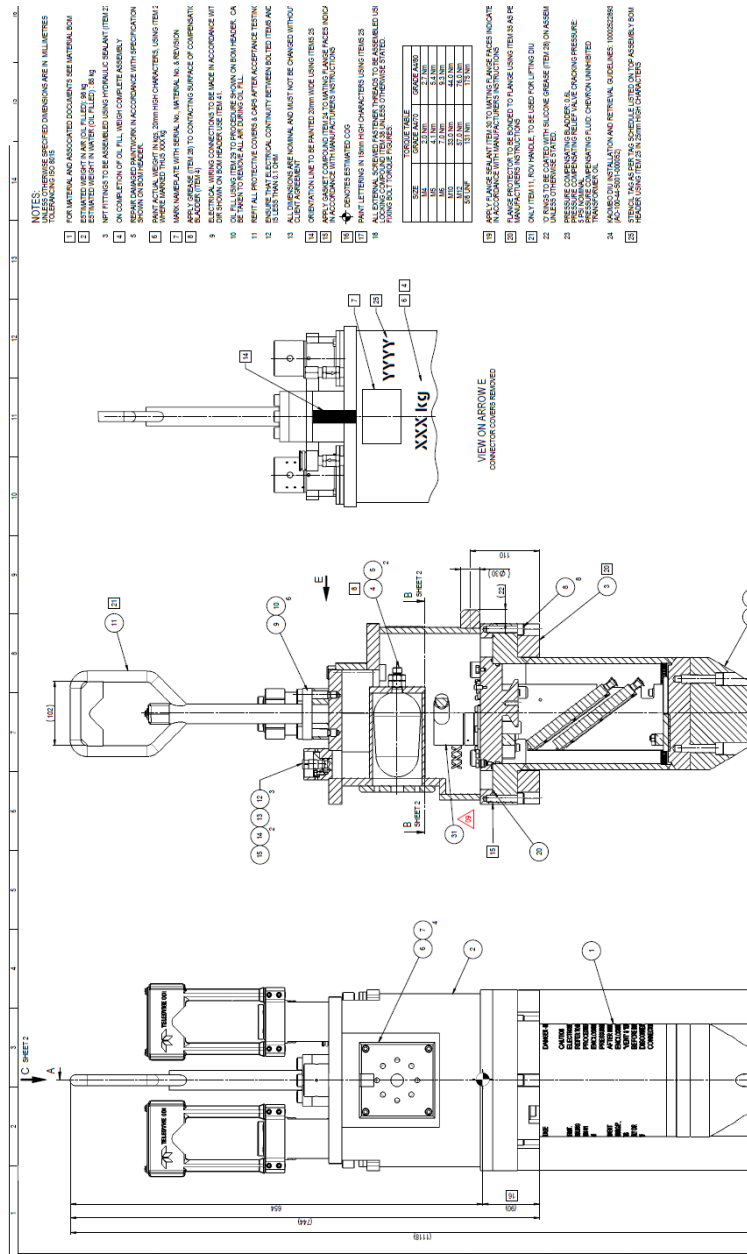
GA – 22 WAY RIMS OUTBOARD CROSSOVER PLATE	10002523230	AO-100-44-S171-000011	BB11-KS0638-18
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TYPE 3 Use as is (if possible)

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 190 of 315

6.3.7.3 DIU Maintain page as per CPY email.



DIU GA	10002522891	AO-100-44-S001-000050	10232299
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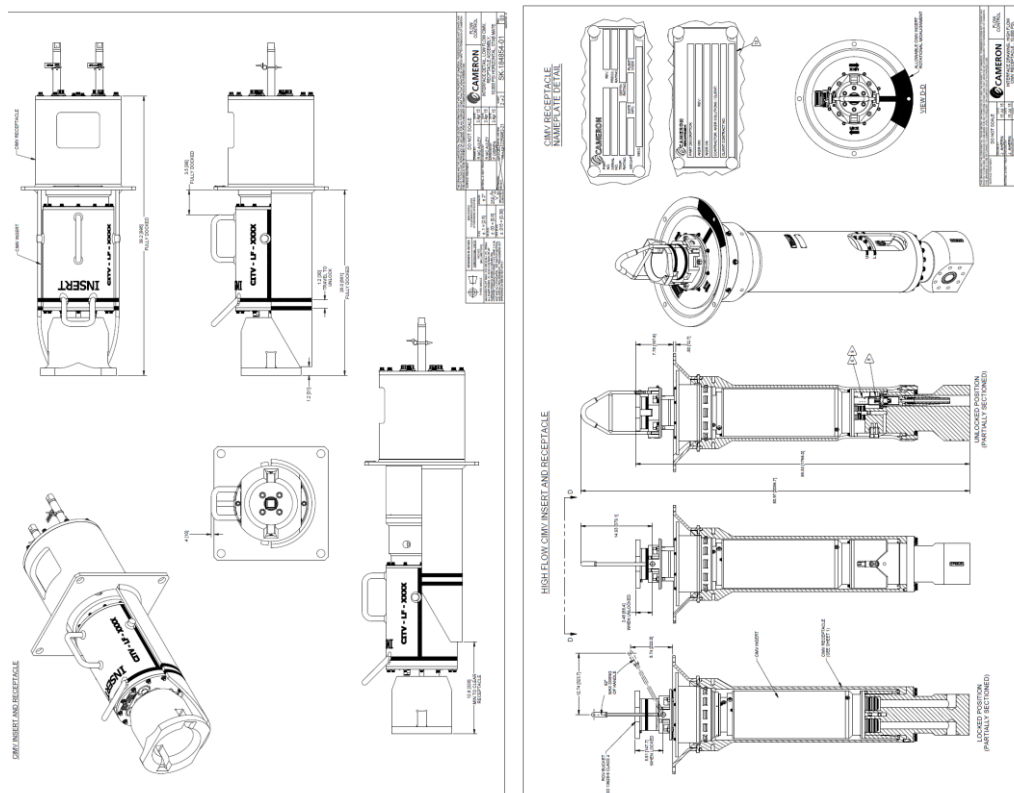
TYPE 3 Use as is (if possible)

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 192 of 315

6.3.7.5 CITV LF & CITV HF



CITV LF GA / Interface Drawing	10002829755	AO-100-44-S184-000011	10234014
CITV HF GA / Interface Drawing	10002522864	AO-100-44-S184-000002	10234113

TYPE 5 Drawing as is + colouring

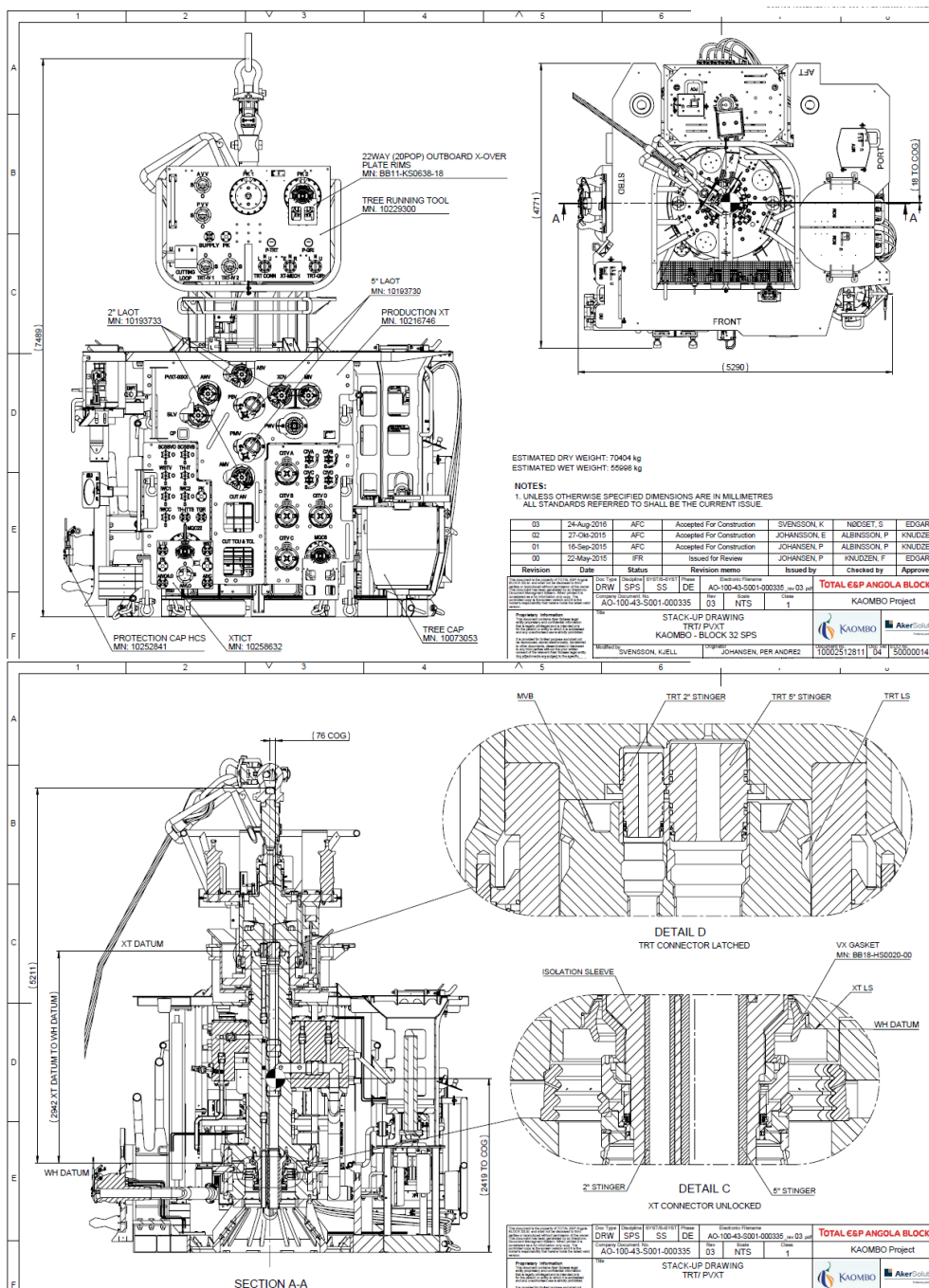
SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 193 of 315

6.3.8 PVXT STACK-UP

6.3.8.1 TRT & VXT



STACK-UP DRAWING TRT/ PVXT

10002512811

AO-100-43-S001-000335

10216746
10229300
10249252

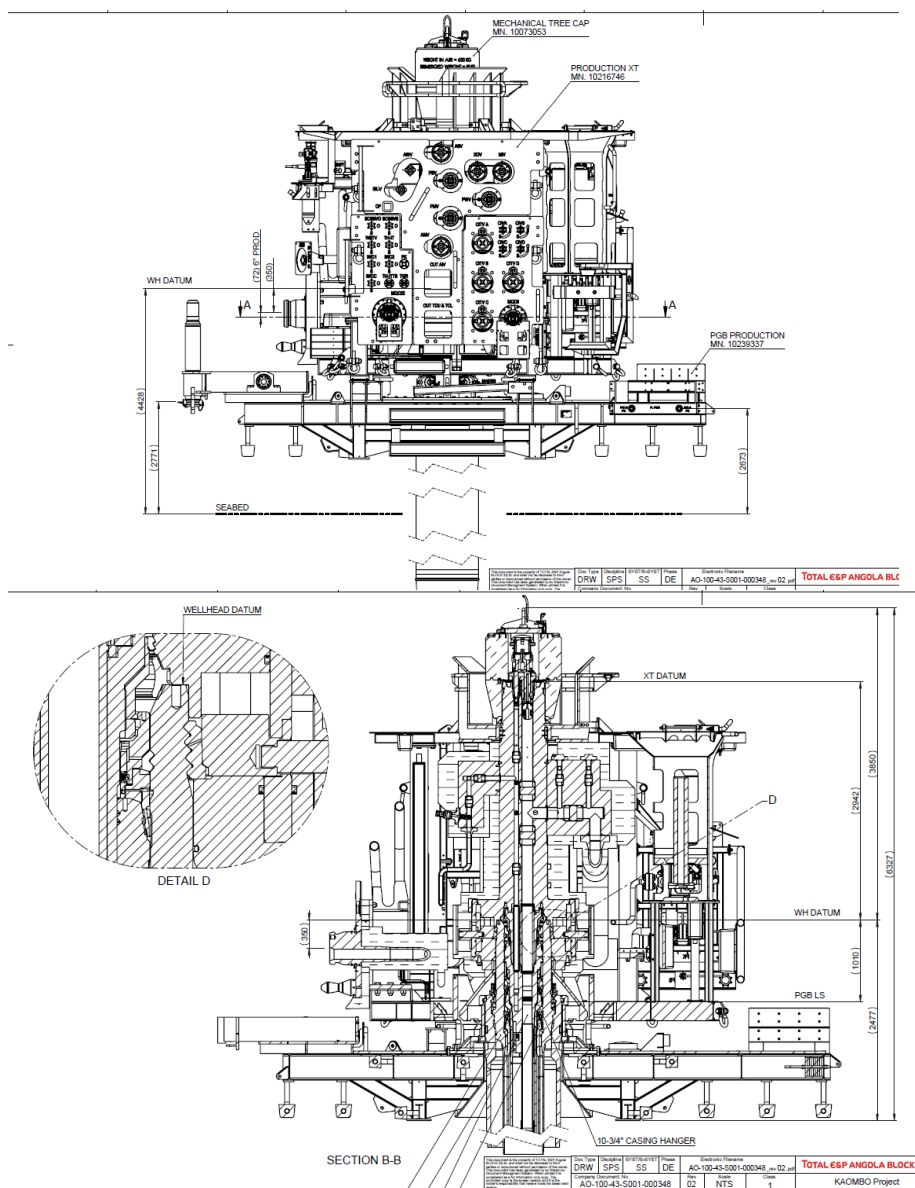
TYPE 3 Use as is (if possible)

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
 Version: 05 - Re-issued Constr
 Issue date: 2017.11.17
 Page: 194 of 315

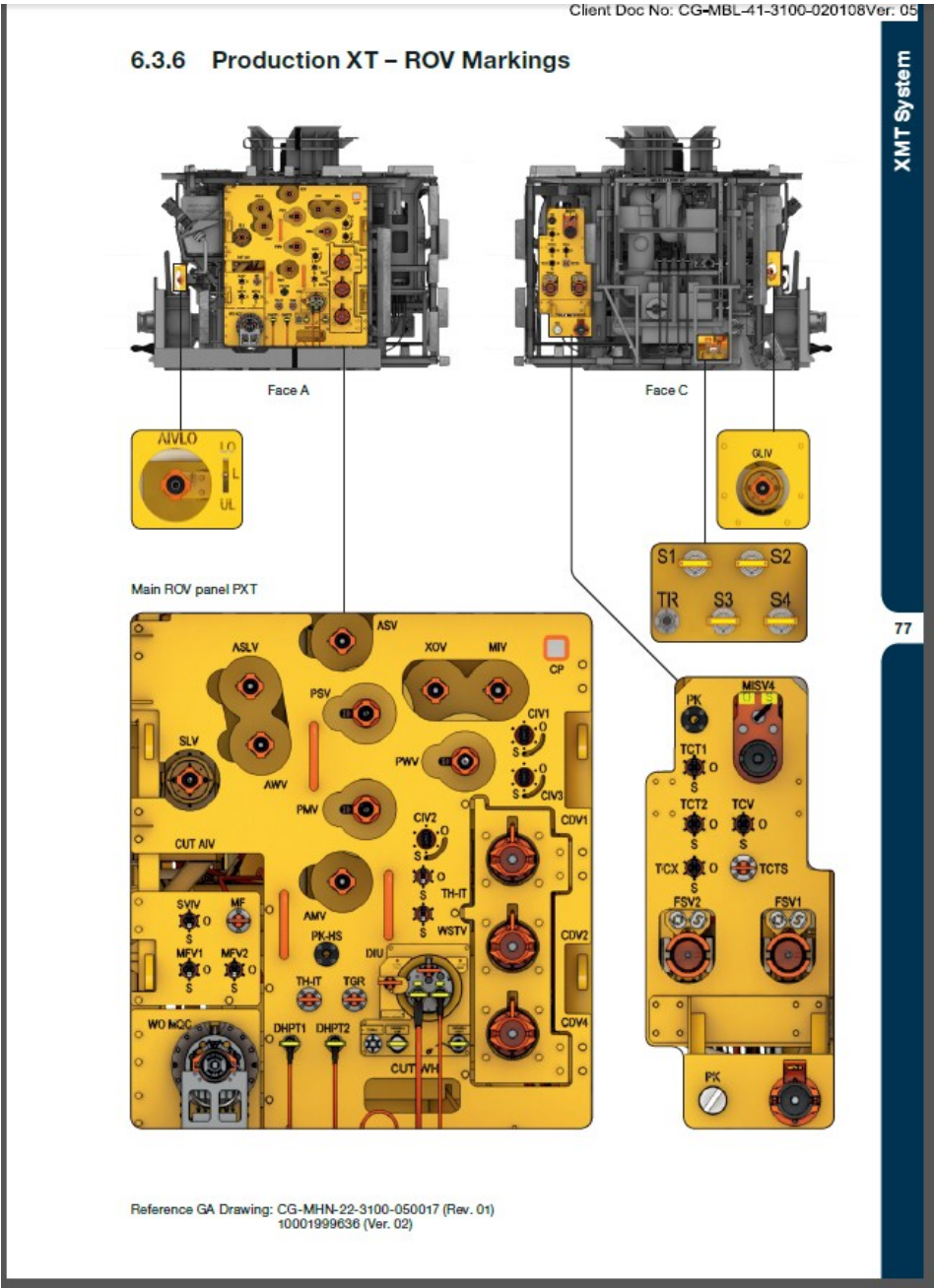
6.3.8.2 TH/WH/PGB/TREE CAP



STACK-UP DRAWING, PVXT	10002512824	AO-100-43-S001-000348	10073053 10216746 10216771 10239337
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TYPE 3 Use as is (if possible)

6.4.4 WI VXT ROV Panel & Markings



WI XMT GA	10002238677	AO-100-43-S001-000058	10216748 10249252
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TYPE 1B Glossy 3-D rendering quality like example

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 199 of 315

6.4.5 WI VXT Valves

Doc. ref. 1000194/4804-PDC-000-05/ 2016.02.18 / 11:00:55 / Page 89 of 220
Client Doc No: CG-MBL-41-3100-020108Ver: 05

6.3.5 Production XT Valves

76

Description	Functional Use / ROW Marking	Sub Tag (HIS)	Fail Safe	Material Number	Valve Data Sheet	Valve Type	Actuation	Supplier	Qty for VXT
Production XMT									
5-1/8" Valve	PMV, PMV, PSV	K-PMV-P***, K-PMV-P***	FSC	10116148	10001346450	Gate	Hydraulic	AKSO	3
2-1/16" Valve	AMV, XOV, MV, ASV	K-AMV-P***, K-PSLV-P***, K-CVA-P***, N/A	FSC	10199044	10001346427	Gate	Hydraulic	AKSO	4
2-1/16" Valve	AWV, ASLV	K-AWV-P***, K-ASLV-P***	FSC	10198311	10001346427	Gate	Hydraulic	AKSO	2
2-1/16" Valve	GLV, SLV	K-GLV-P***, K-SLV-P***	FSC	10117136	10001346427	Gate	Hydraulic	AKSO	2
2-1/16" Valve	AM	N/A	RAI	10191548 (Valve), 10080098 (Actuator)	10003023229	Plug	Hydraulic	AKSO	1
2-1/16" Valve	MSD4	N/A	NA	10180278	CG-MHN-25-3110-689032 (10002716964)	Gate	ROV	PV	1
2" Valve	CDV3	K-RCDD-P***	RAI	10182969	CG-MHN-25-3100-060262 (10001959051)	Mixing/Throttling Valve	Electric	Cameron	1
1" Valve	FSV1, FSV2	K-FSV1-P***, K-FSV2-P***	FSC	10191900	CG-MHN-25-3110-912049 (10002410655)	Gate	Hydraulic with ROV override	Cameron	2
3/4" Valve	CDV1, CDV2, CDV4	K-RCDD-P***, K-RCDD-P***, K-RCDD-P***	RAI	10197181 (CDV1), 10039684 (CDV2), 10182546 (CDV4)	10002205825 / 10002205902 / 10002205987	Mixing/Throttling Valve	Electric	Silo Flo	3
1/2" Valve	CV1, CV3	K-CVB-P***, K-CVD1-P***	FSC	10180527	CG-MHN-25-3110-186010 (10002197428)	Rotary Gate w/ Integral Check Valve	Hydraulic with ROV override	Bentley	2
1/2" Valve	CV2	K-CVD2-P***	FSC	10180526	CG-MHN-25-3110-186009 (10002197428)	Rotary Gate w/ Integral Check Valve	Hydraulic with ROV override	Bentley	1
1/2" Valve	SWV	N/A	NA	10180525	CG-MHN-25-3110-186008 (10002197427)	Rotary Gate	ROV	Bentley	1
1/2" Valve	TCT1, TCT, TCV, MPV1, MPV2, TCT2	N/A	NA	10180524	CG-MHN-25-3110-186007 (10002197428)	Rotary Gate	ROV	Bentley	6
1/2" Valve	TH-IT, WSTV	N/A	NA	10180523	CG-MHN-25-3110-186006 (10002197428)	Rotary Gate	ROV	Bentley	2

Note: *** is well tagging (for example: PMV-41)

Material Number: 10199044 (Master Valve Block), 10191552 (Production Wing Block), 10191586 (Annulus Wing Block), CG-MHN-25-3100-050017 (Flow. 01) 1000199038 (Ver. 02)

Reference GA Drawing:

WI XMT GA	10002238677	AO-100-43-S001-000058	10216748 10249252
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TYPE 1B Glossy 3-D rendering quality like example

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 200 of 315

6.4.6 WI VXT Valve torque list

MISV
CIV a,b,c,d
IWC 1,2
IWC C

Item No	QTY WXMt	Valve Name	ROV ID	S&P Material Nr.	Nominal Valve Size	Valve Type	Actuation	ROV Interface	ROV Tool	Running Torque (Nm)	Break Out Torque (Nm)	Max Torque (Nm)	Damage Torque (Nm)	Closing direction (CW / CCW or Clockwise or Counter-clockwise)	Approx. number of Turns to Open or Close
1		Crossover Valve	XOV	10201562	2-1/16"	Gate	HYDROV	ISO 13628-8 Linear Push Type 'A'	LAOT & LOT	N/A	N/A	N/A	N/A	N/A	N/A
2	3	Annulus Master Valve	AMV	10201562	2-1/16"	Gate	HYDROV	ISO 13628-8 Linear Push Type 'A'	LAOT & LOT	N/A	N/A	N/A	N/A	N/A	N/A
3		Annulus Swab Valve	ASV	10201562	2-1/16"	Gate	HYDROV	ISO 13628-8 Linear Push Type 'A'	LAOT & LOT	N/A	N/A	N/A	N/A	N/A	N/A
4	1	Annulus Injection Valve - Lock Out	AM LO	10213560	N/A	N/A	HYDROV	ISO 13628-8 Linear Push Type 'A'	LAOT & LOT	N/A	N/A	N/A	N/A	N/A	N/A
5		Injection Master Valve	IMV	10219215	5-1/8"	Gate	HYDROV	ISO 13628-8 Linear Push Type 'A'	LAOT & LOT	N/A	N/A	N/A	N/A	N/A	N/A
6	3	Injection Wing Valve	IWV	10219215	5-1/8"	Gate	HYDROV	ISO 13628-8 Linear Push Type 'A'	LAOT & LOT	N/A	N/A	N/A	N/A	N/A	N/A
7		Injection Swab Valve	ISV	10219215	5-1/8"	Gate	HYDROV	ISO 13628-8 Linear Push Type 'A'	LAOT & LOT	N/A	N/A	N/A	N/A	N/A	N/A
8	2	Annulus Wing Valve	AWV	10231848	2-1/16"	Gate	HYDROV	ISO 13628-8 Linear Push Type 'A'	LAOT & LOT	N/A	N/A	N/A	N/A	N/A	N/A
9		Service Line Valve	SLV	10231848	2-1/16"	Gate	HYDROV	ISO 13628-8 Linear Push Type 'A'	LAOT & LOT	N/A	N/A	N/A	N/A	N/A	N/A
10		Tubing Isolation Valve - Open	IWC 1	10243045	1/2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
11		Tubing Isolation Valve - Close	IWC 2	10243045	1/2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
12		Intelligent Well Completion - Close	IWC C	10243045	1/2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
13		Tubing Hanger - Space Test	TH JT	10243045	1/2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
14	9	Surface Controlled Subsurface Safety Valve - Balance	SCSSV B	10243045	1/2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
15		Surface Controlled Subsurface Safety Valve - Open	SCSSV O	10243045	1/2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
16		Wellhead Seal Test Valve	WSTV	10243045	1/2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
17		Tree Cap Vent	TCV	10243045	1/2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
18		Tree Cap Crossover	TCK	10243045	1/2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
19	2	Tree Cap Test 1	TC1H	10243046	1/2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
20		Tree Cap Test 2	TC1T	10243046	1/2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14

VALVE TORQUE LIST

10003313257

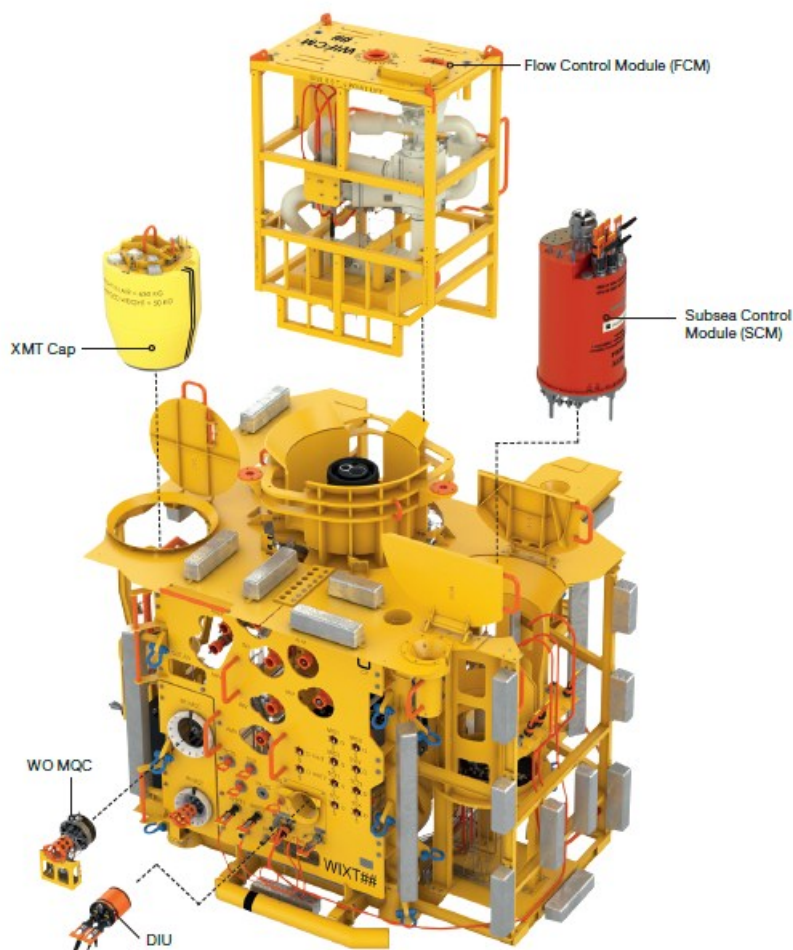
AO-100-40-S001-002601

10216748
10249252

TYPE 3 Use as is (if possible)

6.4.7 WI VXT Retrievable Components

X-vision to create illustration



Retrievable Components				Tools	
Description	Material Number	Est. Weight in Air	Est. Weight in Water	Description	Material Number
Flow Control Module (FCM)	10191326	5400 kg	4700 kg	FCM RT	10193719
Subsea Control Module (SCM)	10189793	2136 kg	1816 kg	SCM RT	10193761
XMT Cap	10208876	598 kg	50 kg	N/A	N/A
	10189835	70 kg	61 kg	N/A	N/A
WO MQC	10202387	71 kg	61 kg	Torque Tool Cl. 4	10193775

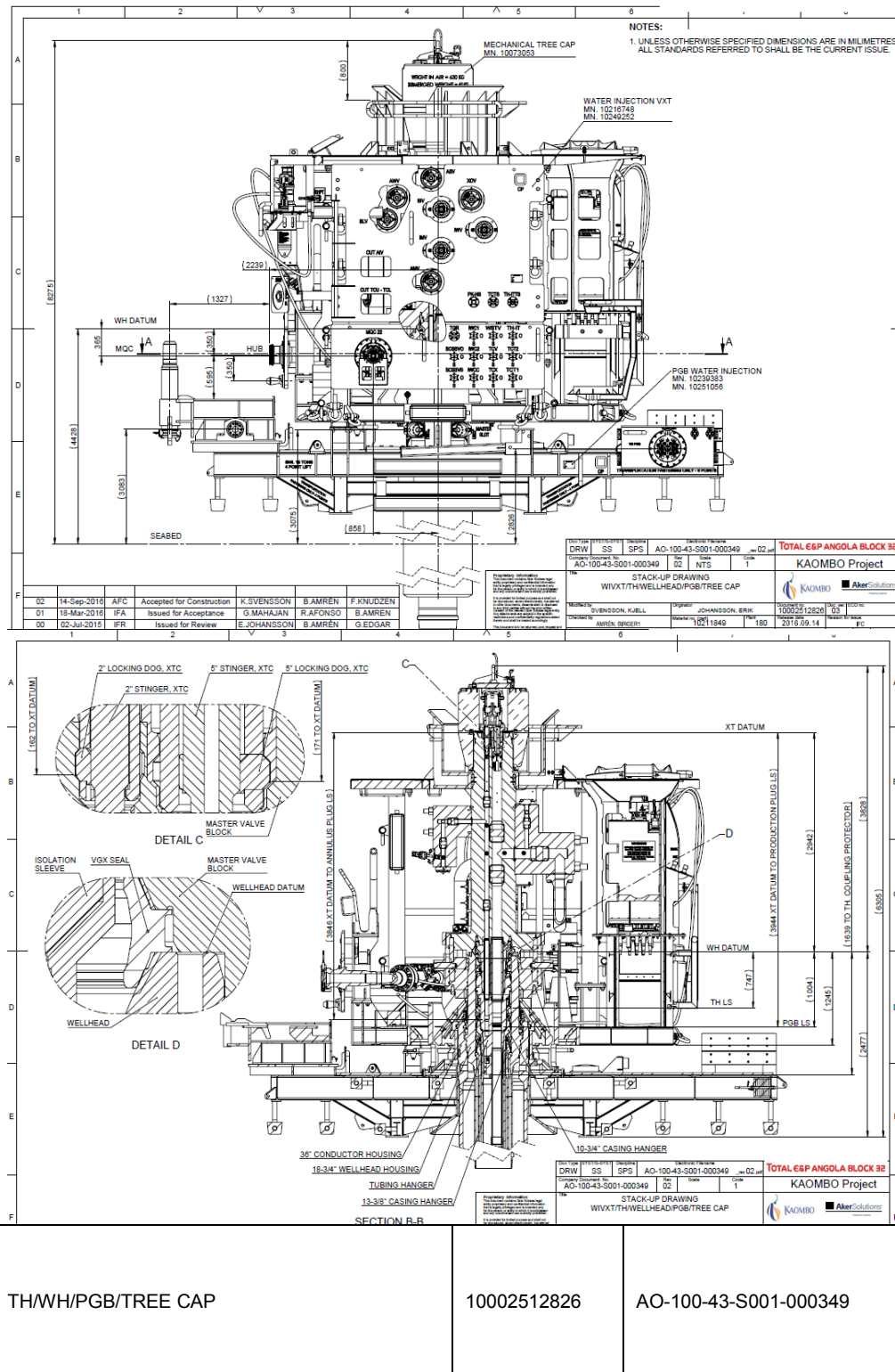
TYPE 1B Glossy 3-D rendering quality like example

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 203 of 315

6.4.8.2 TH/WH/PGB/TREE CAP



TYPE 3 Use as is (if possible)

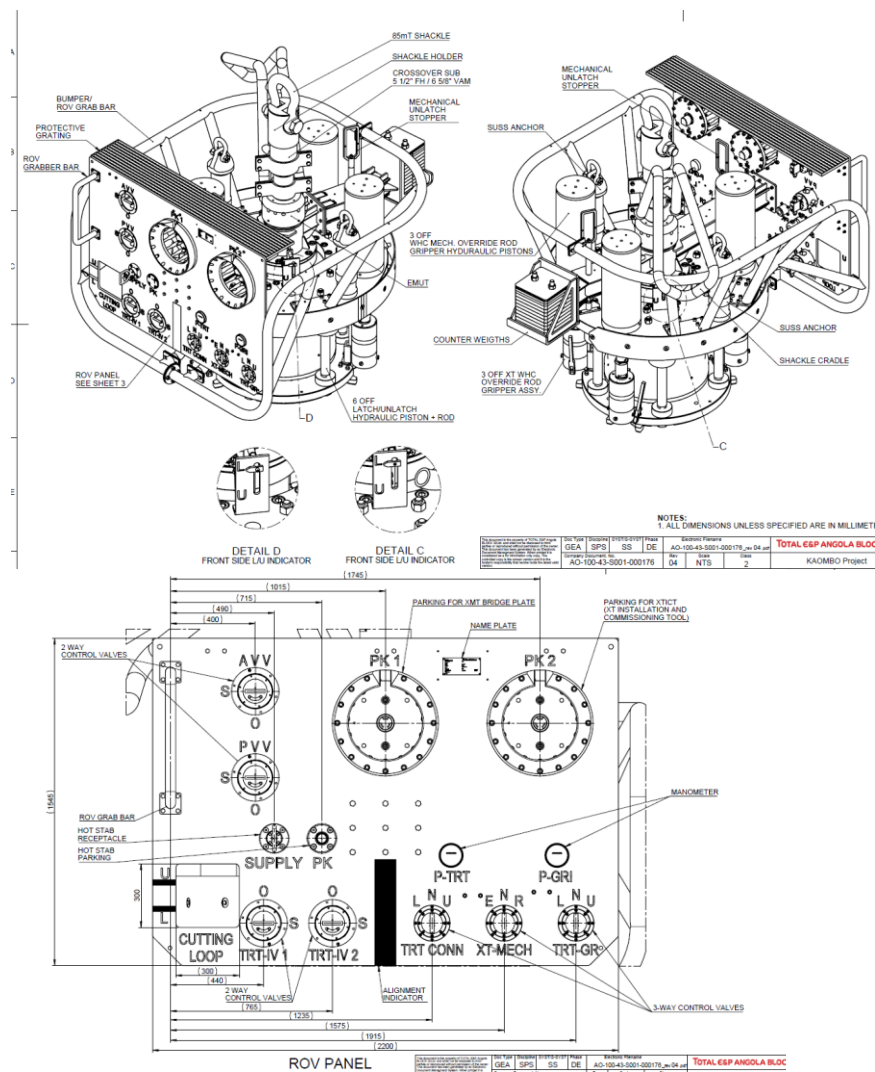
SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 204 of 315

6.5 VXT tooling

6.5.1 Tree Running Tool (TRT)



TRT	10002512558	AO-100-43-S001-000176	10229300
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TYPE 1A Glossy 3-D rendering quality + drawing as is

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
 Version: 05 - Re-issued Constr
 Issue date: 2017.11.17
 Page: 206 of 315

6.5.1.2 TRT Valve torque list

Item No	QTY VTRT	Valve Name	ROV ID	SAP Material Nr.	Nominal Valve Size	Valve Type	Actuation	ROV Interface	ROV Tool	Running Torque (Nm)	Break Out Torque (Nm)	Max torque (Nm)	Damage Torque (Nm)	Closing direction (CW/CCW/ Clockwise or counter-clockwise)	Approx. number of Turns to Open or Close
1		Annulus Vent Valve	AVV	10025835	3/8"	2-Way Ball	ROV	ROV Manipulator	Paddle Tool	20	30	100	160	CW	1/4
2	4	Production Vent Valve	PVV	10025835	3/8"	2-Way Ball	ROV	ROV Manipulator	Paddle Tool	20	30	100	160	CW	1/4
3		Connector Pressure Isolation Valve 1	TRT-IV 1	10025835	3/8"	2-Way Ball	ROV	ROV Manipulator	Paddle Tool	20	30	100	160	CW	1/4
4		Connector Pressure Isolation Valve 2	TRT-IV 2	10025835	3/8"	2-Way Ball	ROV	ROV Manipulator	Paddle Tool	20	30	100	160	CW	1/4
		Valve Name	ROV ID	SAP Material Nr.	Nominal Valve Size	Valve Type	Actuation	ROV Interface	ROV Tool	Running torque centre - right/left (Nm)	Running torque right/left-centre (Nm)		CCW position	Centre position	CV position
5		Tree Running Tool Connector Lock / Unlatch Valve	TRT CONN	10022914	3/8"	3-way control valve	ROV	ROV Manipulator	Paddle Tool	25	15	N/A	Latch	Neutral	Unlatch
6	3	XT secondary Unlatch Cylinder Extend / Retract	XT MECH	10022914	3/8"	3-way control valve	ROV	ROV Manipulator	Paddle Tool	25	15	N/A	Engage	Neutral	Retract
7		XT secondary Unlatch - Gripper Lock / Unlatch Valve	TRT GR	10022914	3/8"	3-way control valve	ROV	ROV Manipulator	Paddle Tool	25	15	N/A	Latch	Neutral	Unlatch

VALVE TORQUE LIST	10003313257	AO-100-40-S001-002601	10229300
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SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document:	10002504361-PDC-000
Version:	05 - Re-issued Constr
Issue date:	2017.11.17
Page:	208 of 315

7 WORKOVER SYSTEM

7.1 Reference list

Same set-up as MOHO

(For this section we might need two pages)

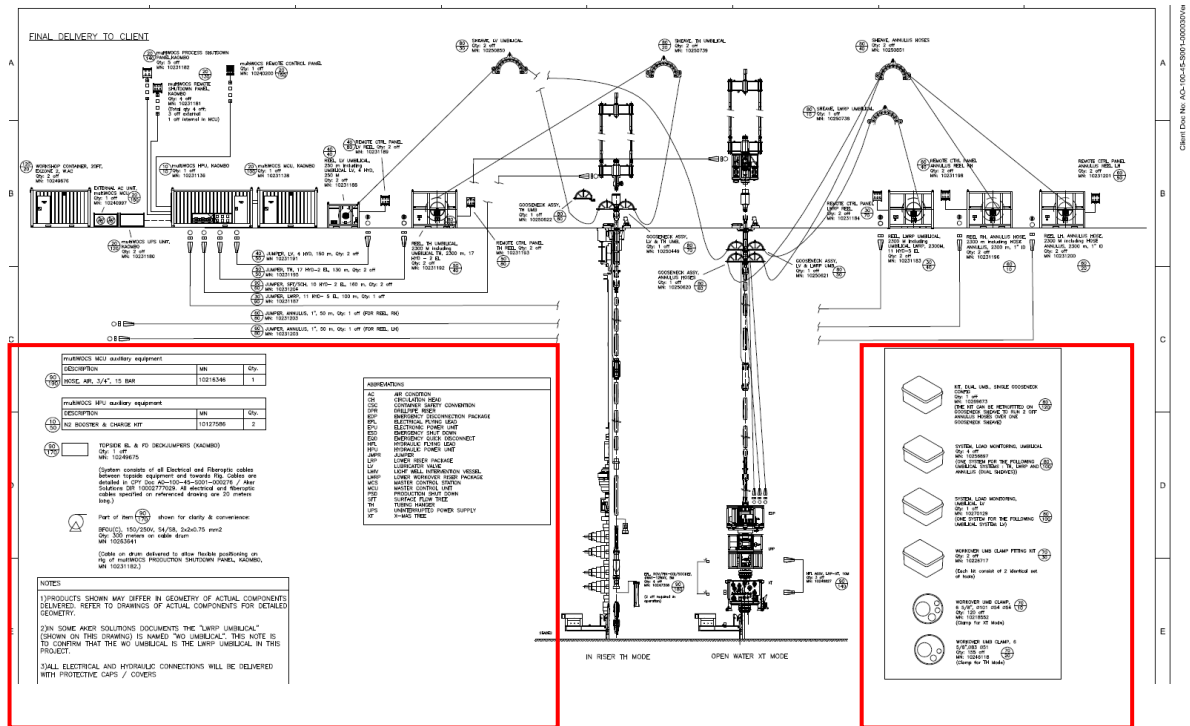
SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 209 of 315

7.2 Workover Scope of supply

Remove tables in red boxes in drawing and replace with table below.



EQUIPMENT LAYOUT Workover System	10002176858	AO-100-45-S001-000001	N/A
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Implement table below in drawing above.

Material number	Equipment	Length[mm]	Width[mm]	Height[mm]	Approx. Gross Weight [kg]
10231138	WOCS MCU Container	6096	2648	3055	15,000
10231136	WOCS HPU Container	6176	2648	3215	21,400
10240997	External AC Unit	1800	2000	1850	1,700
10249676	Workshop Container	6058	2438	3000	5,900 excl. payload
10231188	LV Reeler	2640	2400	2375	4,800
10231192	TH Reeler	4187	5110	4206	34,000
10231196	Annulus Reeler	4140	3850	3865	21,000
10231183	LWRP Reeler	4527	6510	4206	43,500

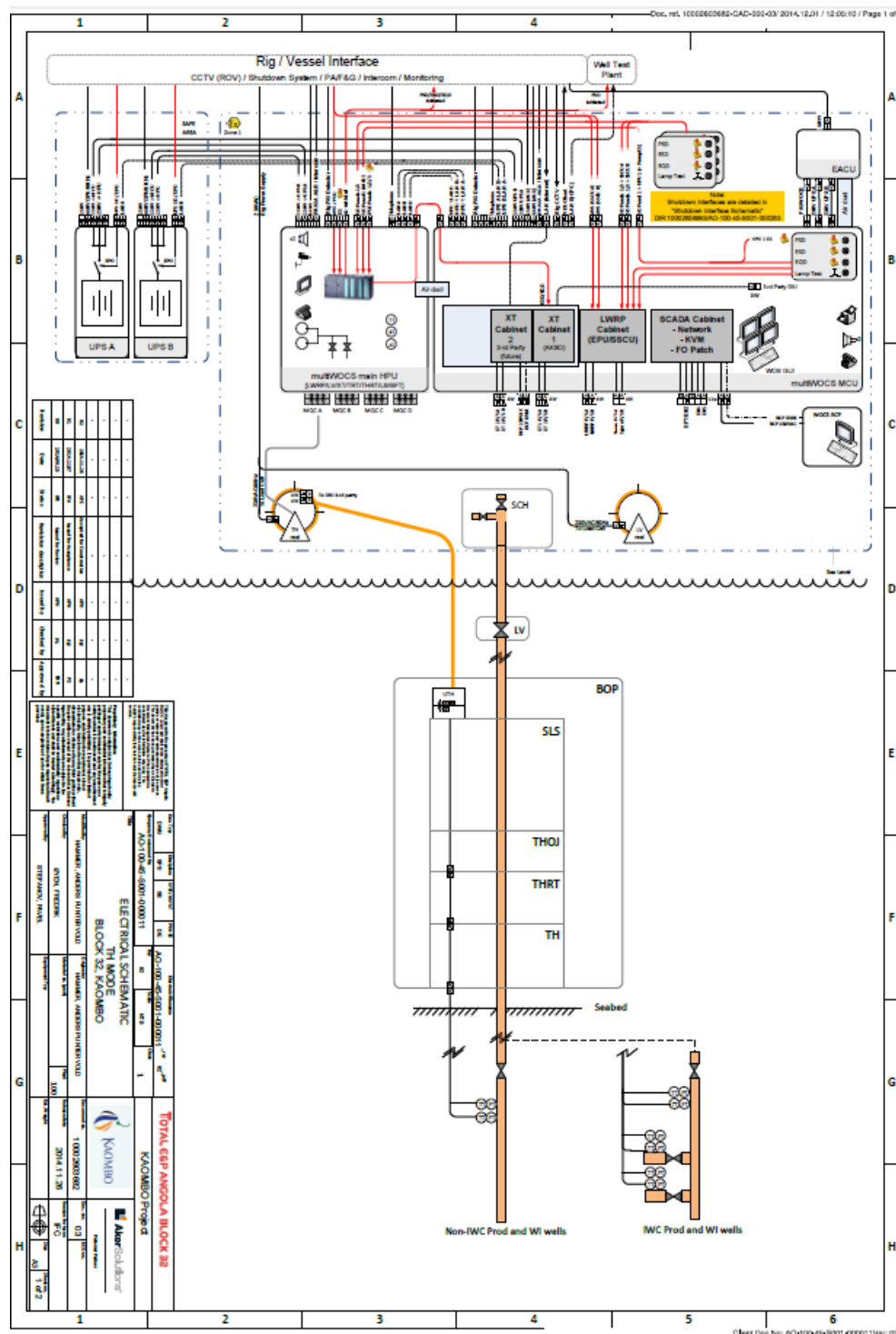
TYPE 3 Use as is (if possible)

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 211 of 315

7.3.2 TH Mode Electric schematic

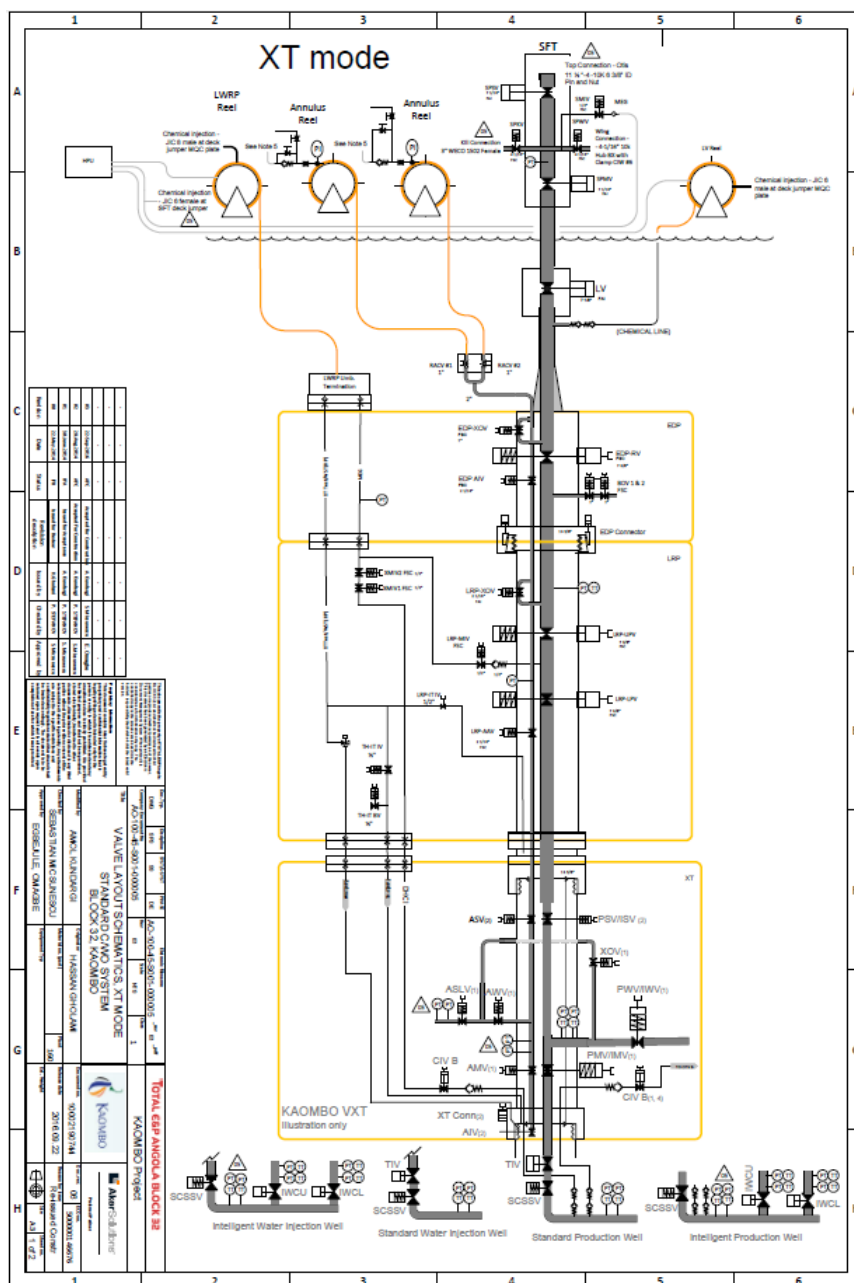


Electric schematic TH mode	10002603682	AO-100-45-S001-000011	N/A
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TYPE 3 Use as is (if possible)

7.4 Workover XT Mode

7.4.1 Valve layout XT mode



Valve layout XT mode

10002190744

AO-100-45-S001-000005

N/A

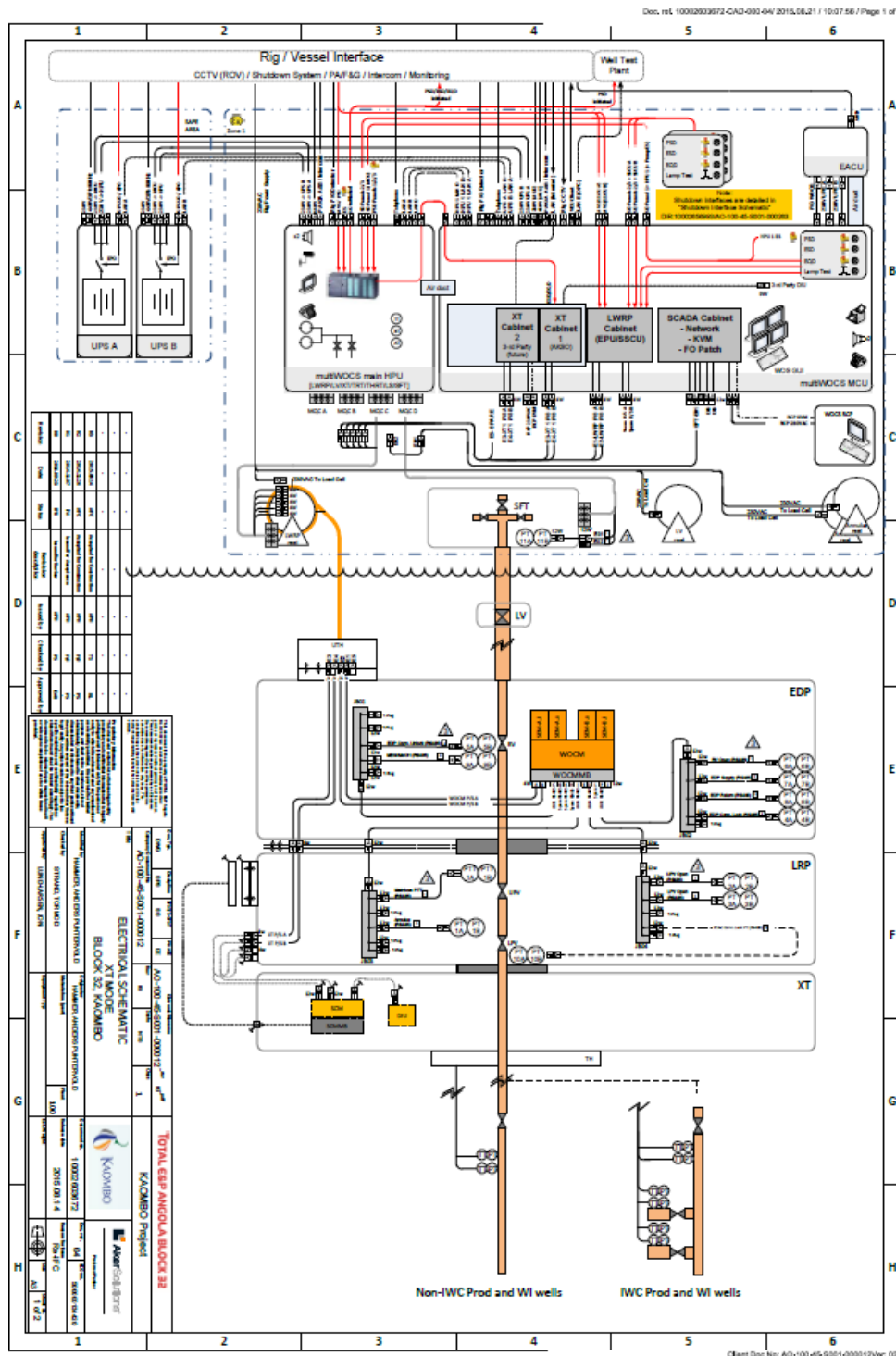
TYPE 3 Use as is (if possible)

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 213 of 315

7.4.2 XT Mode Electric Schematic



Electric schematic XT mode

10002603672

AO-100-45-S001-000012

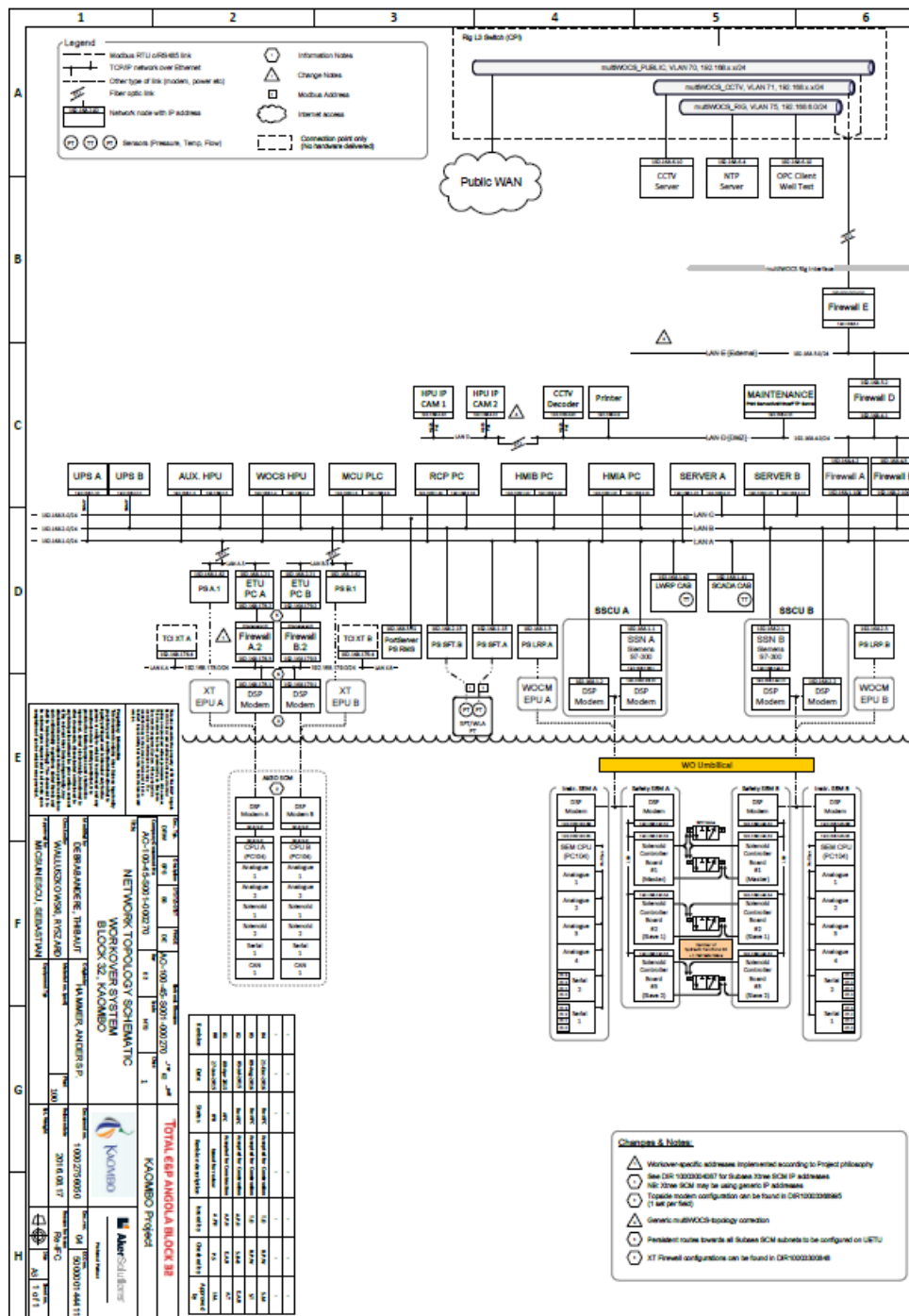
N/A

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 214 of 315

7.5 Workover Control System (WOCS) Network Diagram



WOCS Network Diagram	10002756050	AO-100-45-S001-000270	N/A
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TYPE 3 Use as is (if possible)

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
 Version: 05 - Re-issued Constr
 Issue date: 2017.11.17
 Page: 215 of 315

7.6 Workover Shut Down Sequence

7.6.1 Figure 4 Shutdown sequence, TH mode (in-riser), RIG Emergency Quick Disconnect (EQD)

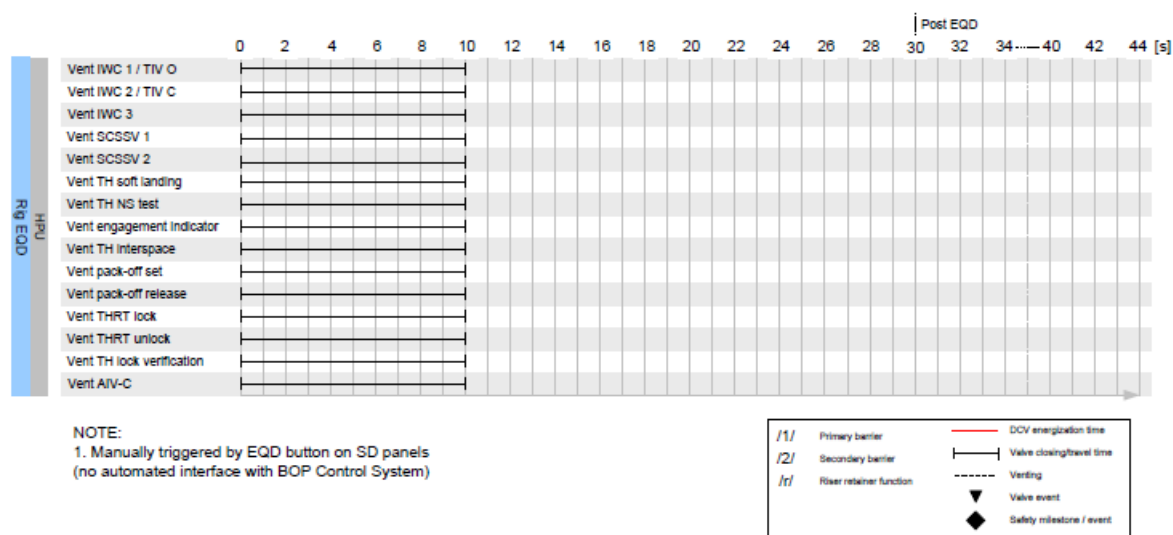


Figure 4 – Shutdown sequence, TH mode (In-riser), RIG EQD

WO shut down sequence	10002515767	AO-100-45-S001-000161	N/A
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TYPE 3 Use as is (if possible)

7.6.2 Figure 1 Shutdown sequence, XT mode (Open water) Normal / Well Flowing (non-concentric) operation

SHUTDOWN SEQUENCES	Document: 10002515767-PDC-000
WORKOVER SYSTEM	Version: 03 - IFC
BLOCK 32 - KAOMBO SPS	Issue date: 2015.02.24
	Page: 22 of 27

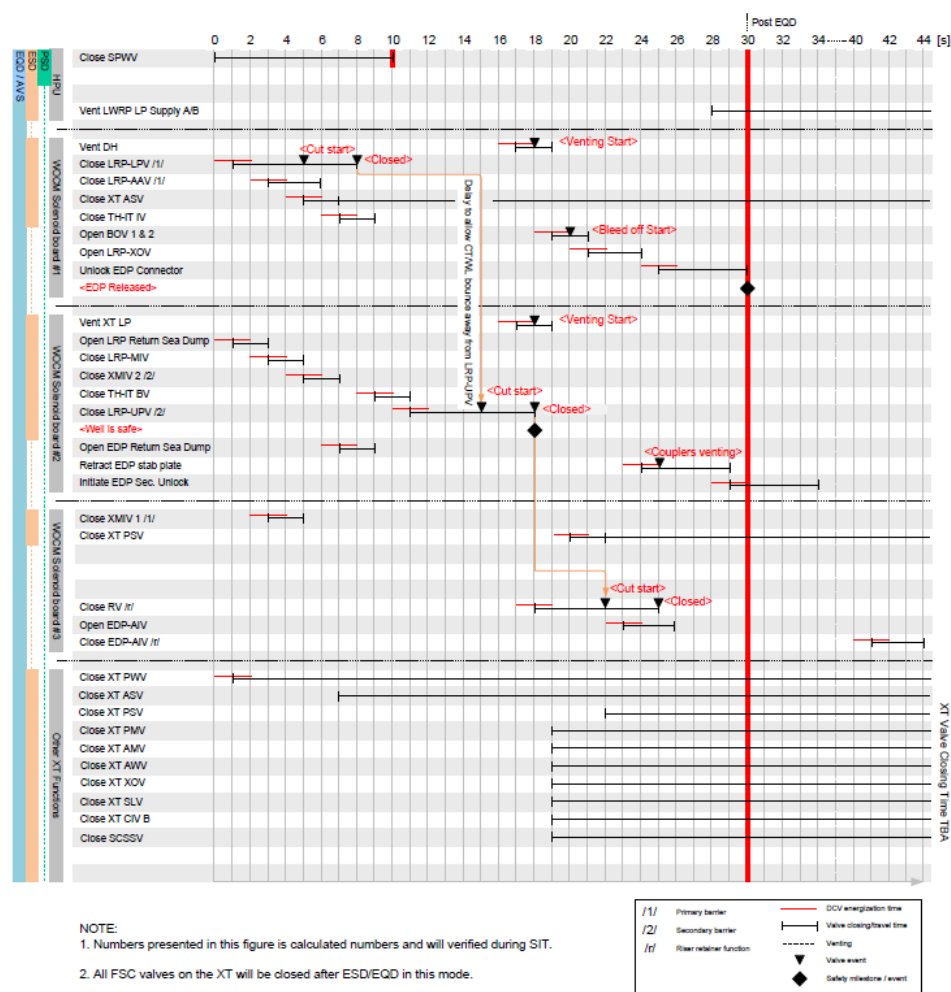


Figure 1 - Shutdown sequence, XT mode (Open water) Normal / Well Flowing (non-concentric) operation

WO shut down sequence	10002515767	AO-100-45-S001-000161	N/A
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TYPE 3 Use as is (if possible)

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 217 of 315

7.6.3 Figure 2 Shutdown sequence, XT mode (Open water) CT/WL (concentric) operation

SHUTDOWN SEQUENCES	Document: 10002515767-PDC-000
WORKOVER SYSTEM	Version: 03 - IFC
BLOCK 32 - KAOMBO SPS	Issue date: 2015.02.24
	Page: 24 of 27

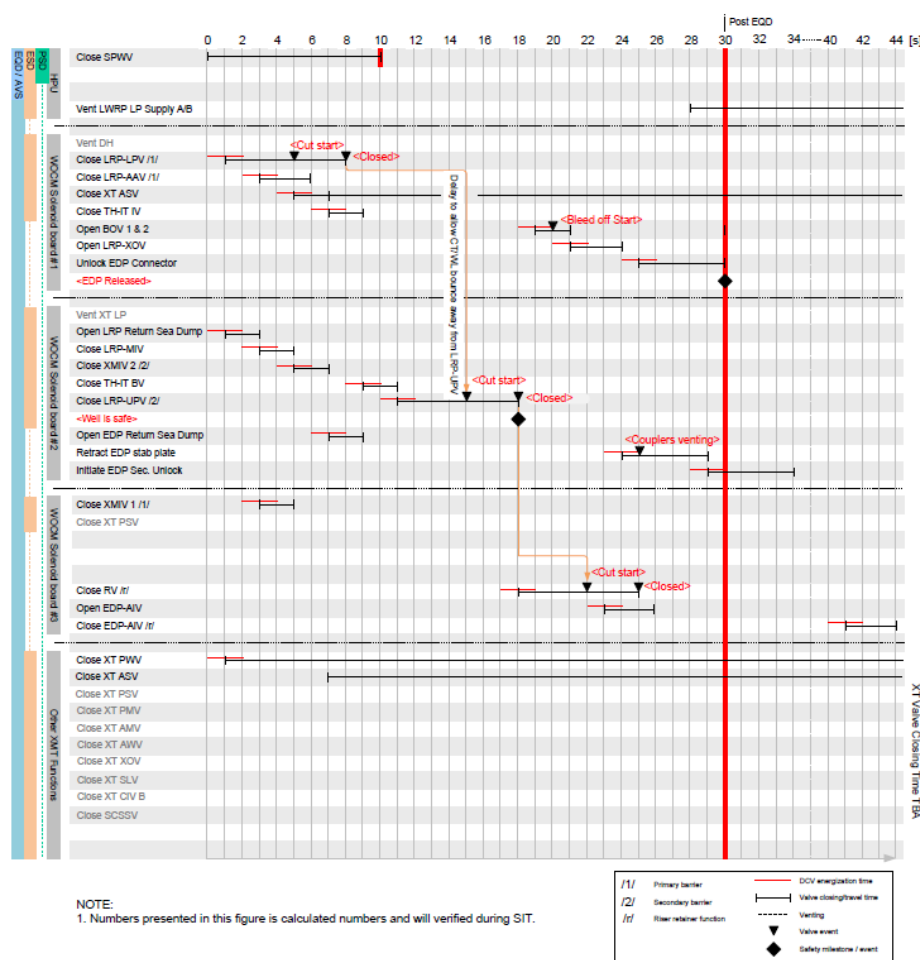


Figure 2 - Shutdown sequence. XT mode (Open water) CT/WL (concentric) operation

WO shut down sequence	10002515767	AO-100-45-S001-000161	N/A
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TYPE 3 Use as is (if possible)

7.6.4 Figure 3 - Shutdown sequence, XT mode (open water) Annulus Access

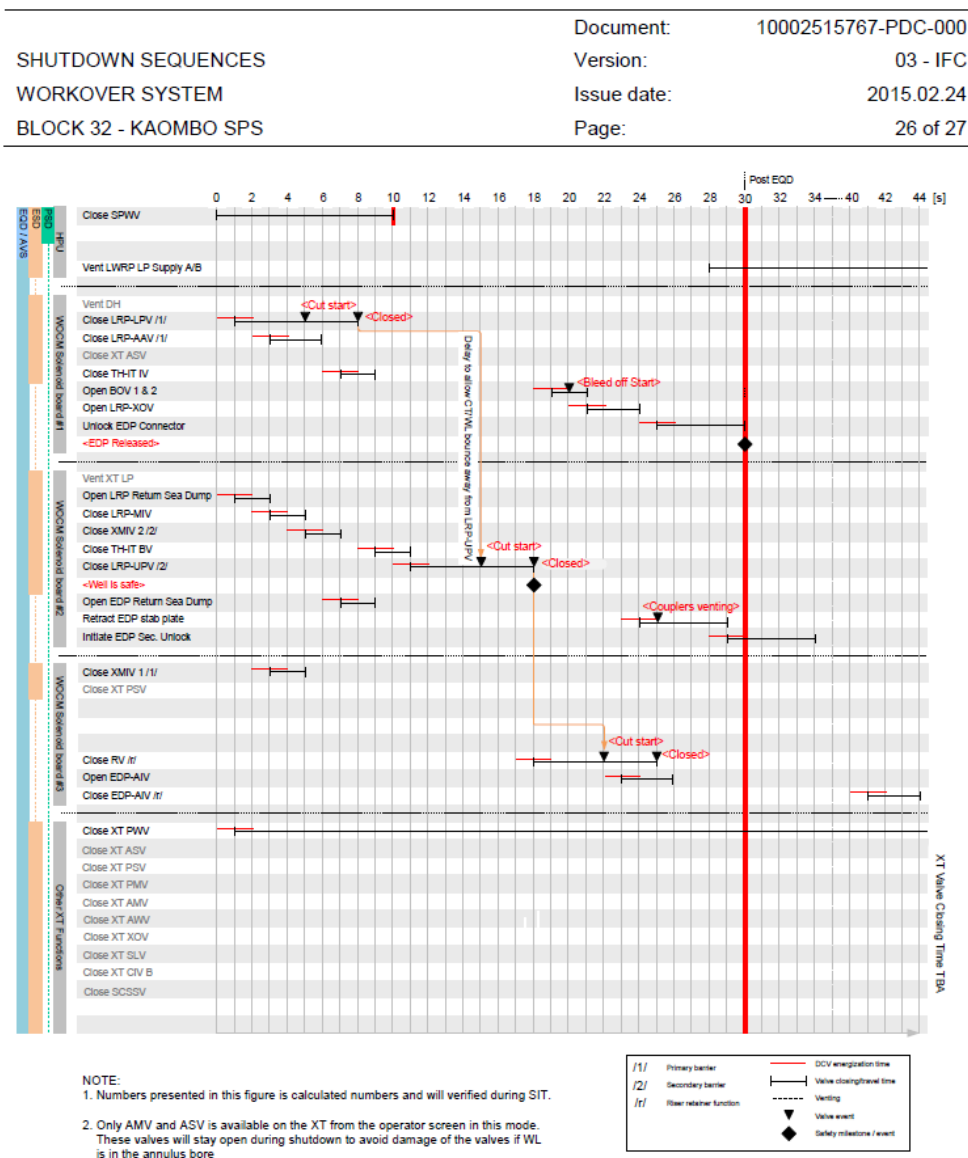


Figure 3 - Shutdown sequence, XT mode (open water) Annulus Access

WO shut down sequence	10002515767	AO-100-45-S001-000161	N/A
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TYPE 3 Use as is (if possible)

SPS HANDBOOK TABLE OF CONTENT

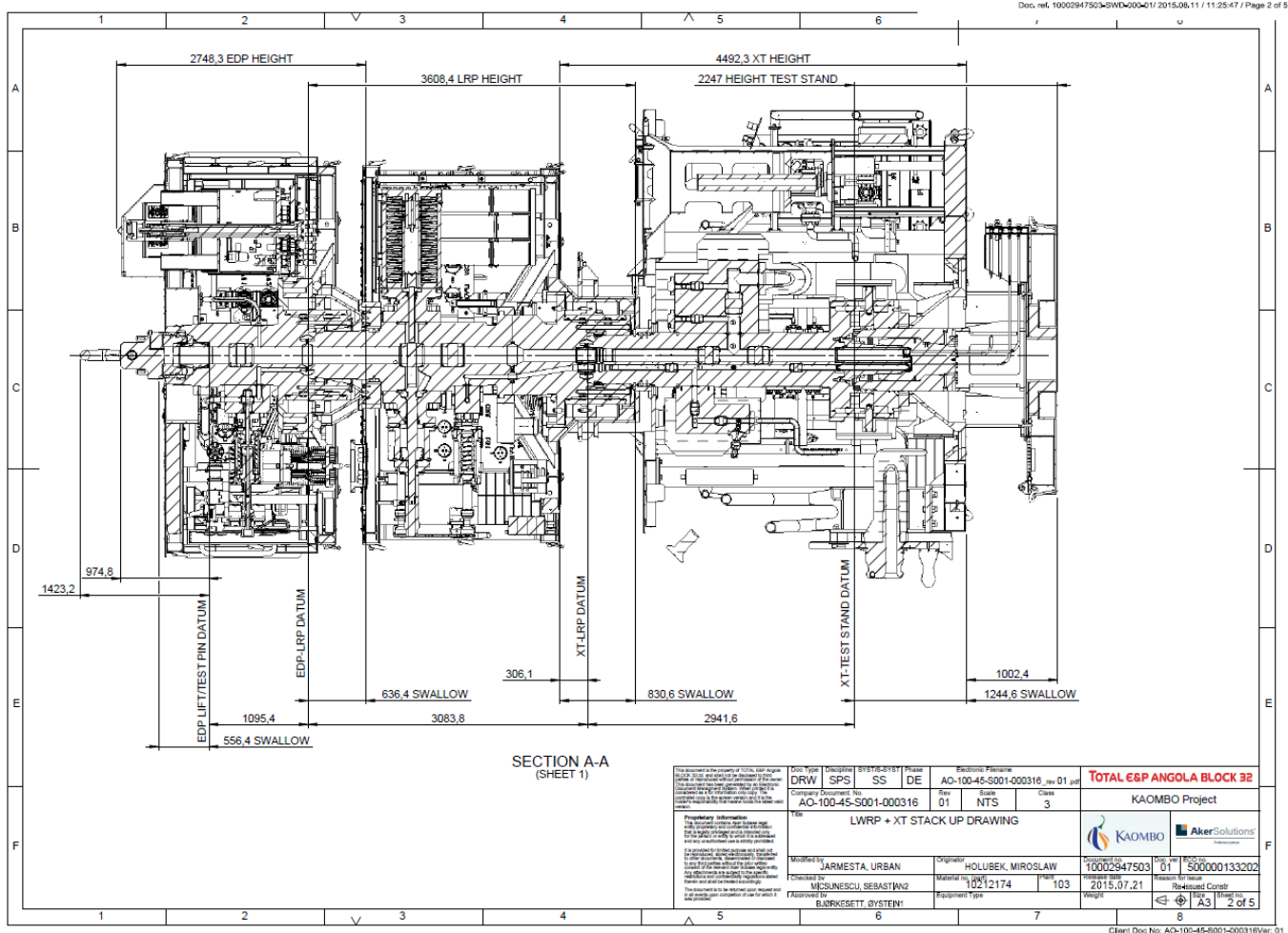
BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 219 of 315

7.7 Lower Workover Riser Package (LWRP)

7.7.1 LWRP Stack-up Drawing

Side by side with one more view (check availability of cross section without VXT)



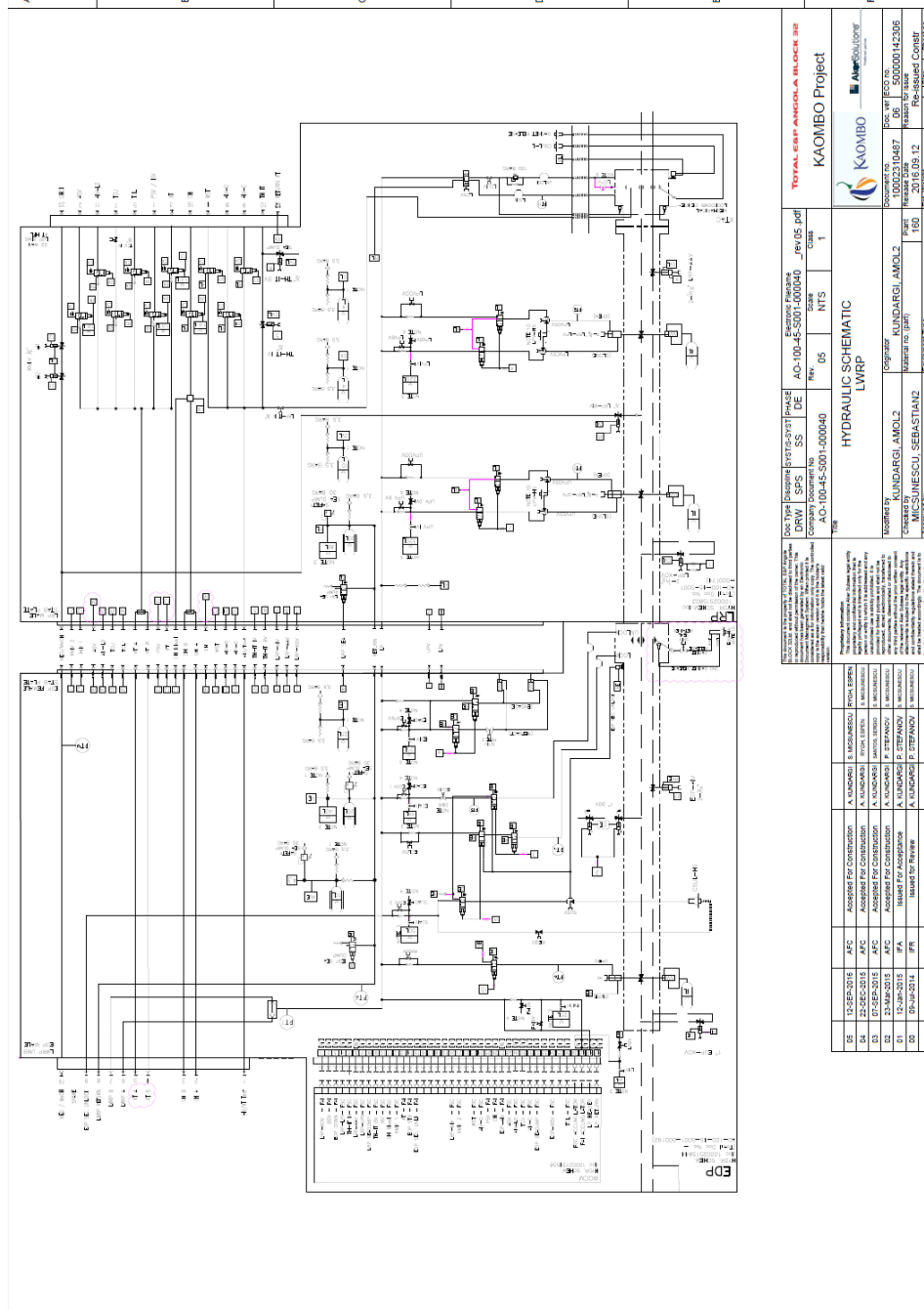
LWRP + XT STACK UP DRAWING	10002947503	AO-100-45-S001-000316	N/A
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SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 220 of 315

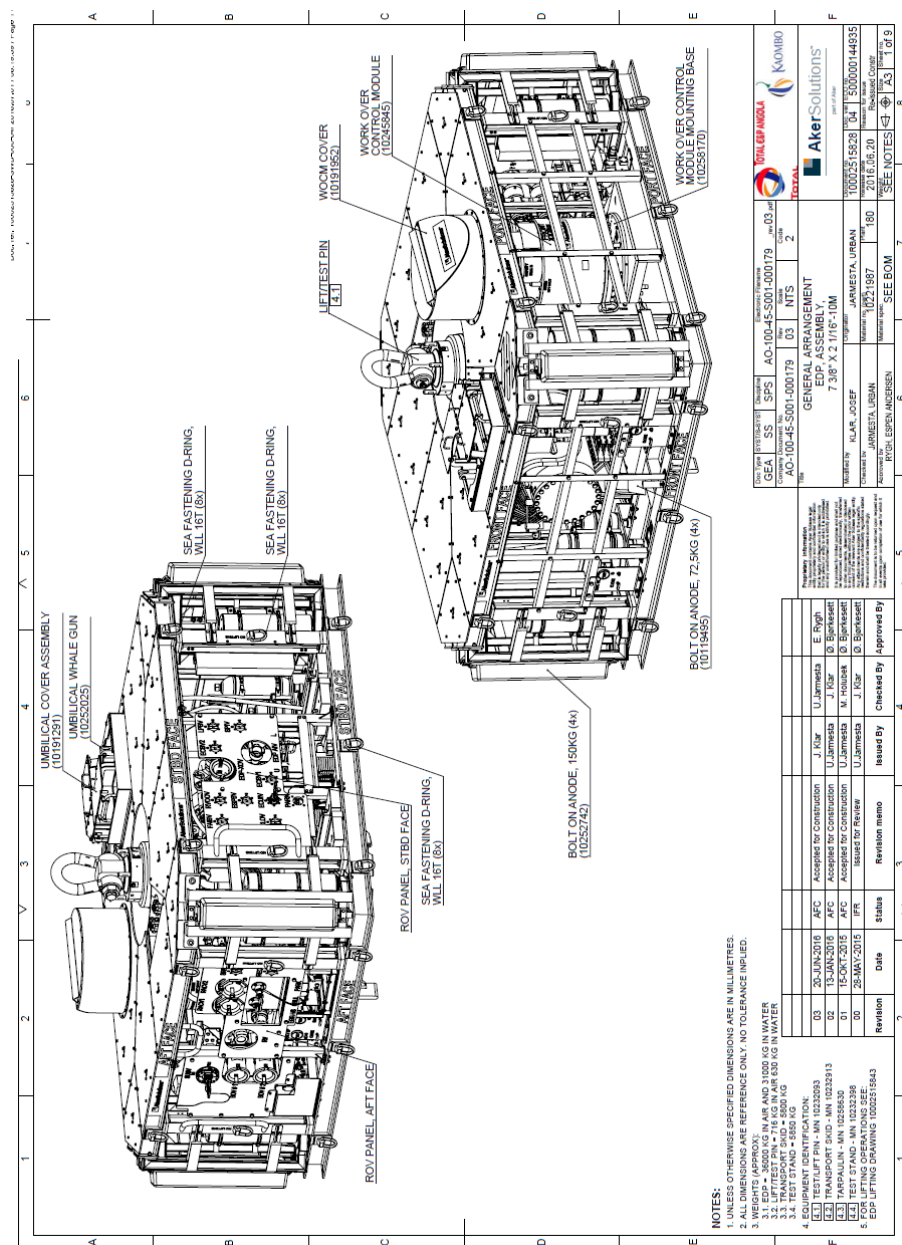
7.7.2 LWRP hydraulic schematic



LWRP hydraulic schematic	10002310487	AO-100-45-S001-000040	10221986 10221987
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TYPE 3 Use as is (if possible)

7.8 Emergency Disconnect Package (EDP)



EDP	10002515828	AO-100-45-S001-000179	10221987
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TYPE 1C Glossy 3-D rendering quality with description/details like

SPS HANDBOOK TABLE OF CONTENT	Document:	10002504361-PDC-000
	Version:	05 - Re-issued Constr
	Issue date:	2017.11.17
BLOCK 32 - KAOMBO SPS	Page:	222 of 315

7.8.1 EDP Stalk view and ROV Panels

As moho

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 223 of 315

7.8.2 EDP Valve torque list

Item No	QTY EDP	Valve Name	ROV ID	SAP Material Nr.	Nominal Valve Size	Valve Type	Actuation	ROV Interface	ROV Tool	Running Torque (Nm)	Break Out Torque (Nm)	Max Torque (Nm)	Damage Torque (Nm)	Closing direction (CW if Clockwise or counter-clockwise)	Approx. number of Turns to Open or Close
1	1	Retainer Valve	RV	10082768	7-3/8"	Gate	HYDROV	ISO 13628-8 Linear Push Type "A"	LAOT & LOT	N/A	N/A	N/A	N/A	N/A	N/A
2	1	Secondary Unlock Selection Valve	SUSV	10092451	3/8"	3-way Ball	ROV	ROV Manipulator	Paddle Tool	20	30	100	160	CW	1/4
3	1	EDP - Annulus Isolation Valve	EDP-ANV	10261716	2-1/16"	Gate	HYDROV	ISO 13628-8 Linear Push Type "A"	LAOT & LOT	N/A	N/A	N/A	N/A	N/A	N/A
4		EDP Connector Bleed Valve #1	ECBV 1	10243550	1/2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	1/4
5		EDP Connector Bleed Valve #2	ECBV 2	10243550	1/2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	1/4
6		EDP Connector Lock Override Valve	ECLOV	10243550	1/2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	1/4
7		EDP Connector Unlock Isolation Valve	ECUNV	10243550	1/2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	1/4
8	10	EDP Sub Plate Bleed Valve	ESPBV	10243550	1/2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	1/4
9		FAI Accumulator Bleed Valve	FAIBV	10243550	1/2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	1/4
10		LP system accumulator Bleed Valve	LPBV	10243550	1/2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	1/4
11		ROV Emergency Quick Disconnect	REQD	10243550	1/2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	1/4
12		RV Open Override Valve	RVOOV	10243550	1/2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	1/4
13		Sub Plate Isolation Valve	SPV	10243550	1/2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	1/4
14	1	Seal Retainer Isolation Valve	SRV	10243551	1/2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	1/4
15	2	Bleed Off Valve #1	BOV#1	10243552	1"	Gate	HYDROV	ISO 13628-8 Class 4	Class 4 Torque Tool	180	180	270	350	CW	6.2
16		Bleed Off Valve #2	BOV#2	10243552	1"	Gate	HYDROV	ISO 13628-8 Class 4	Class 4 Torque Tool	180	180	270	350	CW	6.2
17	1	EDP - Crossover Valve	EDP-XOV	10243553	1"	Gate	HYDROV	ISO 13628-8 Class 4	Class 4 Torque Tool	180	180	270	350	CW	6.2
18		Riser Annulus Circulation Valve #1	RACV1	10256817	1"	Ball	ROV	ISO 13628-8 Class 4	Class 4 Torque Tool	275	400	700	TBC	CW	1/4
19	2	Riser Annulus Circulation Valve #2	RACV2	10256817	1"	Ball	ROV	ISO 13628-8 Class 4	Class 4 Torque Tool	275	400	700	TBC	CW	1/4

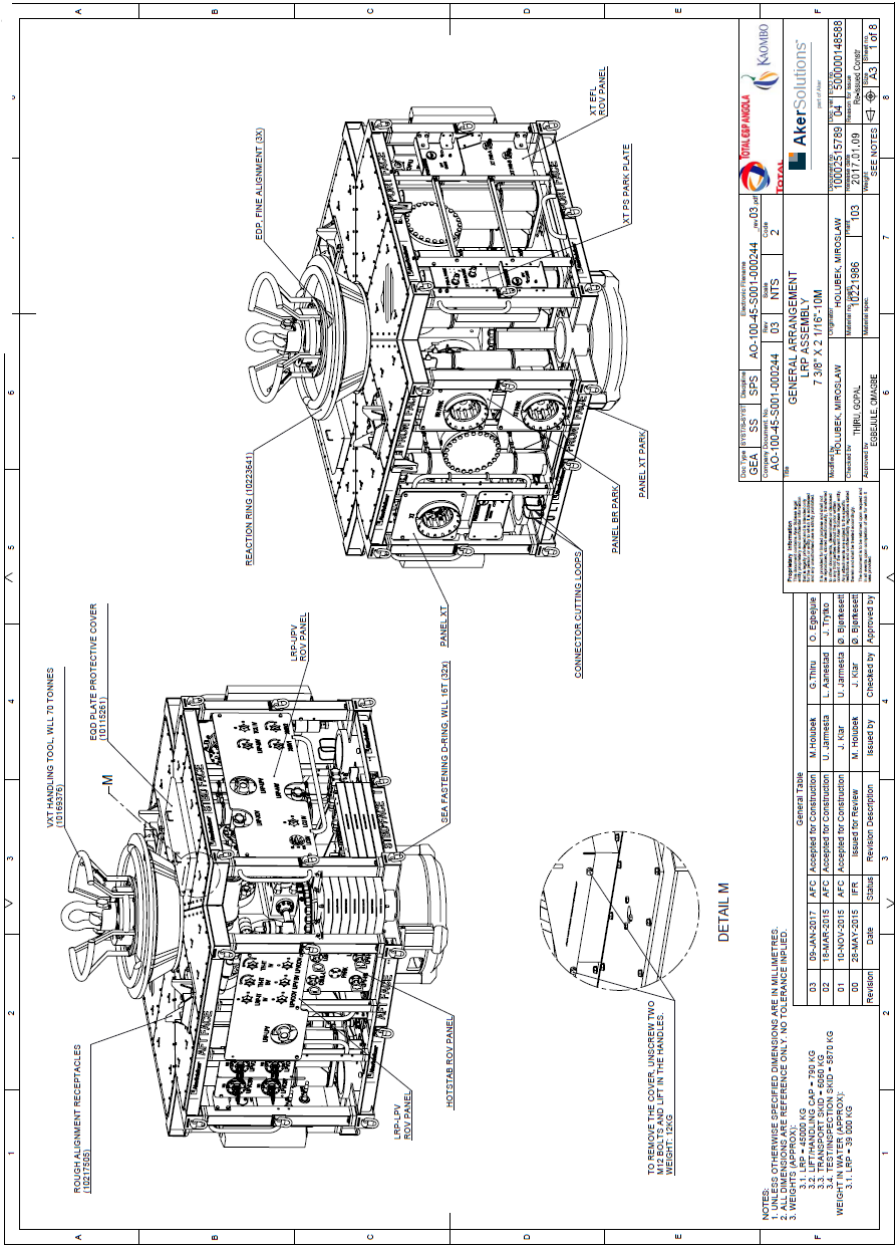
VALVE TORQUE LIST

10003313257

AO-100-40-S001-002601

10221987

7.10 Lower Riser Package (LRP)



LRP	10002515789	AO-100-45-S001-000244	10221986
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TYPE 1C Glossy 3-D rendering quality with description/details like

SPS HANDBOOK TABLE OF CONTENT	Document:	10002504361-PDC-000
	Version:	05 - Re-issued Constr
	Issue date:	2017.11.17
BLOCK 32 - KAOMBO SPS	Page:	227 of 315

7.10.1 LRP stalk view and ROV panels

As moho

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 228 of 315

7.10.2 LRP Valve torque list

Item No	Qty LRP	Valve Name	ROV ID	SAP Material Nr.	Nominal Valve Size	Valve Type	Actuation	ROV Interface	ROV Tool	Running torque centre - right/left (Nm)	Running torque right-left-centre (Nm)	Break Out Torque (Nm)	Max Torque (Nm)	Damage Torque (Nm)	Closing direction (CW if clockwise or CCW if counterclockwise)	Approx. number of Turns to open or Close
1	2	LRP - Upper Production Valve	LRP-UPV	10082766	7-3/8"	Gate	HYDROV	ISO 13628-4 Linear Push Type "A"	LAOT & LOT	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2		LRP - Lower Production Valve	LRP-LPV	10082766	7-3/8"	Gate	HYDROV	ISO 13628-4 Linear Push Type "A"	LAOT & LOT	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3		UPV - Close Selector Valve	UPVCSV	10082451	3/8"	3-way Ball	ROV	ROV Manipulator	Paddle Tool	20	30	100	160	160	CW	1/4
4	4	UPV - Open Selector Valve	UPVOSV	10082451	3/8"	3-way Ball	ROV	ROV Manipulator	Paddle Tool	20	30	100	160	160	CW	1/4
5		LPV - Close Selector Valve	LPVCSV	10082451	3/8"	3-way Ball	ROV	ROV Manipulator	Paddle Tool	20	30	100	160	160	CW	1/4
6		LPV - Open Selector Valve	LPVOSV	10082451	3/8"	3-way Ball	ROV	ROV Manipulator	Paddle Tool	20	30	100	160	160	CW	1/4
7	1	LRP - Annulus Access Valve	LRP-AAV	10225489	2-11/8"	Gate	HYDROV	ISO 13628-4 Linear Push Type "A"	LAOT & LOT	N/A	N/A	N/A	N/A	N/A	N/A	N/A
8	1	LRP - Crossover Valve	LRP-XOV	10228325	2-11/8"	Gate	HYDROV	ISO 13628-4 Linear Push Type "A"	LAOT & LOT	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9		UPV accumulator Bleed Valve	UPV-BV	10243050	1/2"	Rotary	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	400	CW	1/4
10	4	UPV Open Override Valve	UPV-OOV	10243050	1/2"	Rotary	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	400	CW	1/4
11		LPV accumulator Bleed Valve	LPV-BV	10243050	1/2"	Rotary	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	400	CW	1/4
12		LPV Open Override Valve	LPV-OOV	10243050	1/2"	Rotary	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	400	CW	1/4
13		LRP interspace Test Isolation Valve	LRP-TIV	10243051	1/2"	Rotary	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	400	CW	1/4
14	3	Tree Connector Unlock - Isolation Valve	TCU-IV	10243051	1/2"	Rotary	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	400	CW	1/4
15		LRP Connector Unlock Isolation Valve	LCU-IV	10243051	1/2"	Rotary	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	400	CW	1/4
16		LRP - Methanol Injection Valve	LRP-MIV	10243055	1/2"	Rotary	HYDROV	ROV Manipulator	Paddle Tool	14	30	300	400	400	CW	10
17	3	XT Methanol Injection Valve #1	XIMV#1	10243055	1/2"	Rotary	HYDROV	ROV Manipulator	Paddle Tool	14	30	300	400	400	CW	10
18		XT Methanol Injection Valve #2	XIMV#2	10243055	1/2"	Rotary	HYDROV	ROV Manipulator	Paddle Tool	14	30	300	400	400	CW	10
19	2	Tubing Hanger Interspace Test Isolation Valve	TH-TIV	10243056	1/2"	Rotary	HYDROV	ROV Manipulator	Paddle Tool	14	30	300	400	400	CW	10
20		Tubing Hanger Interspace Test Bleed Valve	TH-TBV	10243056	1/2"	Rotary	HYDROV	ROV Manipulator	Paddle Tool	14	30	300	400	400	CW	10
21	1	LRP Connector Selector Valve	LCSV	BBPH-000010803	3/8"	4-way control valve	ROV	ROV Manipulator	Paddle Tool	25	15	N/A	N/A	Connector unlock	Shut	Connector lock

VALVE TORQUE LIST

10003313257

AO-100-40-S001-002601

10221986

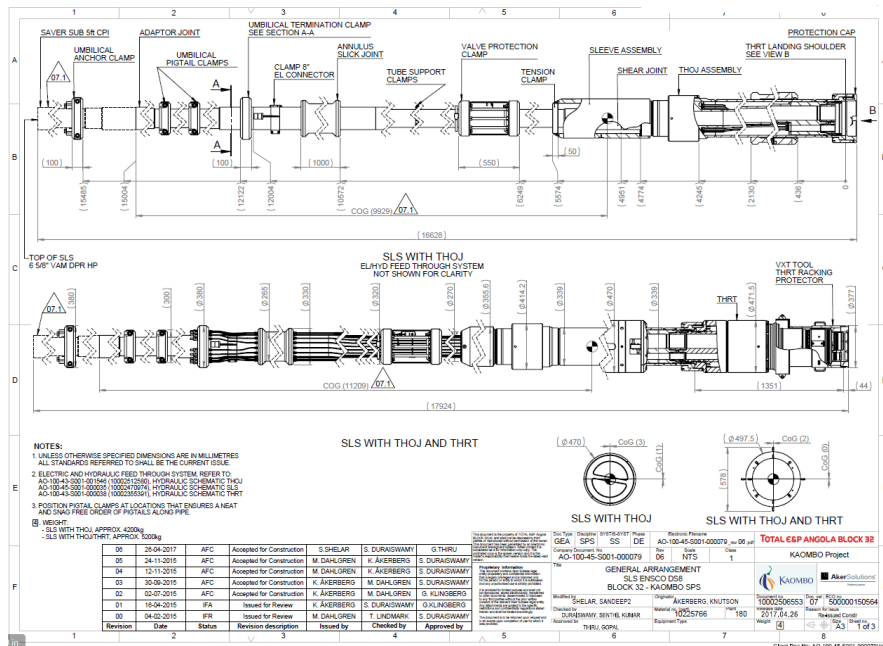
SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 229 of 315

7.11 Simplified Landing String (SLS)

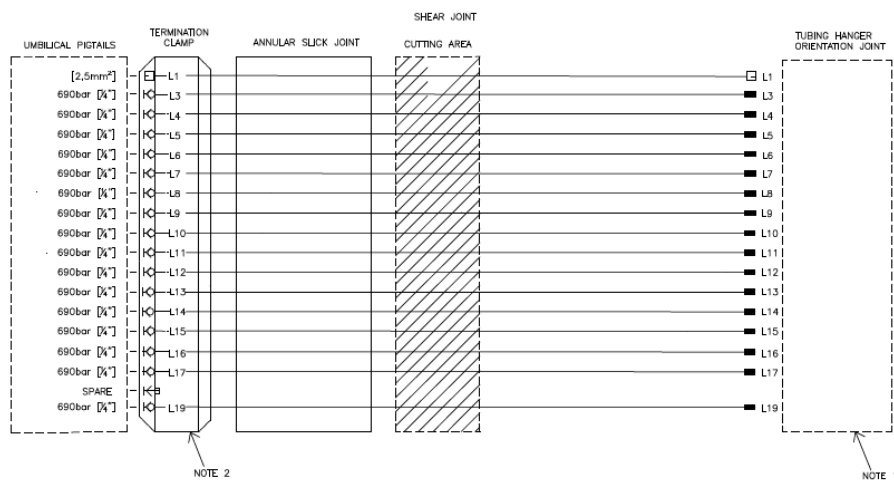
7.11.1 SLS Assembly



GA SLS	10002506553	AO-100-45-S001-000079	10225766
Simplified landing string, Schematic	10002470974	AO-100-45-S001-000035	N/A

TYPE 3 Use as is (if possible)

7.11.2 SLS Schematic



Try to include in one page with assembly drawing

SPS HANDBOOK TABLE OF CONTENT

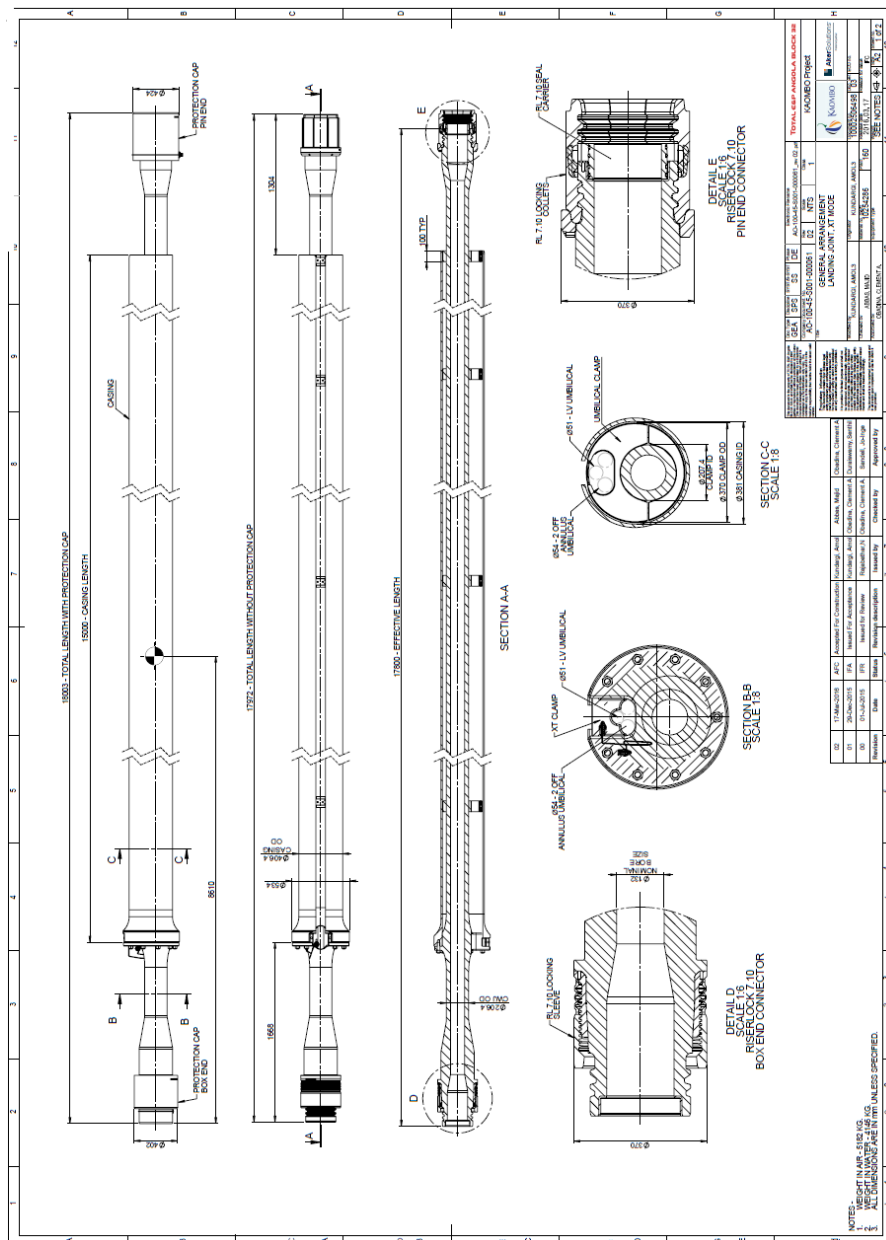
BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 231 of 315

7.12 Riser special joints

Use moho as reference – one section view to be included for each joint. Two joints per page.

7.12.1 Landing joint + Cased wear joint (CWJ)



Cased wear joint (CWJ) can be grouped on same page as Landing Joint.

Landing joint	10002506498	AO-100-45-S001-000061	10254286
GA CASED WEAR JOINT, RL7.10 - RL7.10	10002506518	AO-100-45-S001-000067	10225761

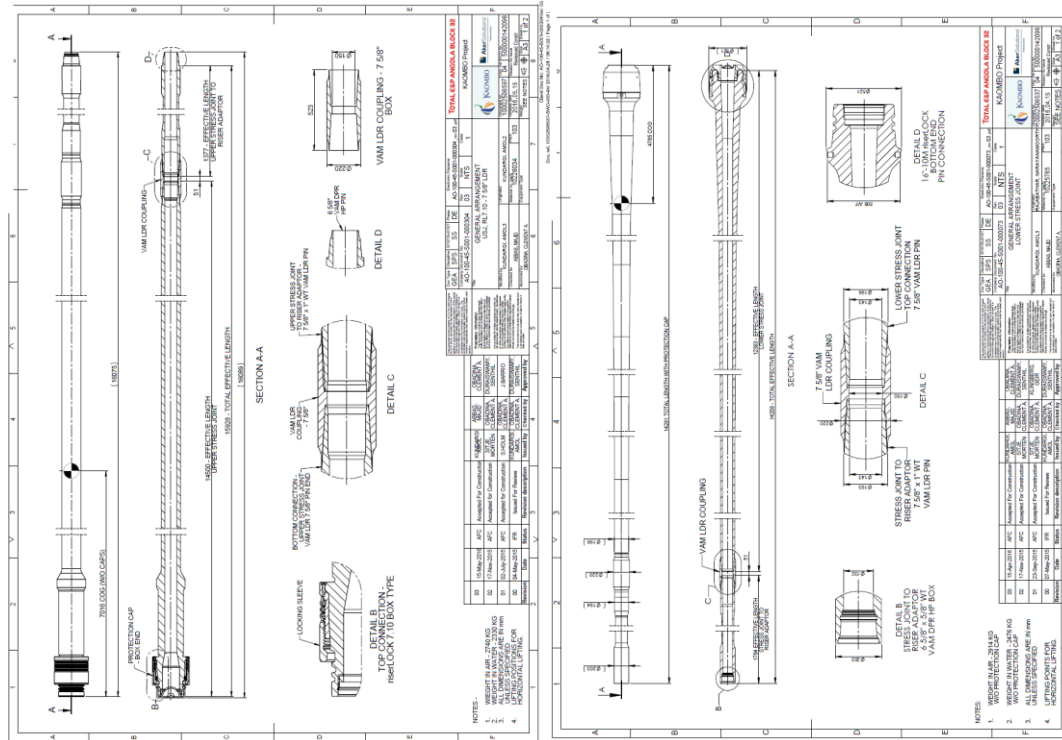
TYPE 5 Drawing as is + colouring

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 232 of 315

7.12.1 Upper stress joint (upper and lower stress joint in same page)



Lower stress joint	10002506537	AO-100-45-S001-000073	10225765
Upper stress joint	10002506597	AO-100-45-S001-000304	10226034

TYPE 5 Drawing as is + colouring

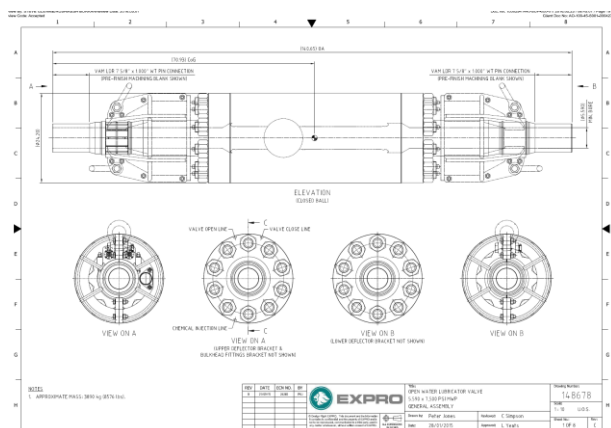
SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 233 of 315

7.13 Lubricator valves

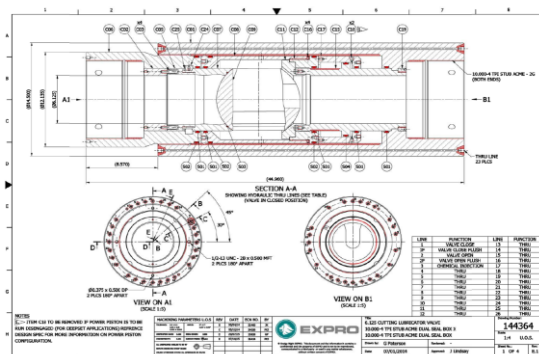
7.13.1 Open water Lubricator valve 6.125 (merge page with below)



TYPE 3 Use as is (if possible)

Open water LV	10002941440	AO-100-45-S001-000427	10244441
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7.13.2 In-riser Cutting lubricator valve 6.125



TYPE 3 Use as is (if possible)

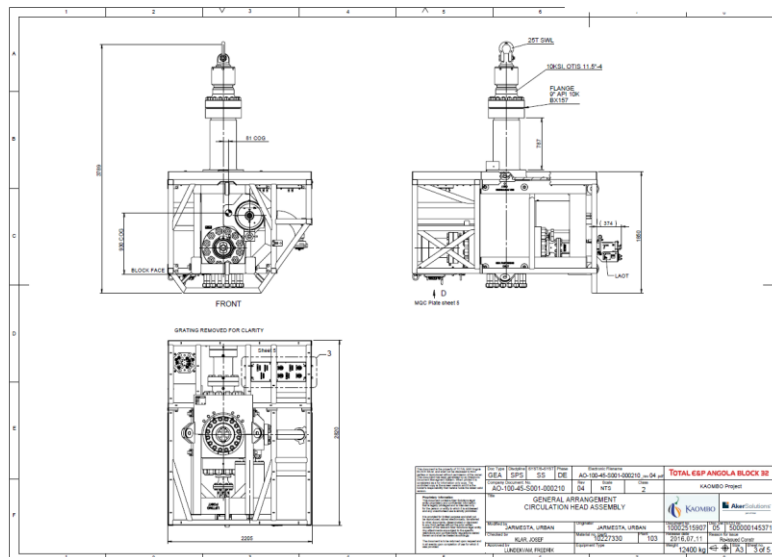
Cutting water LV	10002943199	AO-100-45-S001-000432	10259656
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SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 234 of 315

7.14 Circulation head (CH)

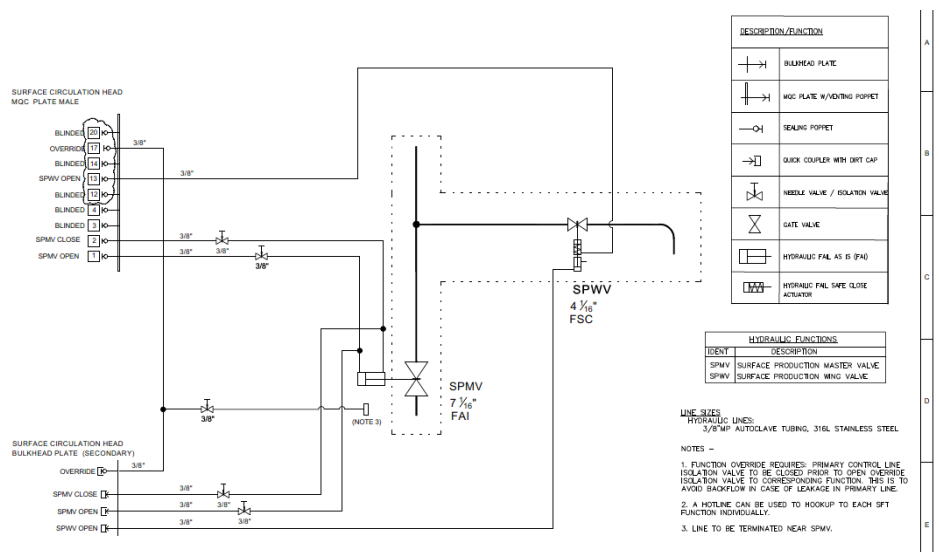


Circulation head	10002515907	AO-100-45-S001-000210	10227330
Circulation head, Schematic	10002469875	AO-100-45-S001-000034	10227330

TYPE 1C Glossy 3-D rendering quality with description/details like GA

Try to merge on one page with schematic

7.14.1 CH schematic

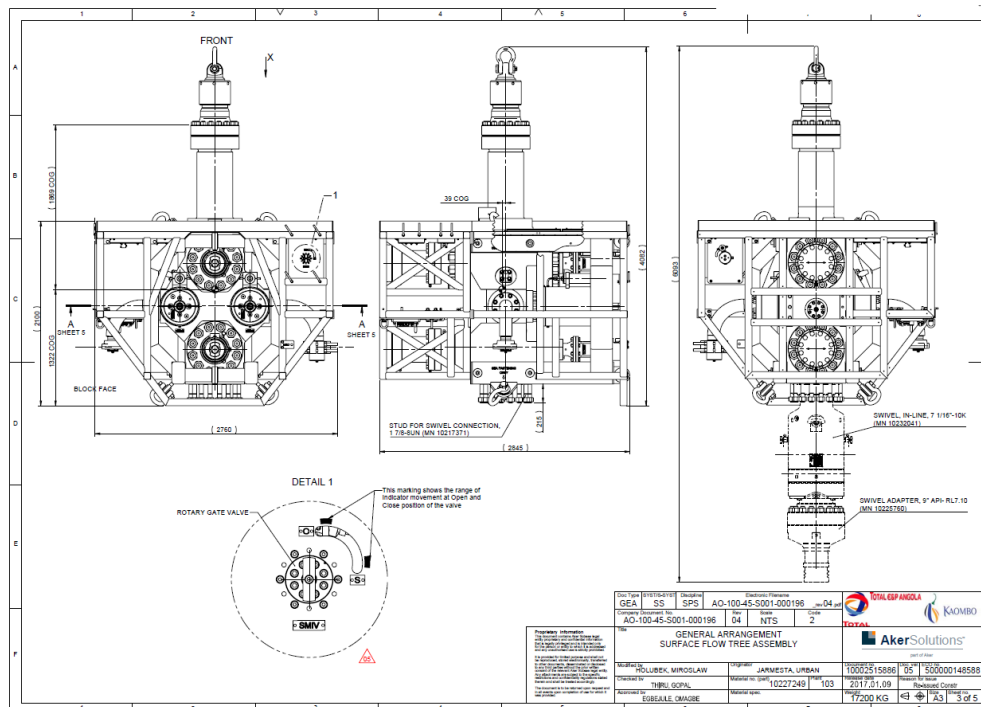


SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 235 of 315

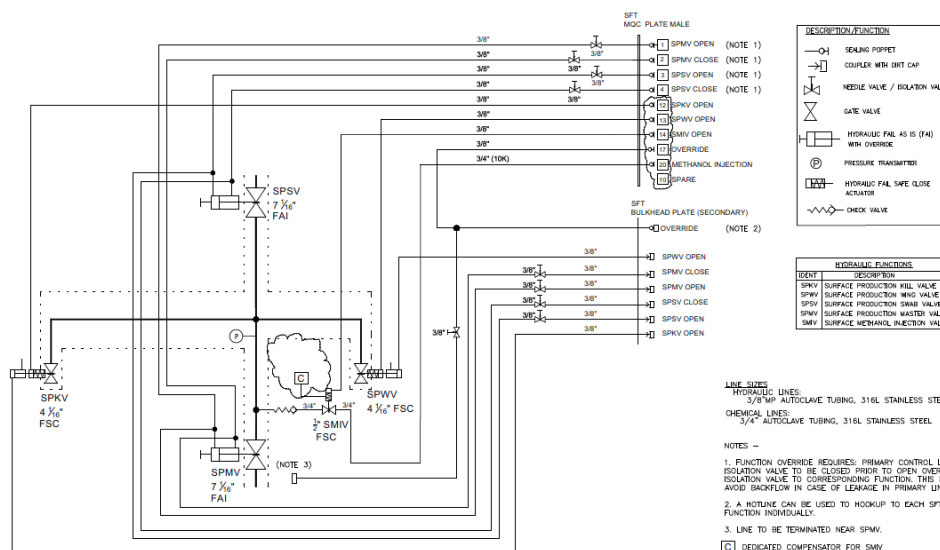
7.15 Surface flow tree (SFT)



Surface flow tree	10002515886	AO-100-45-S001-000196	10227249
CTLF+SFT+CWJ ASSEMBLY	10003093275	AO-100-45-S001-000460	10227249

TYPE 1C Glossy 3-D rendering quality with description/details like GA

7.15.1 SFT schematic

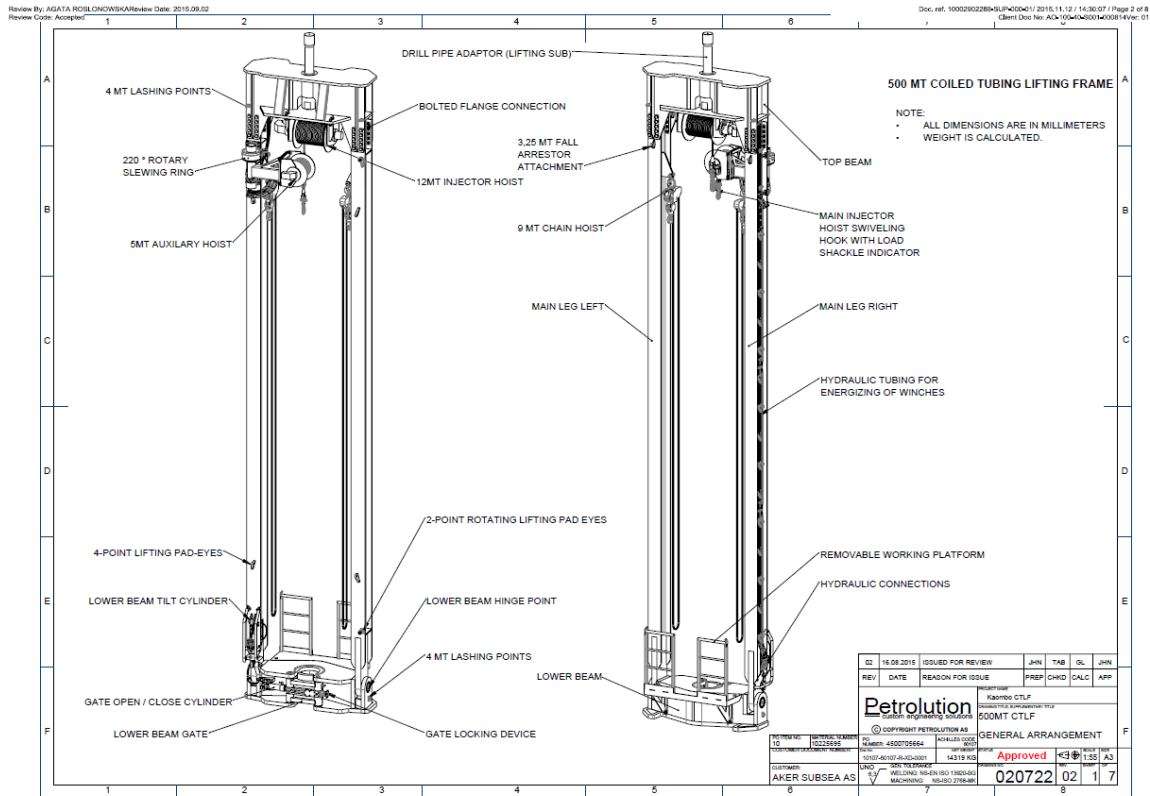


SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
 Version: 05 - Re-issued Constr
 Issue date: 2017.11.17
 Page: 236 of 315

7.16 Coil tubing lifting frame (CTLF) One view to be included



GA COILED TUBING LIFTING FRAME

10002902289

AO-100-40-S001-000814

10234236

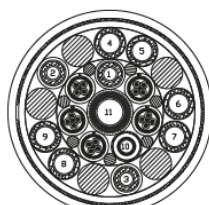
TYPE 5 Drawing as is + colouring

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 237 of 315

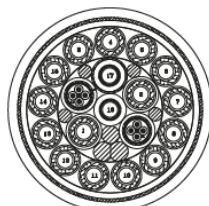
7.17 Umbilicals



LWRP Umbilical Cross Section

Material Number: 10100544
Reference GA Drawing: CG-MHN-20-3110-642130 (Rev. 02) / 10002184970 (Ver. 05)

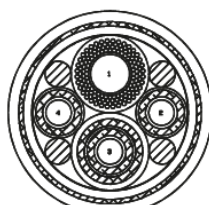
Umb Line No.	Functional Use	ND
1-3	Hydraulic	1/4"
4-9	Hydraulic	3/8"
10	Hyd/MEG/MeOH	1/4"
11	MEG/MeOH	1/2"
E1	Electric	N/A
E2	Electric	N/A
E3	Electric	N/A
E4	Electric	N/A
E5	Electric	N/A



TH Umbilical Cross Section

Material Number: 10100075
Reference GA Drawing: CG-MHN-20-3110-642131 (Rev. 01) / 10002184971 (Ver. 04)

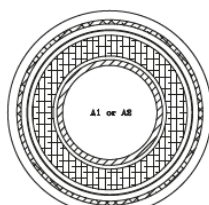
Umb Line No.	Functional Use	ND
1-15	Hydraulic	1/4"
16	Hyd/MEG/MeOH	1/4"
17	MEG/MeOH	1/4"
E1	Electric	N/A
E2	Electric	N/A



LV Umbilical Cross Section

Material Number: 10100076
Reference GA Drawing: CG-MHN-20-3110-642071 (Rev. 02) / 10002184972 (Ver. 03)

Umb Line No.	Functional Use	ND
1	MEG/MeOH	3/8"
2-3	Hydraulic	1/4"
4	Hyd/MEG/MeOH	1/4"



A1 or A2

Material Number: 10100078
Reference GA Drawing: CG-MHN-20-3110-642044 (Rev. 02) / 10002184973 (Ver. 06)

Hose No.	Umb Line No.	Functional Use	NB
1	A1	HYD/CHEM	1" HCR
2	A2	HYD/CHEM	1" HCR
3	A1	HYD/CHEM	1" HCR
4	A2	HYD/CHEM	1" HCR
5	SPARE	HYD/CHEM	1" HCR

TH Umbilical	10002898373	AO-100-40-S187-000023	10231213
LWRP Umbilical	10002898271	AO-100-40-S187-000021	10231185
Annulus Hose	10002898475	AO-100-40-S001-000779	10231197
LV umbilical	10002895386	AO-100-40-S187-000015	10231190
GA TH JUMPER	10002934257	AO-100-40-S187-000047	10231195
GA LV Jumper	10002934147	AO-100-40-S187-000048	10231191
GA SFT JUMPER	10002934296	AO-100-40-S187-000051	10231204
GA LWRP JUMPER	10002934223	AO-100-40-S187-000046	10231187
GA ANNULUS JUMPER	10002934114	AO-100-40-S187-000050	10231203

Picture above is an example from Moho. We want to have the same layout (+ deck jumpers) with the table on the right side with same type of information

SPS HANDBOOK TABLE OF CONTENT	Document:	10002504361-PDC-000
	Version:	05 - Re-issued Constr
	Issue date:	2017.11.17
BLOCK 32 - KAOMBO SPS	Page:	240 of 315

8 PRODUCTION JUMPER SYSTEM

8.1 Reference List

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 241 of 315

8.2 Scope of Supply Production Jumper

SR NO		MATERIAL NO	DESCRIPTION	FIELD
1		10234656	PWJ MB 33-IP-1012	GINUNGO
2		10234659	PWJ MB 33-IP-1013	GINUNGO
3		10234671	PWJ MB 33-IP-1014	GINUNGO
4		10234674	PWJ MB 33-IP-1023	GINUNGO
5		10234675	PWJ MB 33-IP-1022	GINUNGO
6		10234676	PWJ MB 33-IP-1022	GINUNGO
7		10234677	PWJ MB 33-IP-1022	GINUNGO
8		10234678	PWJ MB 34-IP-1023	GENGERRE
9		10234680	PWJ MB 34-IP-1023	GENGERRE
10		10234681	PWJ MB 34-IP-1021	GENGERRE
11		10234682	PWJ MB 34-IP-1021	GENGERRE
12		10234683	PWJ MB 34-IP-1023	GENGERRE
13		10234684	PWJ MB 34-IP-1023	GENGERRE
14		10234685	PWJ MB 38-IP-1014	CARIL
15		10234686	PWJ MB 38-IP-1013	CARIL
16		10234687	PWJ MB 38-IP-1022	CARIL
17		10234688	PWJ MB 38-IP-1021	CARIL
18		10234689	PWJ MB 35-IP-1021	CANELA
19		10234620	PWJ MB 35-IP-1021	CANELA
20		10234601	PWJ MB 35-IP-1022	CANELA
21		10234601	PWJ MB 35-IP-1022	CANELA
22		10234603	PWJ MB 36-IP-1011	MOSTARDA
23		10234603	PWJ MB 36-IP-1011	MOSTARDA
24		10234605	PWJ MB 36-IP-1012	MOSTARDA
25		10234605	PWJ MB 36-IP-1022	MOSTARDA
26		10234606	PWJ MB 36-IP-1022	MOSTARDA
27		10234607	PWJ MB 37-IP-1011	LOURO
28		10234608	PWJ MB 37-IP-1021	LOURO
29		10234610	PWJ MB 37-IP-1021	LOURO
30		10234611	PWJ MB 37-IP-1024	LOURO
31		10234612	PWJ MB 37-IP-1023	LOURO
32		10234614	PWJ MB 37-IP-1033	LOURO
33		10234615	PWJ MB 37-IP-1032	LOURO
34		10234616	PWJ MB TBA-1	TBA
35		10234619	PWJ MB TBA-2	TBA
SR NO		MATERIAL NO	DESCRIPTION	QTY
2		10244248	TERM. PWJ. UNINSUL PIPING W/ TOP COVER	3
3		10235628	PROTECTION CAP OB HCS-R 12" MB	54
4		10235629	TEMP. PRESS. CAP OB HCS 12" 5" 2" 8HC28	20

1

PROD. JUMPER

PROD. JUMPER HCS 12" 5" 2" 8HC28
QTY 35
MN. SEE TABLE

2

TERM. PWJ. UNINSUL PIPING W/ TOP COVER
QTY 3 (CAPITAL SPARE)
MN. 10244248

3

PROTECTION CAP OB HCS-R
12" 5" 2" 8HC28
QTY 54
MN. 10235628

4

TEMP. PRESS. CAP OB HCS 12" 5" 2" 8HC28
QTY 20
MN. 10235629

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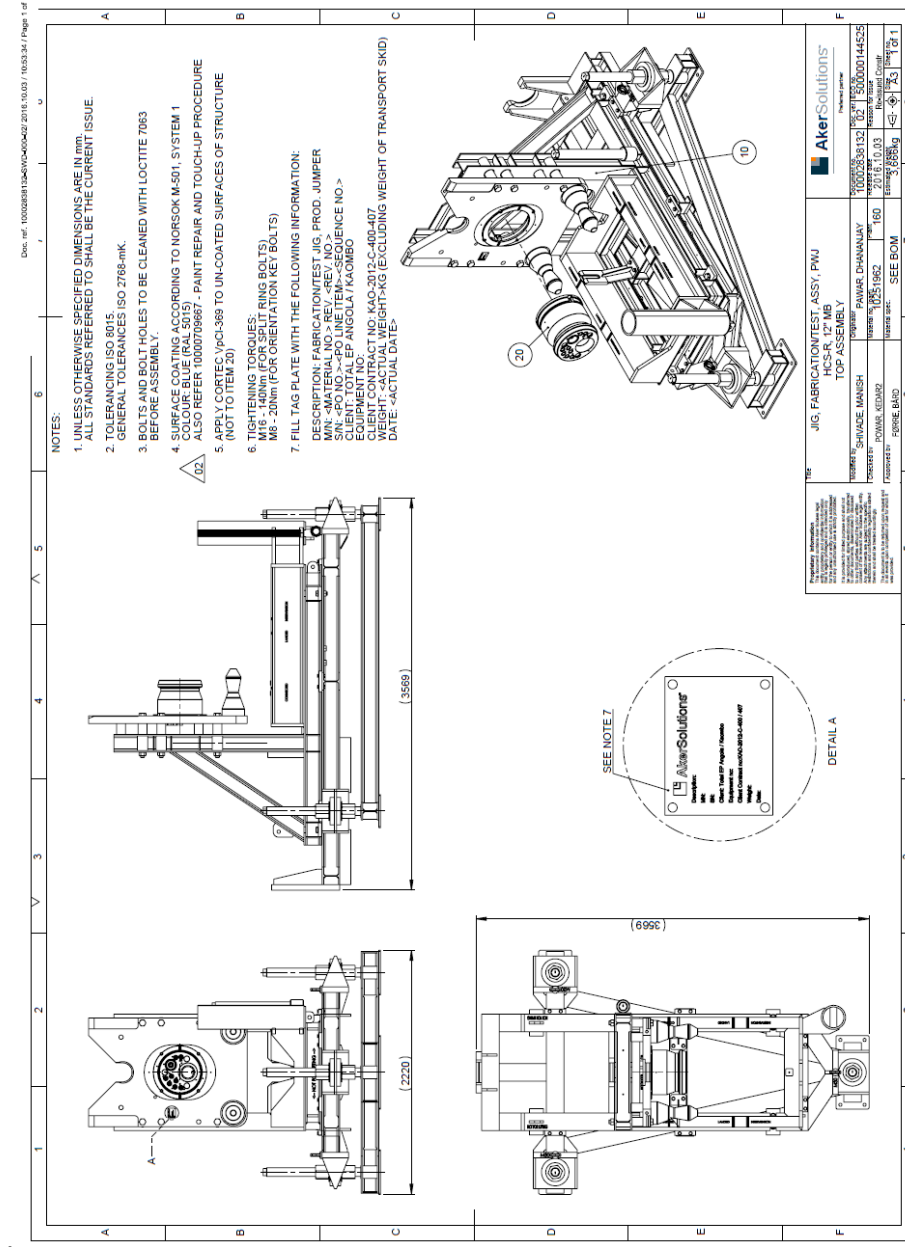
QTY 20

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 243 of 315

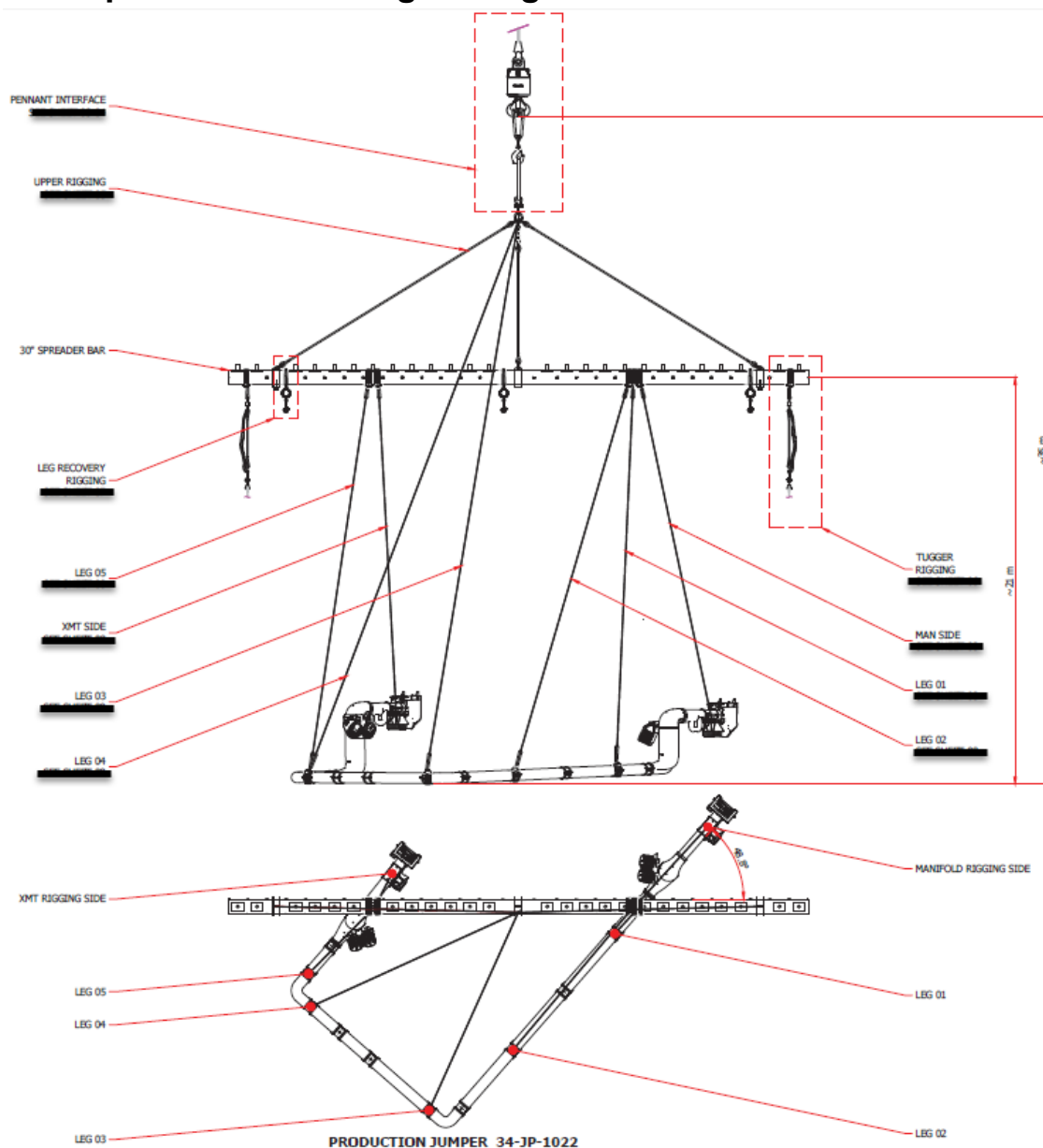
8.4 Fabrication/Test Jig



Fabrication/Test JIG	10002838132	N/A	10251962
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TYPE 2A Colour screenshot solidworks ISO VIEW + drawing as is

8.5 Typical Spreader Bar Lifting Arrangement



This sketch is for information only; note that lifting design and lifting arrangement is not supplied by Aker Solutions.

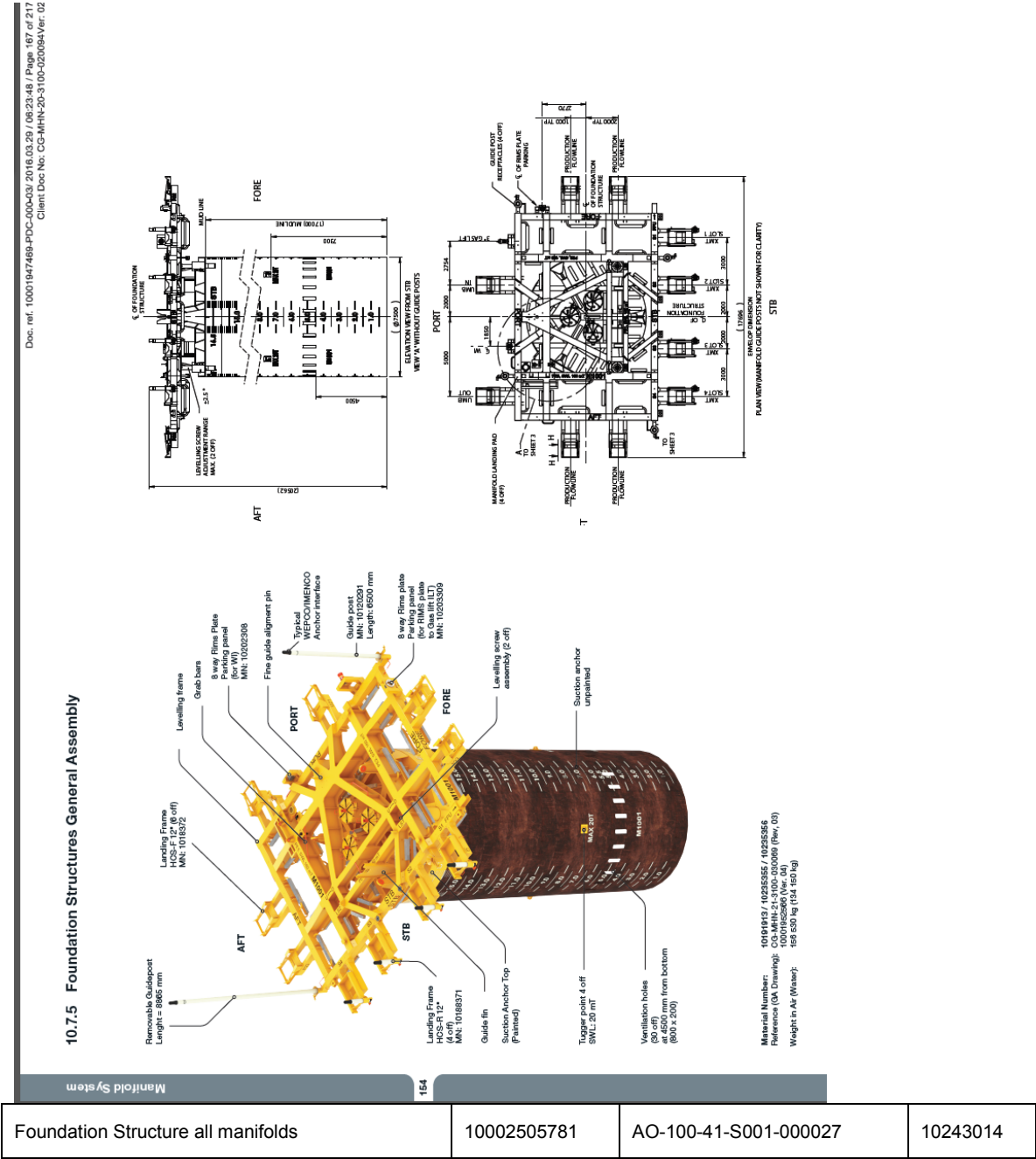
Spreader Frame Normal PWJ	N/A	AO-100-42-S001-000019 (Page 44)	N/A
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SPS HANDBOOK TABLE OF CONTENT	Document:	10002504361-PDC-000
	Version:	05 - Re-issued Constr
	Issue date:	2017.11.17
BLOCK 32 - KAOMBO SPS	Page:	245 of 315

9 MANIFOLD SYSTEM

9.1 Reference list

9.2 Foundation Structure manifold



SPS HANDBOOK TABLE OF CONTENT	Document:	10002504361-PDC-000
	Version:	05 - Re-issued Constr
	Issue date:	2017.11.17
BLOCK 32 - KAOMBO SPS	Page:	247 of 315

9.3 Manifold types summary Table

Summary table to be included by X-vision

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 248 of 315

9.4 Valve torque list 2-slot & 4 slot

Item No	QTY 2-slot end MAN	Valve Name	ROV ID	SAP Material Nr.	Nominal Valve Size	Valve Type	Actuation	ROV Interface	ROV Tool	Running Torque (Nm)	Break Out Torque (Nm)	Max torque (Nm)	Damage Torque (Nm)	Closing direction (CW # Clockwise or CCW # counterclockwise #)	Approx. number of Turns to Open or Close
1	2	Service Line Isolation Valve	SLIV	10237758	10"	Ball	HYDRO	ISO 13628-8 Class 4	Class 4 Torque Tool	1830	2700	2711	3000	CW	60.5
2		Manifold Line Valve	MLV	10237758	10"	Ball	HYDRO	ISO 13628-8 Class 4	Class 4 Torque Tool	1830	2700	2711	3000	CW	60.5
3		Spare 2 Isolation Valve (Fore)	SP2-1	10237678	2-1/16"	Gate	ROV	ISO 13628-8 Class 4	Class 4 Torque Tool	1250	1250	2711	3500	CW	4.2
4		Spare 2 Isolation Valve (Aft)	SP2-2	10237678	2-1/16"	Gate	ROV	ISO 13628-8 Class 4	Class 4 Torque Tool	1250	1250	2711	3500	CW	4.2
5	4	Methanol Isolation Valve (Slot 1)	ME1 (S1)	10237678	2-1/16"	Gate	ROV	ISO 13628-8 Class 4	Class 4 Torque Tool	1250	1250	2711	3500	CW	4.2
6		Methanol Isolation Valve (Slot 2)	ME2 (S2)	10237678	2-1/16"	Gate	ROV	ISO 13628-8 Class 4	Class 4 Torque Tool	1250	1250	2711	3500	CW	4.2
7		Spare 2 Injection Valve	Sp2IV	10242378	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	14	30	300	400	CW	10
8		Biocide Injection Valve	BIV	10242378	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	14	30	300	400	CW	10
9	5	Scale Inhibitor Injection Valve 2	SIV2	10242378	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	14	30	300	400	CW	10
10		Demulsifier Injection Valve 2	DIV2	10242378	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	14	30	300	400	CW	10
11		Manifold Methanol Injection Valve	MMIV	10242378	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	14	30	300	400	CW	10
12		Scale Inhibitor Injection Valve 1	SIV1	10243040	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
13	12	Demulsifier Injection Valve 1	DIV1	10243040	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
14		LP A Isolation Valve (Aft)	LP A	10243040	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
15		LP B Isolation Valve (Aft)	LP B	10243040	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
16		Corrosion Inhibitor Isolation Valve (Aft)	CI	10243040	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
17	17	Scale Inhibitor Isolation Valve (Aft)	SI	10243040	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
18		Asphaltene Inhibitor Isolation Valve (Aft)	AI	10243040	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
19		Methanol Manifold Isolation Valve (Aft)	3ME	10243040	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
20		Methanol W/DXT Isolation Valve (Aft)	2ME	10243040	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
21	21	Biocide Isolation Valve (Aft)	BI	10243040	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
22		Demulsifier Isolation Valve (Aft)	DE	10243040	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
23		Spare 1 Isolation Valve (Aft)	SP1	10243040	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
24		LP A Isolation Valve (Slot 1)	LP A (S1)	10243040	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
25	30	LP B Isolation Valve (Slot 1)	LP B (S1)	10243040	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
26		Corrosion Inhibitor Isolation Valve (Slot 1)	CI A (S1)	10243040	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
27		Scale Inhibitor Isolation Valve (Slot 1)	CI C (S1)	10243040	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
28		Asphaltene Inhibitor Isolation Valve (Slot 1)	CI B (S1)	10243040	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
29	29	Spare 1 Isolation Valve (Slot 1)	CI D (S1)	10243040	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
30		LP A Isolation Valve (Slot 2)	LP A (S2)	10243040	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
31		LP B Isolation Valve (Slot 2)	LP B (S2)	10243040	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
32		Corrosion Inhibitor Isolation Valve (Slot 2)	CI A (S2)	10243040	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
33	33	Scale Inhibitor Isolation Valve (Slot 2)	CI C (S2)	10243040	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
34		Asphaltene Inhibitor Isolation Valve (Slot 2)	CI B (S2)	10243040	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
35		Spare 1 Isolation Valve (Slot 2)	CI D (S2)	10243040	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
36		LP A Isolation Valve (PORT)	LP A (UMB)	10243040	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
37	37	LP B Isolation Valve (PORT)	LP B (UMB)	10243040	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
38		Methanol Isolation Valve (PORT)	ME (UMB)	10243040	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
39		LP A Isolation Valve (STB)	LP A (UMB STB)	10243040	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
40		LP B Isolation Valve (STB)	LP B (UMB STB)	10243040	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
41	41	Methanol Isolation Valve (STB)	ME (UMB STB)	10243040	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
42		Downhole LP A Isolation Valve (Aft)	DHLP A	10243041	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
43		Downhole LP B Isolation Valve (Aft)	DHLP B	10243041	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
44		Downhole LP A Isolation Valve (Slot 1)	DHLP A (S1)	10243041	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14
45	45	Downhole LP B Isolation Valve (Slot 1)	DHLP B (S1)	10243041	V2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	14

TYPE 3 Use as is (if possible)

Merge these two tables together & add an extra column to the right where we write which Manifold the different valve is applicable for.

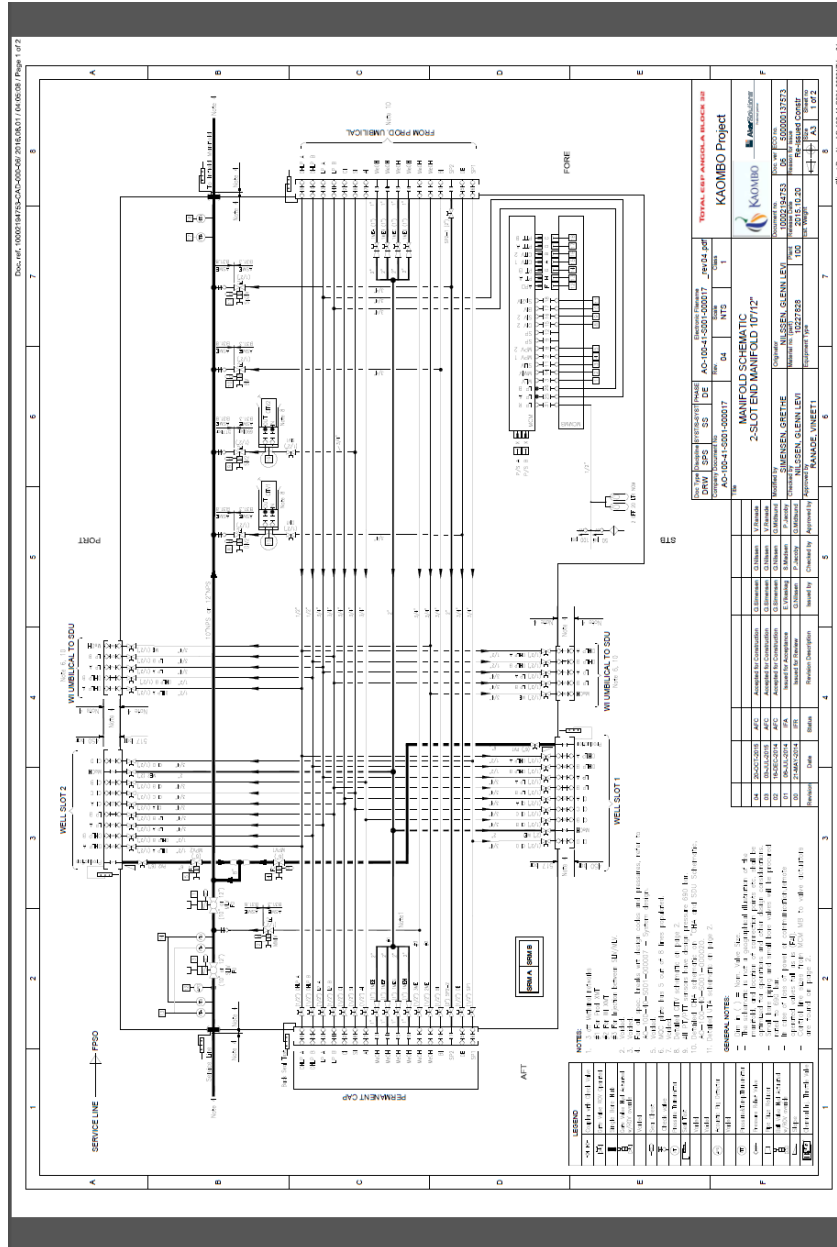
SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 249 of 315

9.5 2 Slot 12" End Manifold

9.5.1 Manifold 2 slot end Schematic

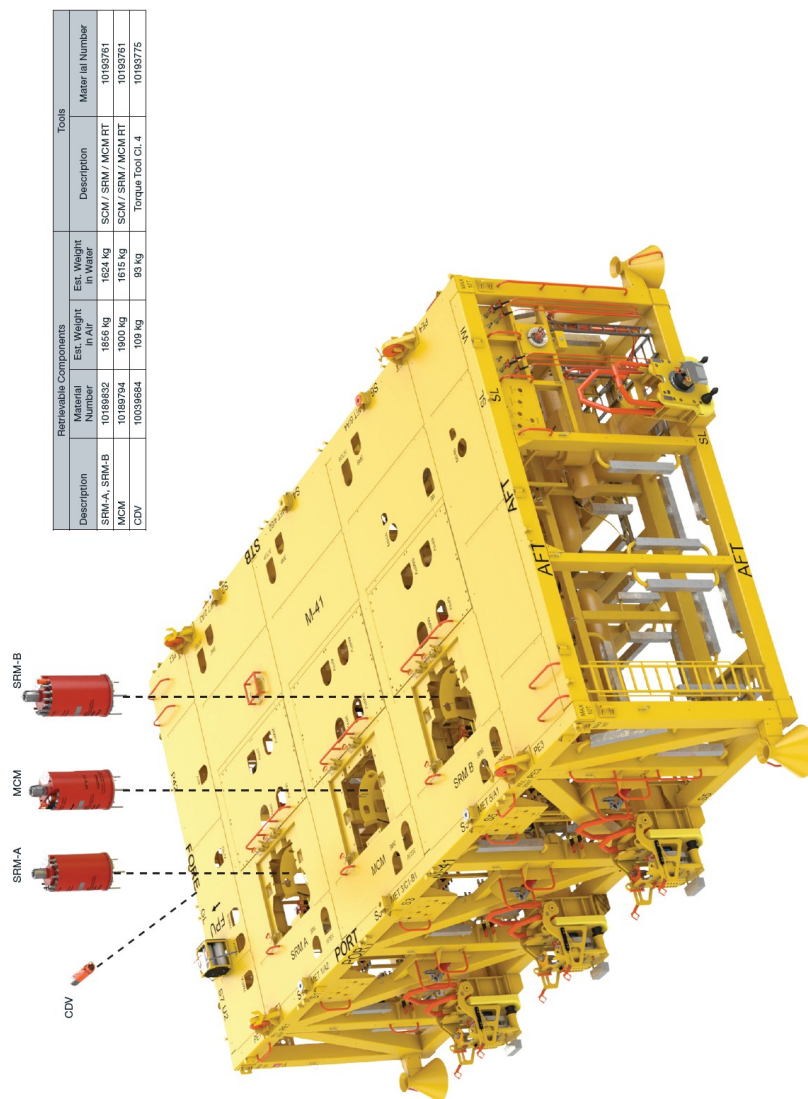


SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
 Version: 05 - Re-issued Constr
 Issue date: 2017.11.17
 Page: 251 of 315

9.5.3 Manifold 2 slot end – Retrievable components



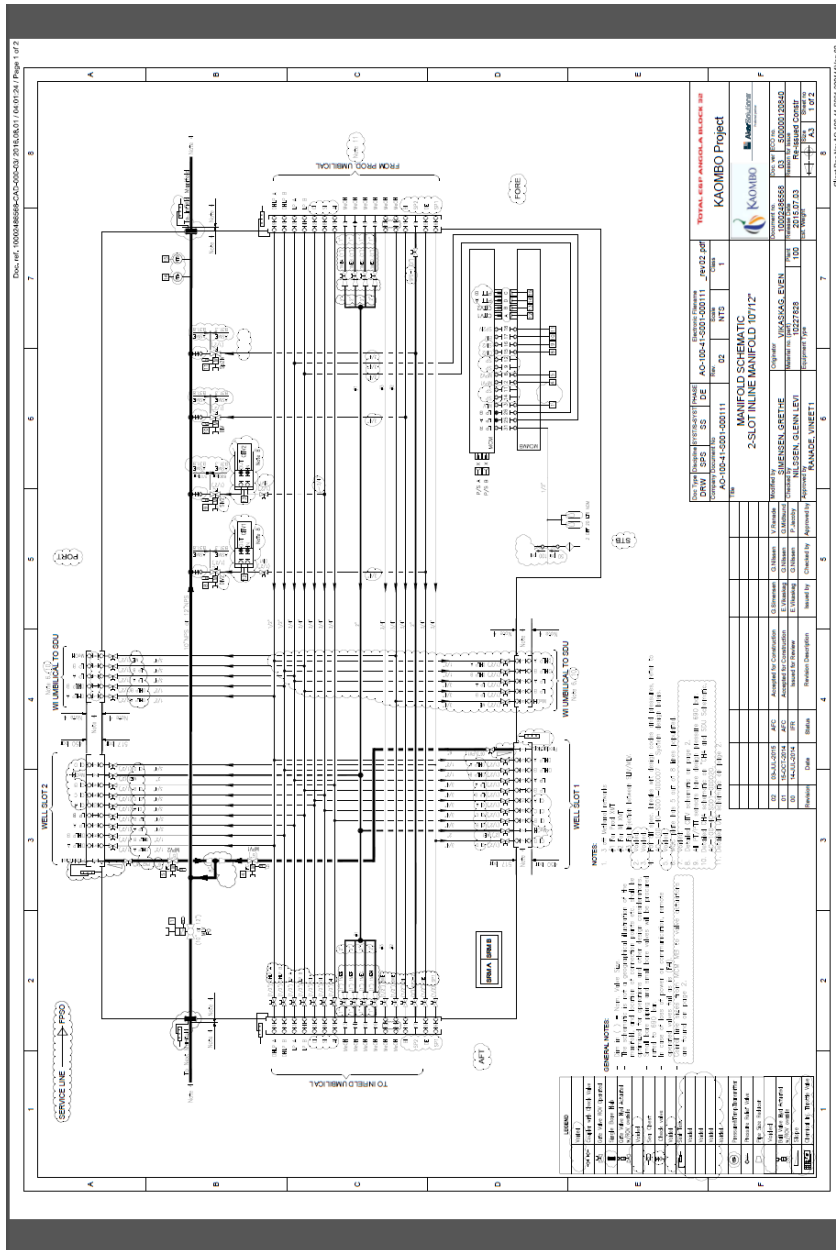
Retrievable Components		Tools	
Description	Material Number	Est. Weight in Water	Est. Weight in Air
SRM-A, SRM-B	10198832	1856 kg	1624 kg
MCM	10198784	1900 kg	1615 kg
CDV	10098684	109 kg	93 kg
			Torque Tool Cl. 4
			Material Number
			10195761
			10195761
			10193775

Illustration from MOHO

GA, 2 Slot 12" End Manifold	10002506028	AO-100-41-S001-000080	10234514
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9.6 2 Slot 12" Infield Manifold

9.6.1 Manifold 2 slot Inline Schematic



Manifold Schematic

10002486568

AO-100-41-S001-00111

10234511

TYPE 3 Use as is (if possible)

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
 Version: 05 - Re-issued Constr
 Issue date: 2017.11.17
 Page: 255 of 315

9.6.3 Manifold 2 slot inline – Retrievable components

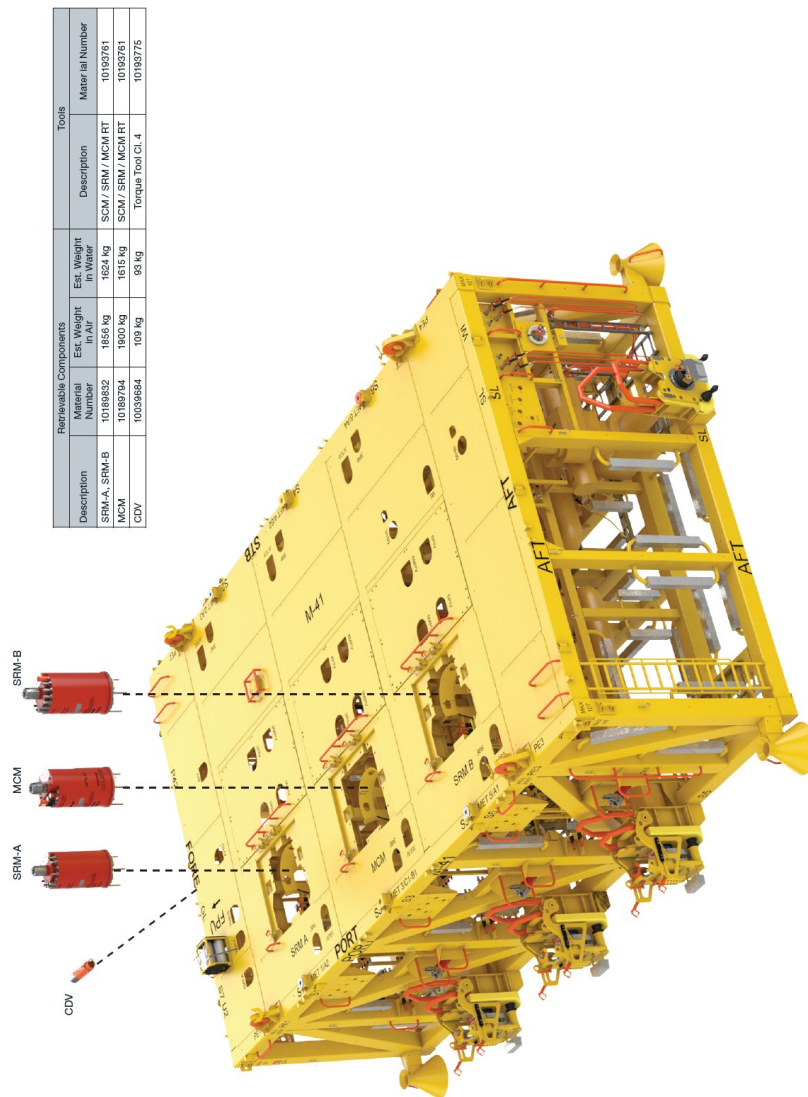
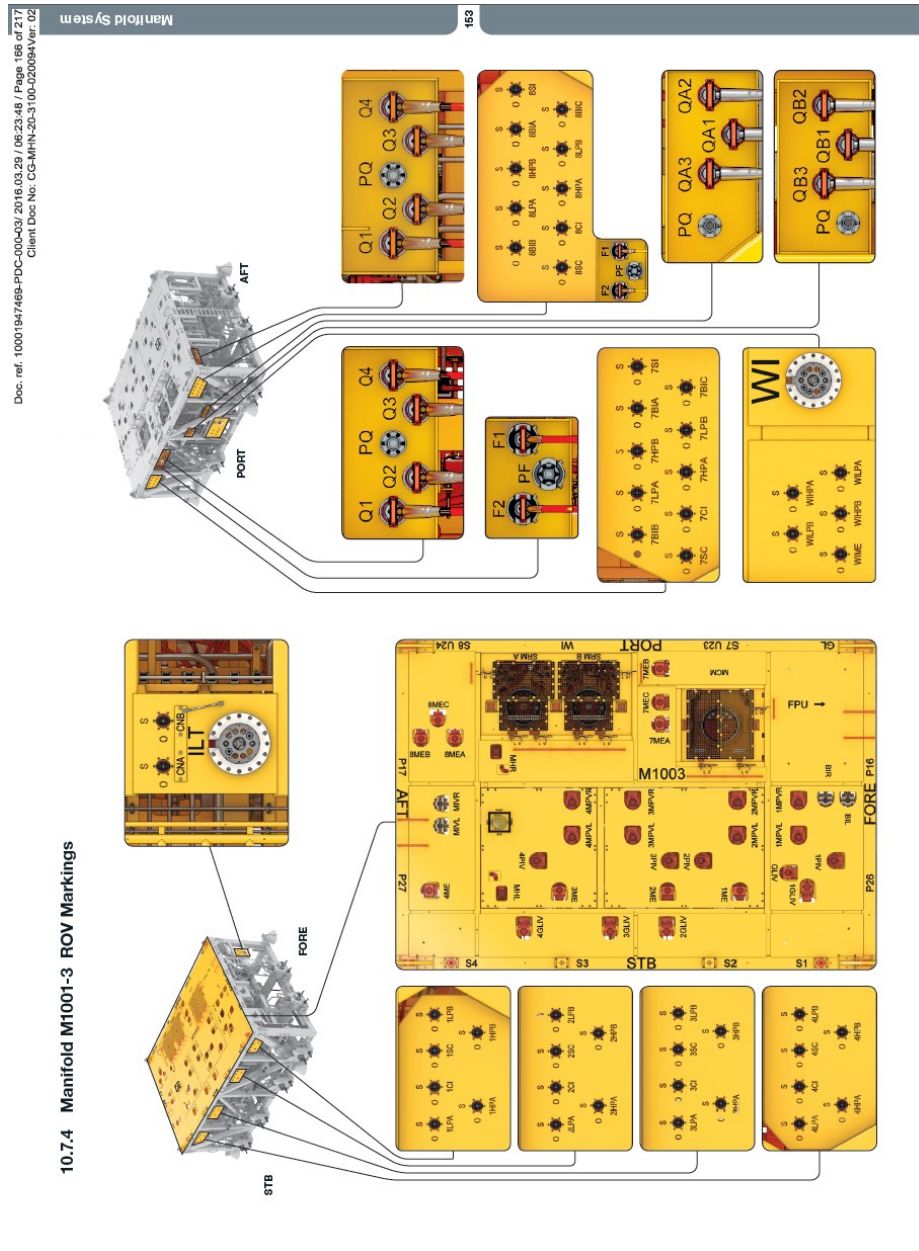


Illustration from MOHO

GA, 2 Slot 12" Infield Manifold	10002505940	AO-100-41-S001-000057	10234511
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9.6.4 Manifold 2 slot Inline ROV Panel Markings



GA, 2 Slot 12" Infield Manifold	10002505940	AO-100-41-S001-000057	10234511
Manifold GA Subsea Marking 2 slot inline	10002505941	AO-100-41-S001-000058	10260453

Picture above is an example from Moho & is how we want it

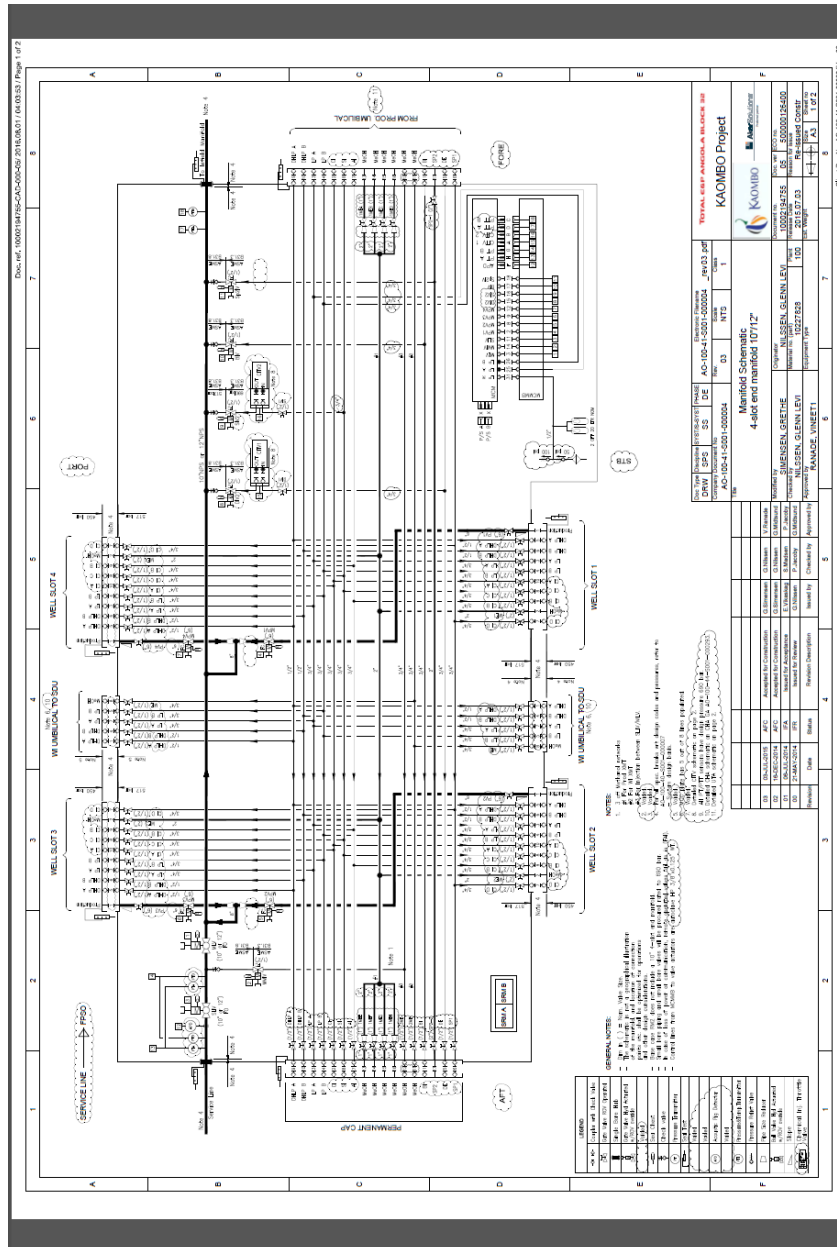
SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 257 of 315

9.7 4 Slot 12" End Manifold

9.7.1 Manifold 4 slot end Schematic



Manifold Schematic 4 slot end

10002194755

AO-100-41-S001-000004

10234513

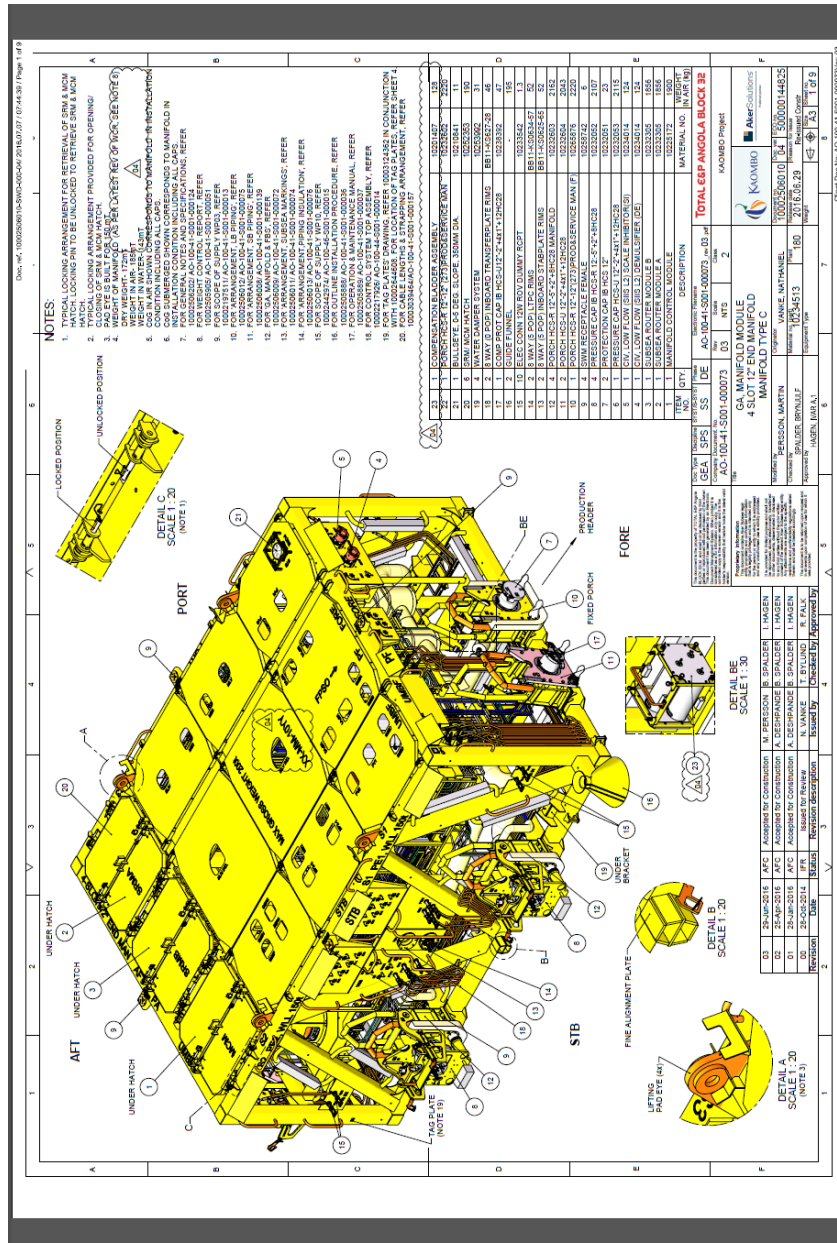
TYPE 3 Use as is (if possible)

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 258 of 315

9.7.2 Manifold 4 slot end GA



GA, 4 Slot 12" End Manifold

10002506010

AO-100-41-S001-000073

10234513

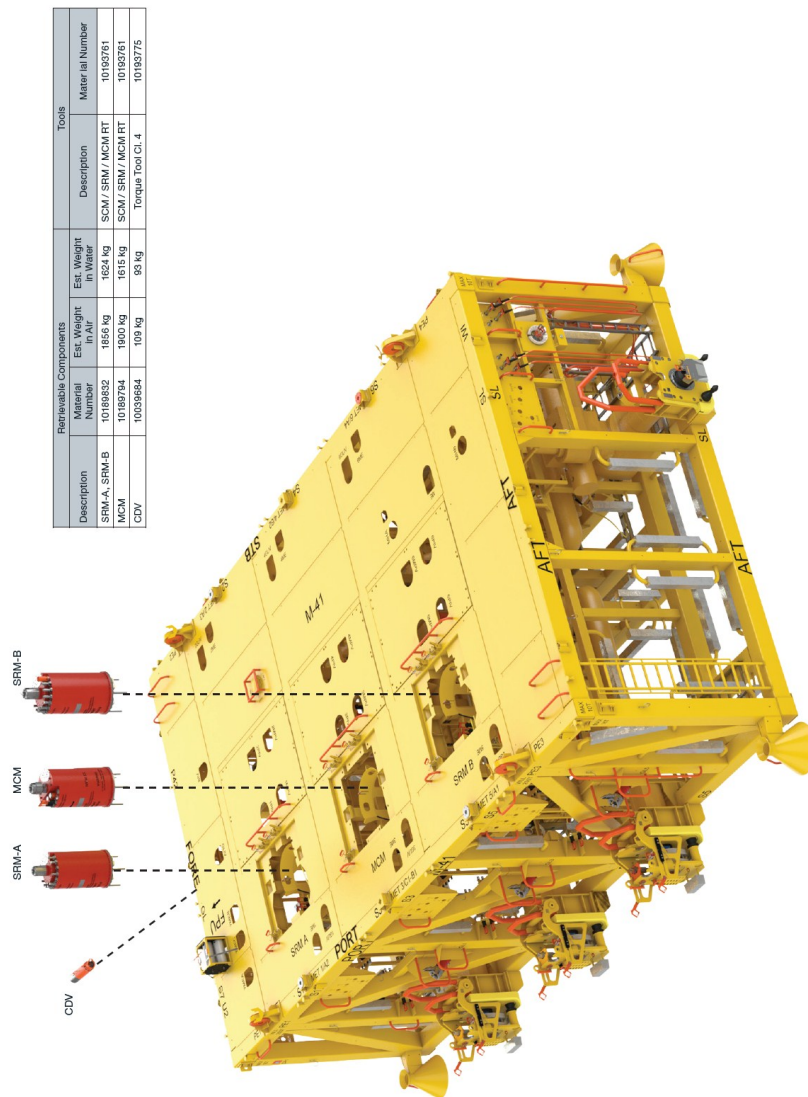
TYPE 1C Glossy 3-D rendering quality with description/details like GA

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
 Version: 05 - Re-issued Constr
 Issue date: 2017.11.17
 Page: 259 of 315

9.7.3 Manifold 4 slot end – Retrievable components



Retrievable Components			Tools	
Description	Material Number	Est. Weight in Air	Description	Material Number
SRM-A, SRM-B	10189832	1856 kg	SCM / SRM / MCM RT	10193761
MCM	10189784	1900 kg	SCM / SRM / MCM RT	10193761
CDV	10039684	109 kg	Torque Tool Cl. 4	10193775

Illustration from MOHO

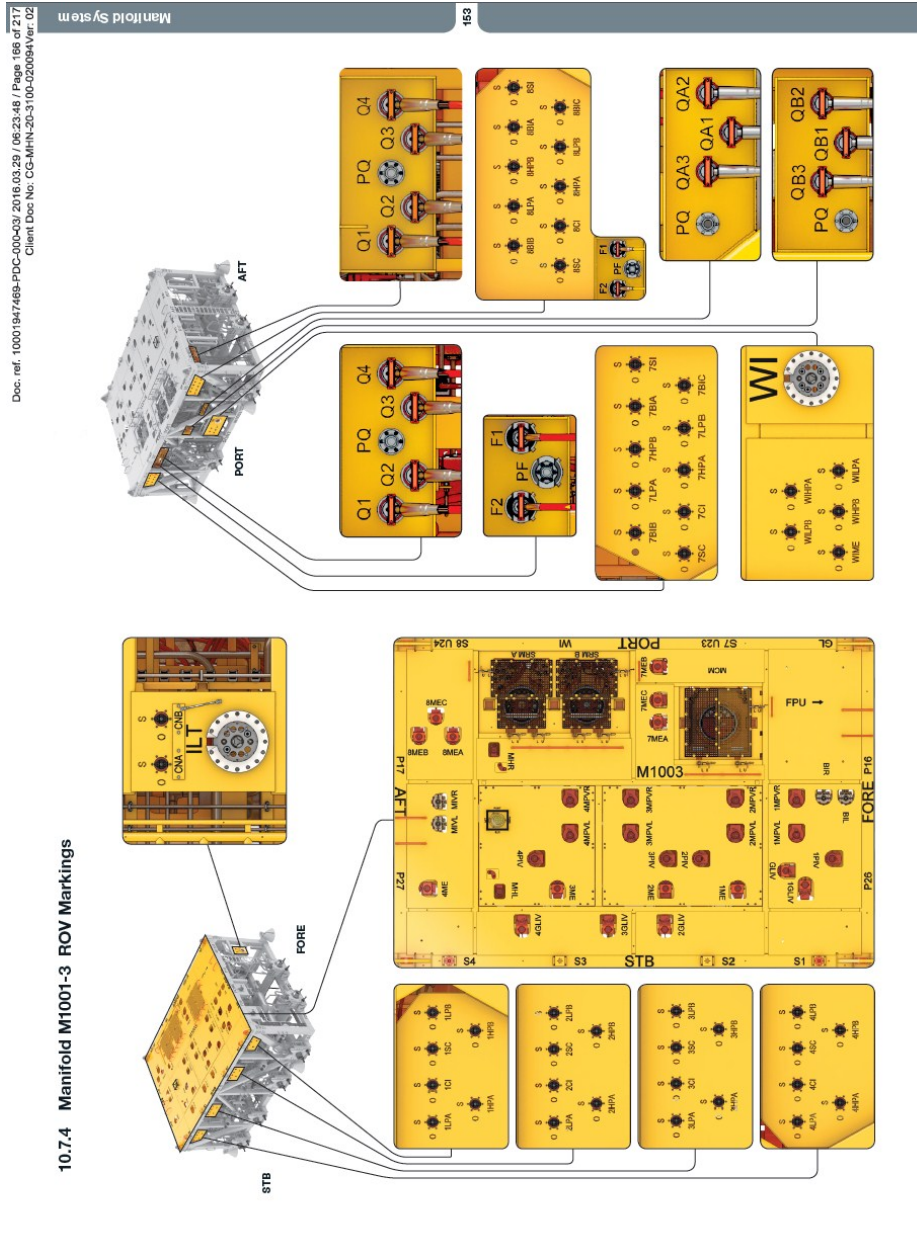
GA, 4 Slot 12" End Manifold	10002506010	AO-100-41-S001-000073	10234513
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SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
 Version: 05 - Re-issued Constr
 Issue date: 2017.11.17
 Page: 260 of 315

9.7.4 Manifold 4 slot end ROV Panel Markings



GA, 4 Slot 12" End Manifold	10002506010	AO-100-41-S001-000073	10234513
Manifold GA Subsea Marking 4 slot end	10002506011	AO-100-41-S001-000074	10260058

Picture above is an example from Moho & is how we want it

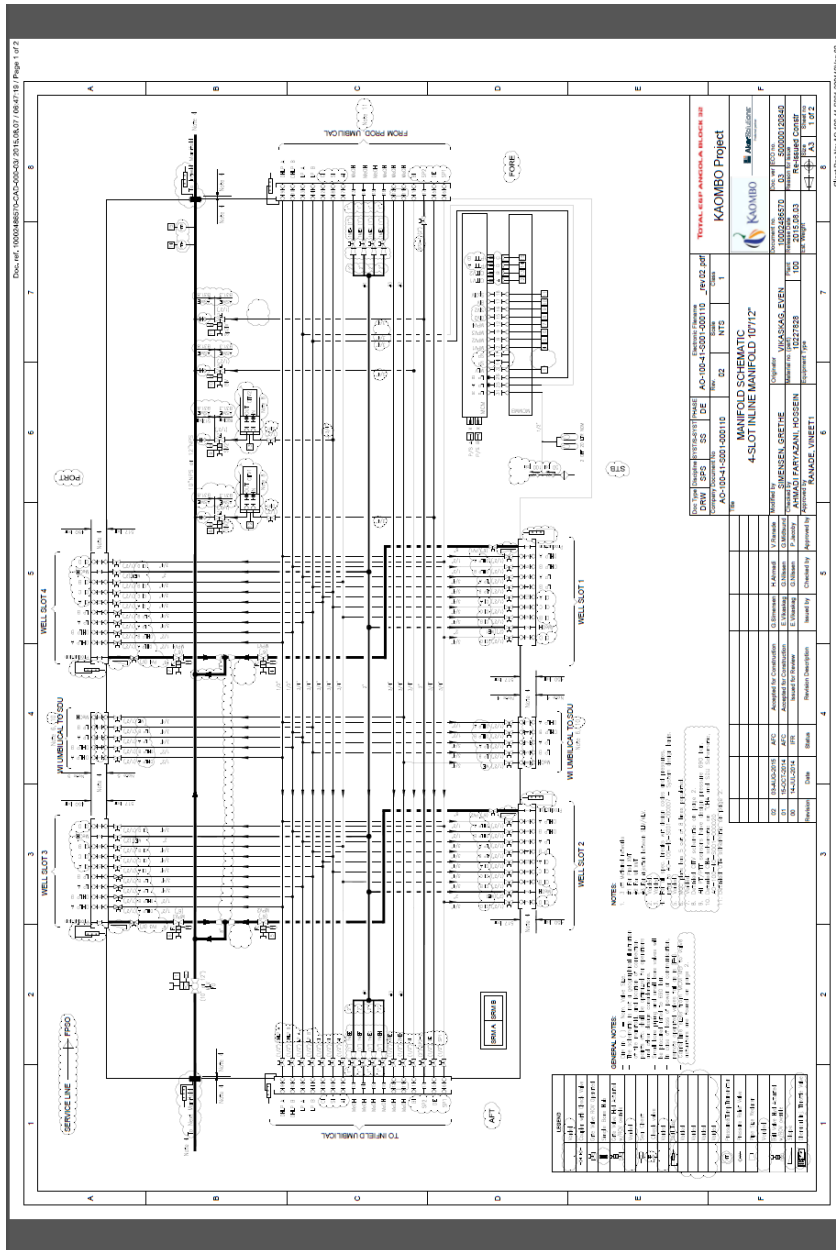
SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 261 of 315

9.8 4 Slot 12" Infield Manifold

9.8.1 Manifold 4 slot Inline Schematic



Manifold Schematic 4 slot inline	10002486570	AO-100-41-S001-000110	10234512
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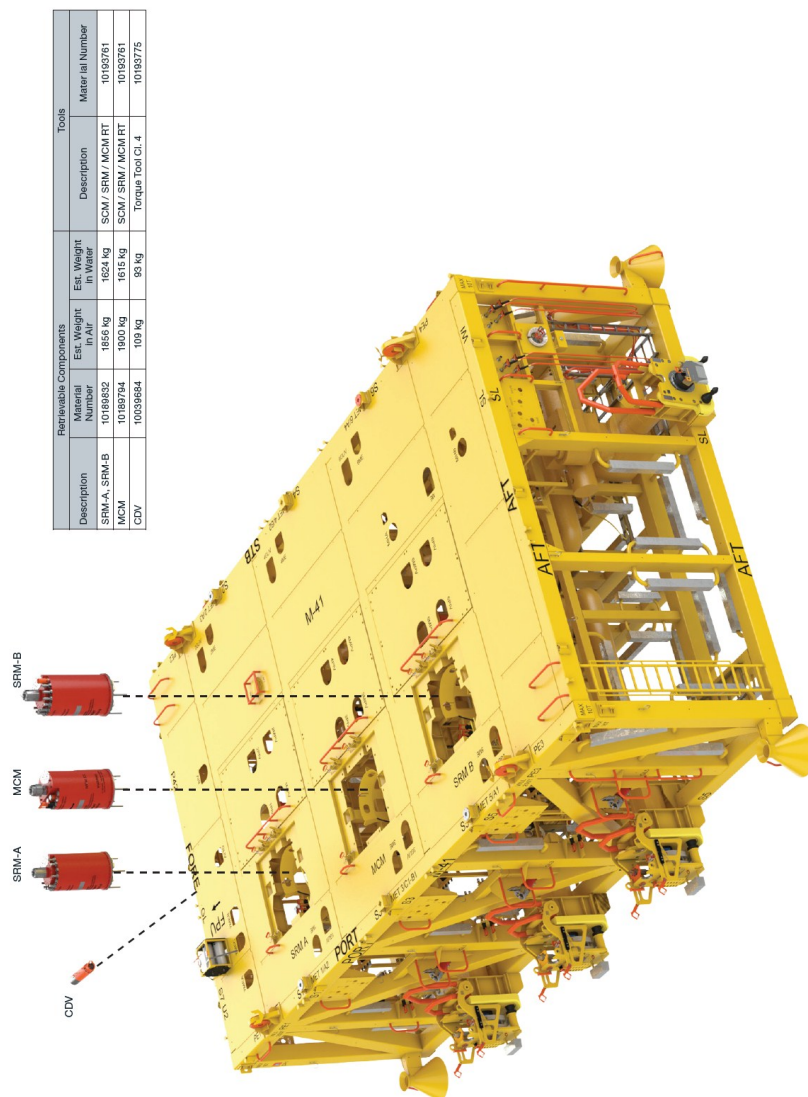
TYPE 3 Use as is (if possible)

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
 Version: 05 - Re-issued Constr
 Issue date: 2017.11.17
 Page: 263 of 315

9.8.3 Manifold 4 slot Inline – Retrievable components

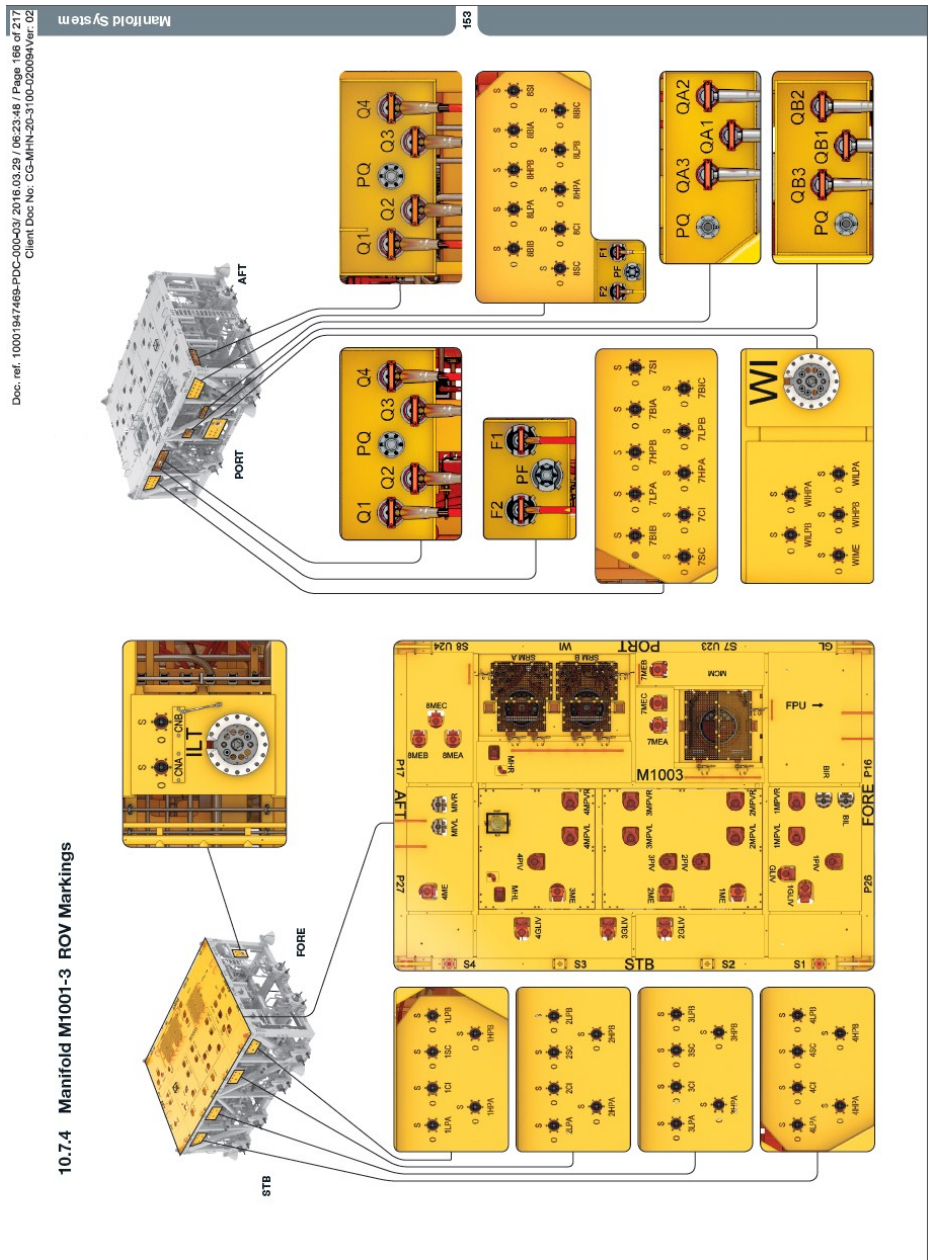


Retrievable Components			Tools	
Description	Material Number	Est. Weight in Air	Description	Material Number
SRM-A, SRM-B	10189532	1856 kg	SCM / SRM / MCM RT	10193761
MCM	10189784	1900 kg	SCM / SRM / MCM RT	10193761
CDV	10039684	109 kg	Torque Tool Cl. 4	10193775

Illustration from MOHO

GA, 4 Slot 12" Infield Manifold	10002505968	AO-100-41-S001-000065	10234512
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9.8.4 Manifold 4 slot Inline ROV Panel Markings



GA, 4 Slot 12" Infield Manifold	10002505968	AO-100-41-S001-000065	10234512
Manifold Subsea Marking 4 slot inline	10002505969	AO-100-41-S001-000066	10260164

Picture above is an example from Moho & is how we want it

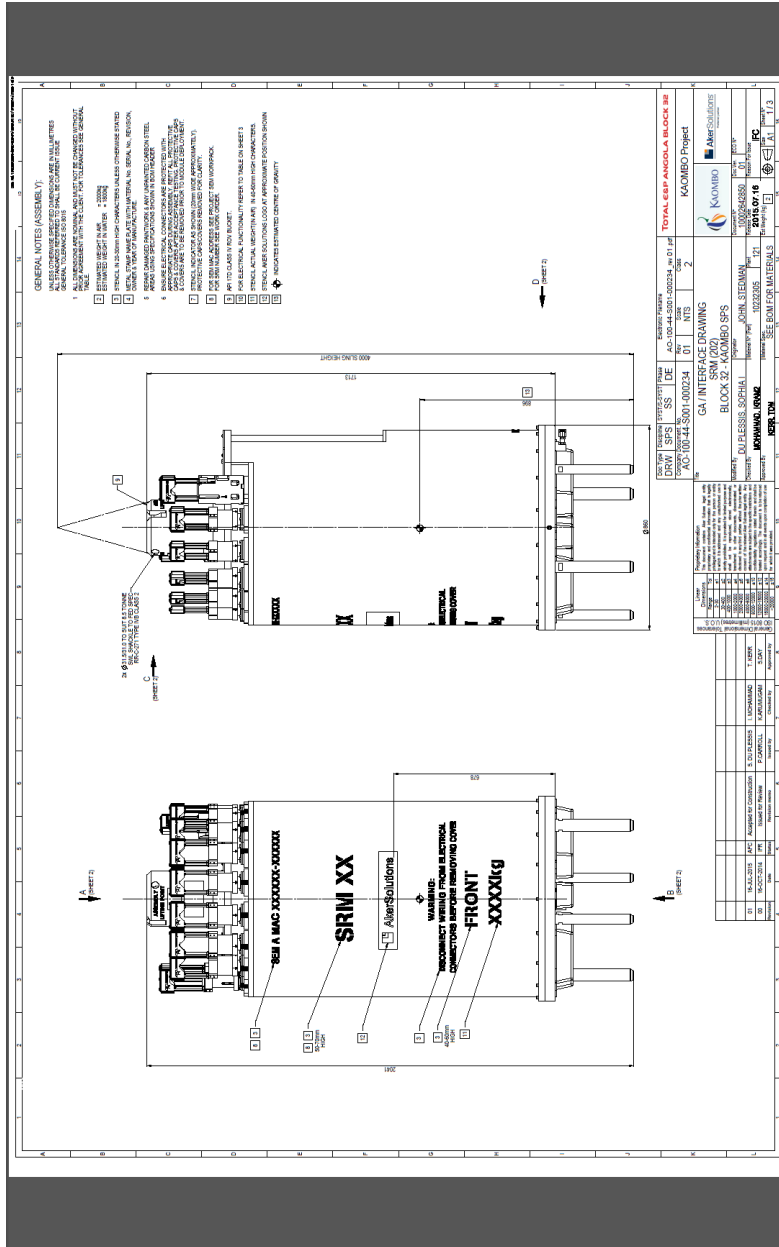
SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 265 of 315

9.9 Retrievable components

9.9.1 SRM



SRM	10002642850	AO-100-44-S001-000234	10232305
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TYPE 2A Colour screenshot solidworks ISO VIEW + drawing as is

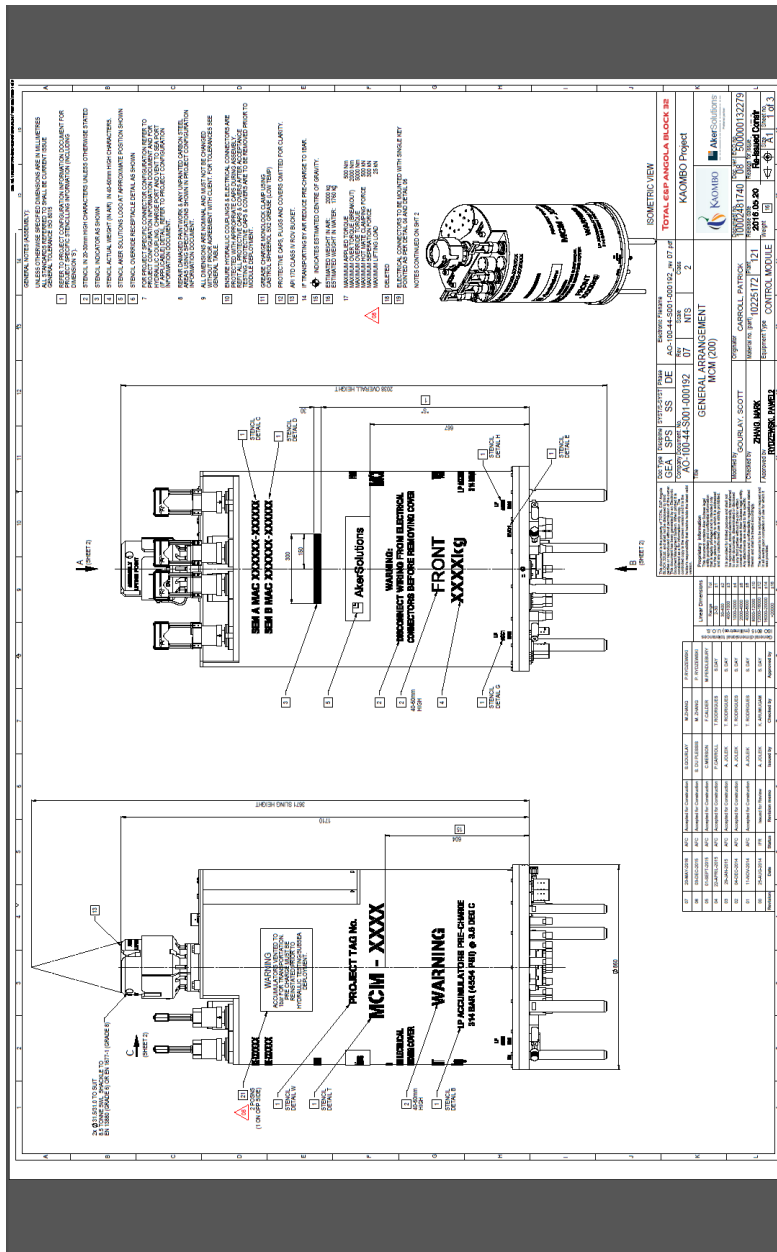
Also include top view with connections overview

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 266 of 315

9.9.2 MCM

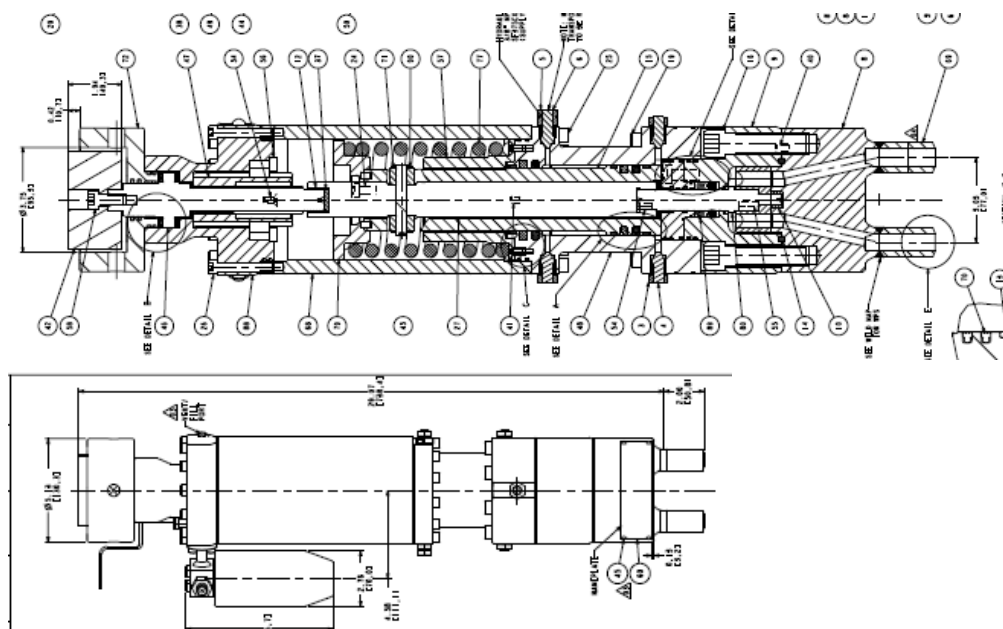


MCM, GA	10002481740	AO-100-44-S001-000192	10225172
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TYPE 2A Colour screenshot solidworks ISO VIEW + drawing as is

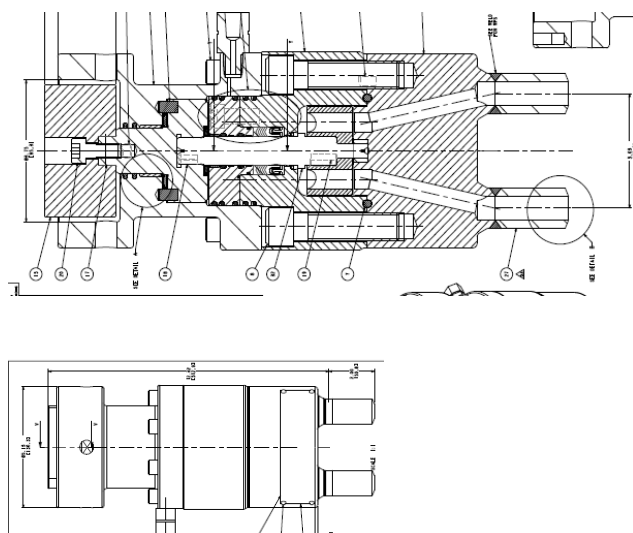
Also include top/bottom view with connections overview

9.10.3 Valve cross section ½” Rotary Gate (10 turn) Valve



½” Rotary Gate Valve (10turn)	10002859716	AO-100-40-S104-000054	10242978
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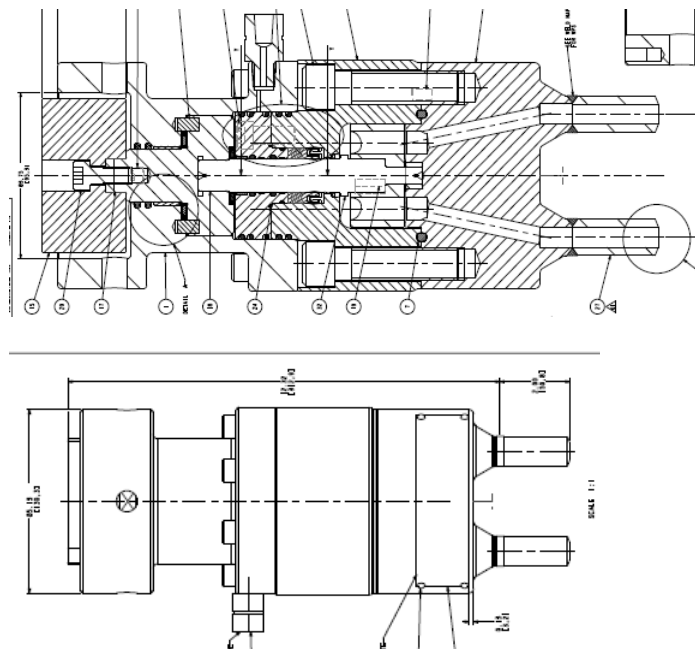
9.10.4 Valve cross section ½” Rotary Gate (1/4 turn) valve



½” Rotary Gate Valve (1/4 turn)	10002859828	AO-100-40-S104-000055	10243040
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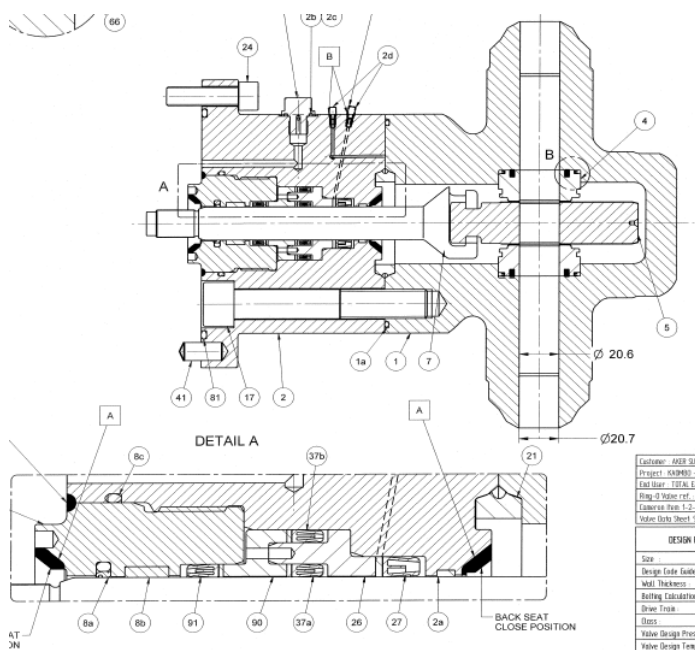
TYPE 4 Use image from sharefile

9.10.5 Valve cross section ½” Rotary Gate Valve



½ “ Rotary Gate Valve (1/4 turn)	10002860018	AO-100-40-S104-000056	10243041
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9.10.6 Valve cross section 1” Gate Valve



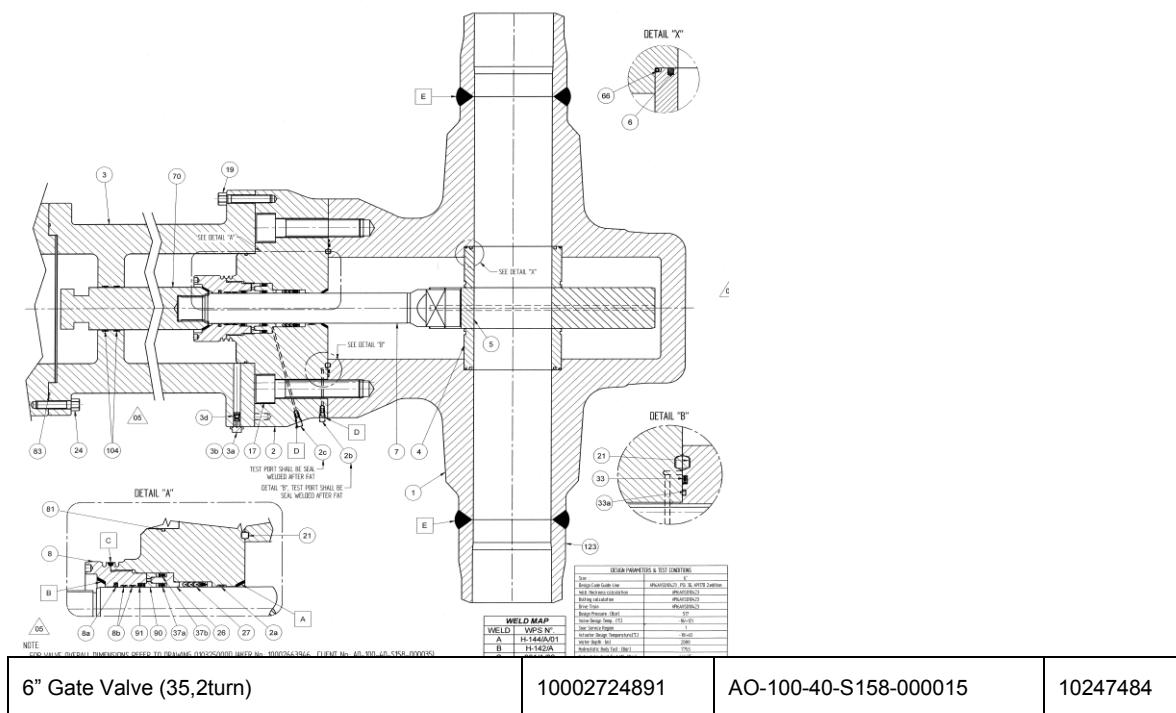
1” Gate Valve	10002786343	AO-100-40-S158-000081	10243042
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SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

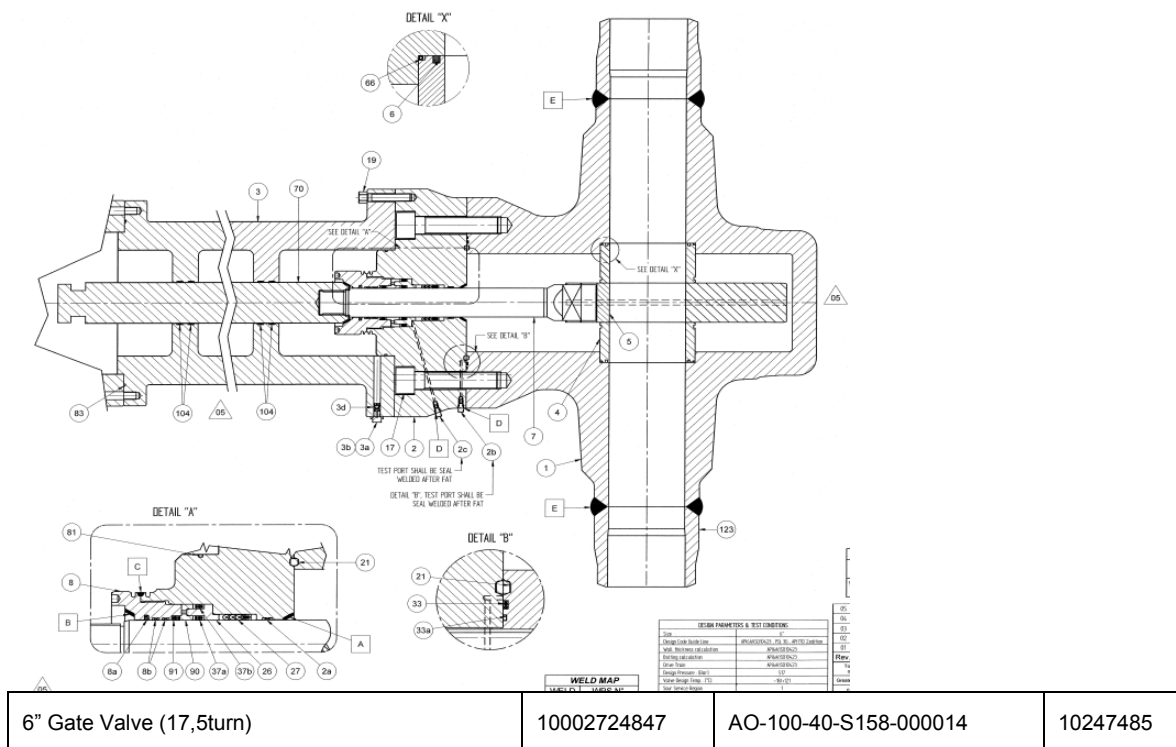
Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 270 of 315

9.10.7 Valve cross section 6" Gate (35,2turn) Valve



6" Gate Valve (35,2turn)	10002724891	AO-100-40-S158-000015	10247484
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9.10.8 Valve cross section 6" Gate (17,5turn) Valve



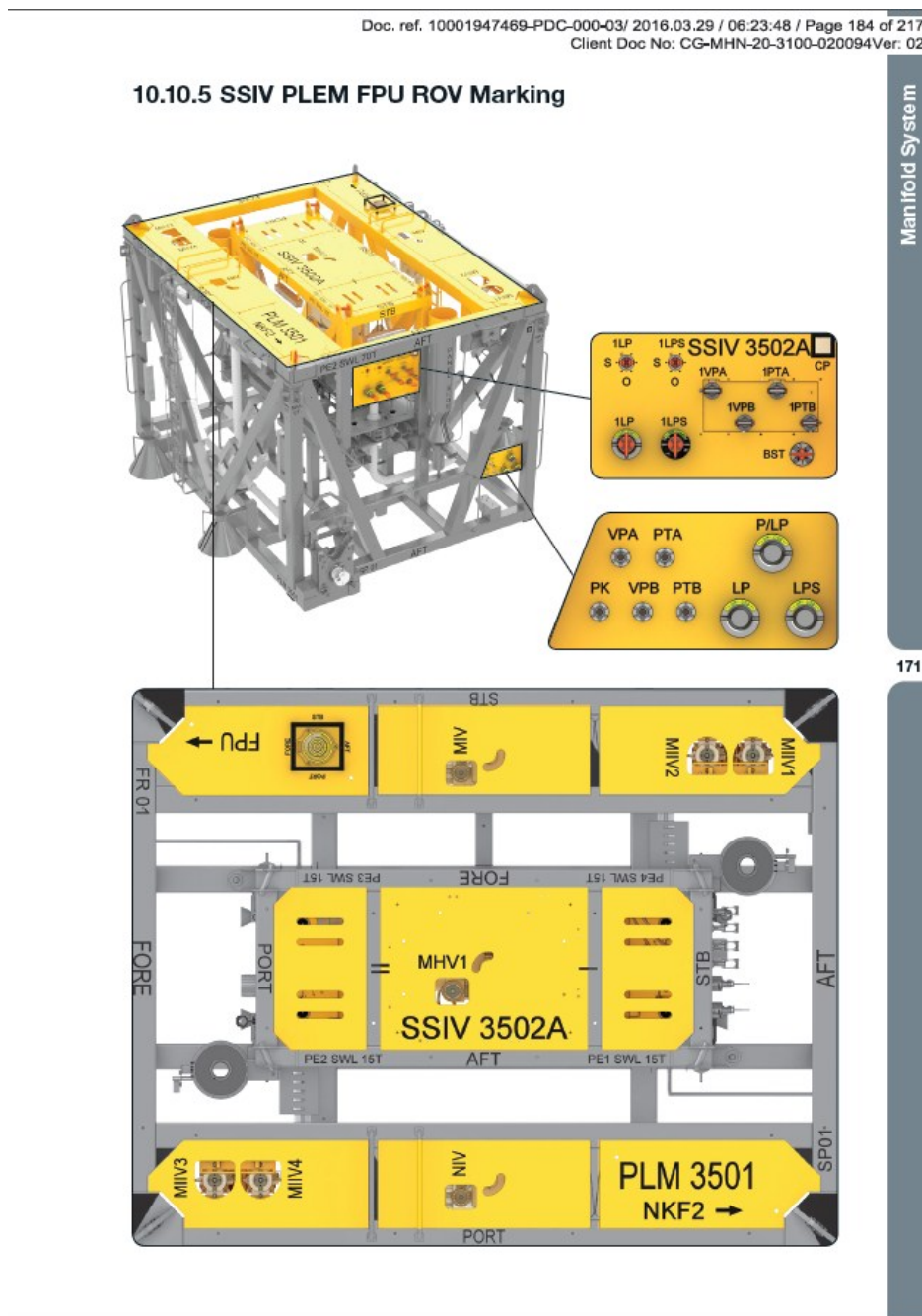
6" Gate Valve (17,5turn)	10002724847	AO-100-40-S158-000014	10247485
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SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
 Version: 05 - Re-issued Constr
 Issue date: 2017.11.17
 Page: 276 of 315

9.12.4 SSIV ROV Panel marking



GA, SSIV Subsea Marking	10002506182	AO-100-47-S001-000009	10234570
GA, SSIV Retrievable Structure	10002506183	AO-100-47-S001-000010	10233723
GA, SSIV Foundation & Support Structure	10002506184	AO-100-47-S001-000011	10233722

Picture above is an example from Moho & is how we want it

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
 Version: 05 - Re-issued Constr
 Issue date: 2017.11.17
 Page: 277 of 315

9.12.5 SSIV Valve torque list

Item No	QTY	SSIV Module	Valve Name	ROV ID	SAP Material Nr.	Nominal Valve Size	Valve Type	Actuation	ROV Interface	ROV Tool	Running Torque (Nm)	Break Out Torque (Nm)	Max torque (Nm)	Damage Torque (Nm)	Closing direction (CW if Clockwise or CCW if counterclockwise)	Approx. number of Turns to Open or Close
1	1		Subsea Safety Isolation Valve	SSIV	10237759	10"	Ball	HYD/ROV	ISO 13628-8 Class 4	Class 4 Torque Tool	1890	1890	2711	3000	CW	60.5
2			MeOH Isolation Valve 1	MIV1	10237878	2-1/16"	Gate	ROV	ISO 13628-8 Class 4	Class 4 Torque Tool	1250	1250	2711	3500	CW	4.2
3			MeOH Isolation Valve 2	MIV2	10237878	2-1/16"	Gate	ROV	ISO 13628-8 Class 4	Class 4 Torque Tool	1250	1250	2711	3500	CW	4.2
4			MeOH Isolation Valve 5	MIV5	10237878	2-1/16"	Gate	ROV	ISO 13628-8 Class 4	Class 4 Torque Tool	1250	1250	2711	3500	CW	4.2
5			MeOH Isolation Valve 6	MIV6	10237878	2-1/16"	Gate	ROV	ISO 13628-8 Class 4	Class 4 Torque Tool	1250	1250	2711	3500	CW	4.2
6			Gas Export Valve 1	GEV1	10237900	10"	Ball	ROV	ISO 13628-8 Class 4	Class 4 Torque Tool	1890	1890	2711	3000	CW	31.5
7			Gas Export Valve 2	GEV2	10237900	10"	Ball	ROV	ISO 13628-8 Class 4	Class 4 Torque Tool	1890	1890	2711	3000	CW	31.5
8			MeOH Isolation Valve 3	MIV3	10243040	1/2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	1/4
9			MeOH Isolation Valve 4	MIV4	10243040	1/2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	1/4
10			LP Isolation Valve 1	LP1	10243040	1/2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	1/4
11			LP Isolation Valve 2	LP2	10243040	1/2"	Rotary Gate	ROV	ROV Manipulator	Paddle Tool	20	51.5	300	400	CW	1/4

VALVE TORQUE LIST

10003313257

AO-100-40-S001-002601

10233723

SPS HANDBOOK TABLE OF CONTENT	Document:	10002504361-PDC-000
	Version:	05 - Re-issued Constr
	Issue date:	2017.11.17
BLOCK 32 - KAOMBO SPS	Page:	279 of 315

10 TIE-IN SYSTEM

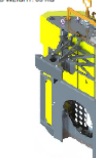
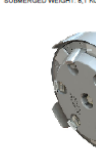
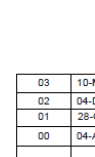
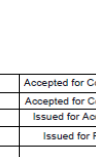
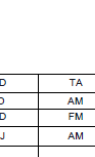
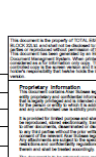
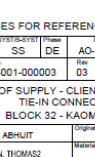
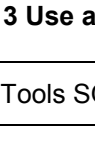
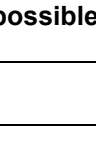
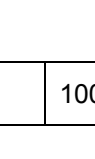
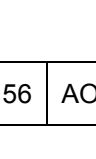
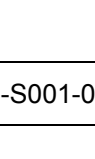
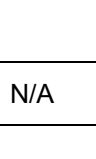
10.1 Reference List

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 281 of 315

10.3 Tie-In Tools Scope of Supply

TOOLING & INSTALLATION EQUIPMENT (BLOCK 32 - KAOMBO SPS)					
1	2	3	4	5	6
TORQUE TOOL 17mm+DISPLAY MATERIAL NO: 1013378 BASE QTY: 8 WEIGHT IN AIR: 80 KG SUBMERGED WEIGHT: 80 KG 	TORQUE TOOL 40mm+DISPLAY MATERIAL NO: 1013475 BASE QTY: 8 WEIGHT IN AIR: 80 KG SUBMERGED WEIGHT: 80 KG 	CALIBRATION JIG 17-17mm+40mm CL2 MATERIAL NO: 1033870 BASE QTY: 12 WEIGHT IN AIR: 18 KG SUBMERGED WEIGHT: NA 	STROKE TOOL HCS 16" & 12" MATERIAL NO: 1014083 BASE QTY: 8 WEIGHT IN AIR: 118 KG SUBMERGED WEIGHT: 78 KG 	STROKE TOOL HCS 16" & 12" MATERIAL NO: 1014083 BASE QTY: 8 WEIGHT IN AIR: 118 KG SUBMERGED WEIGHT: 78 KG 	TOOL CARRIER BRT/BSCT, HCS 16" MATERIAL NO: 1022950 BASE QTY: 4 WEIGHT IN AIR: 28 KG SUBMERGED WEIGHT: 42 KG 
TOOL CARRIER BRT/BSCT, HCS 16" MATERIAL NO: 1013568 BASE QTY: 8 WEIGHT IN AIR: 24 KG SUBMERGED WEIGHT: 36 KG 	TOOL CARRIER HCS 16" MATERIAL NO: 1014515 BASE QTY: 4 WEIGHT IN AIR: 44 KG SUBMERGED WEIGHT: 65 KG 	INSTALLATION TOOL 1227 HCS 12" 2025 KD MATERIAL NO: 1014519 BASE QTY: 4 WEIGHT IN AIR: 167 KG SUBMERGED WEIGHT: 160 KG 	INSTALLATION TOOL 1227 HCS 12" 2025 KD MATERIAL NO: 1022120 BASE QTY: 4 WEIGHT IN AIR: 160 KG SUBMERGED WEIGHT: 157 KG 	SEAL REPLACEMENT INSERT HCS 16" 12" (2025) MATERIAL NO: 1022584 BASE QTY: 4 WEIGHT IN AIR: 20 KG SUBMERGED WEIGHT: 15.0 KG 	CLEANING DISC HCS 16" 14" (B) (2025) MATERIAL NO: 1022950 BASE QTY: 4 WEIGHT IN AIR: 28 KG SUBMERGED WEIGHT: 42 KG 
CLEANING DISC HCS 16" 14" (B) (2025) MATERIAL NO: 1022950 BASE QTY: 4 WEIGHT IN AIR: 28 KG SUBMERGED WEIGHT: 42 KG 	SEAL REPLACEMENT INSERT HCS 16" 12" (2025) MATERIAL NO: 1022584 BASE QTY: 4 WEIGHT IN AIR: 20 KG SUBMERGED WEIGHT: 15.0 KG 	SEAL REPLACEMENT INSERT HCS 16" 12" (2025) MATERIAL NO: 1022584 BASE QTY: 4 WEIGHT IN AIR: 20 KG SUBMERGED WEIGHT: 15.0 KG 	SEAL REPLACEMENT INSERT HCS 16" 12" (2025) MATERIAL NO: 1022584 BASE QTY: 4 WEIGHT IN AIR: 20 KG SUBMERGED WEIGHT: 15.0 KG 	SEAL REPLACEMENT INSERT HCS 16" 12" (2025) MATERIAL NO: 1022584 BASE QTY: 4 WEIGHT IN AIR: 20 KG SUBMERGED WEIGHT: 15.0 KG 	CLEANING DISC HCS 16" 14" (B) (2025) MATERIAL NO: 1022950 BASE QTY: 4 WEIGHT IN AIR: 28 KG SUBMERGED WEIGHT: 42 KG 
CLEANING DISC HCS 16" 14" (B) (2025) MATERIAL NO: 1022950 BASE QTY: 4 WEIGHT IN AIR: 28 KG SUBMERGED WEIGHT: 42 KG 	SEAL REPLACEMENT INSERT HCS 16" 12" (2025) MATERIAL NO: 1022584 BASE QTY: 4 WEIGHT IN AIR: 20 KG SUBMERGED WEIGHT: 15.0 KG 	SEAL REPLACEMENT INSERT HCS 16" 12" (2025) MATERIAL NO: 1022584 BASE QTY: 4 WEIGHT IN AIR: 20 KG SUBMERGED WEIGHT: 15.0 KG 	SEAL REPLACEMENT INSERT HCS 16" 12" (2025) MATERIAL NO: 1022584 BASE QTY: 4 WEIGHT IN AIR: 20 KG SUBMERGED WEIGHT: 15.0 KG 	SEAL REPLACEMENT INSERT HCS 16" 12" (2025) MATERIAL NO: 1022584 BASE QTY: 4 WEIGHT IN AIR: 20 KG SUBMERGED WEIGHT: 15.0 KG 	CLEANING DISC HCS 16" 14" (B) (2025) MATERIAL NO: 1022950 BASE QTY: 4 WEIGHT IN AIR: 28 KG SUBMERGED WEIGHT: 42 KG 
CLEANING DISC HCS 16" 14" (B) (2025) MATERIAL NO: 1022950 BASE QTY: 4 WEIGHT IN AIR: 28 KG SUBMERGED WEIGHT: 42 KG 	SEAL REPLACEMENT INSERT HCS 16" 12" (2025) MATERIAL NO: 1022584 BASE QTY: 4 WEIGHT IN AIR: 20 KG SUBMERGED WEIGHT: 15.0 KG 	SEAL REPLACEMENT INSERT HCS 16" 12" (2025) MATERIAL NO: 1022584 BASE QTY: 4 WEIGHT IN AIR: 20 KG SUBMERGED WEIGHT: 15.0 KG 	SEAL REPLACEMENT INSERT HCS 16" 12" (2025) MATERIAL NO: 1022584 BASE QTY: 4 WEIGHT IN AIR: 20 KG SUBMERGED WEIGHT: 15.0 KG 	SEAL REPLACEMENT INSERT HCS 16" 12" (2025) MATERIAL NO: 1022584 BASE QTY: 4 WEIGHT IN AIR: 20 KG SUBMERGED WEIGHT: 15.0 KG 	CLEANING DISC HCS 16" 14" (B) (2025) MATERIAL NO: 1022950 BASE QTY: 4 WEIGHT IN AIR: 28 KG SUBMERGED WEIGHT: 42 KG 
CLEANING DISC HCS 16" 14" (B) (2025) MATERIAL NO: 1022950 BASE QTY: 4 WEIGHT IN AIR: 28 KG SUBMERGED WEIGHT: 42 KG 	SEAL REPLACEMENT INSERT HCS 16" 12" (2025) MATERIAL NO: 1022584 BASE QTY: 4 WEIGHT IN AIR: 20 KG SUBMERGED WEIGHT: 15.0 KG 	SEAL REPLACEMENT INSERT HCS 16" 12" (2025) MATERIAL NO: 1022584 BASE QTY: 4 WEIGHT IN AIR: 20 KG SUBMERGED WEIGHT: 15.0 KG 	SEAL REPLACEMENT INSERT HCS 16" 12" (2025) MATERIAL NO: 1022584 BASE QTY: 4 WEIGHT IN AIR: 20 KG SUBMERGED WEIGHT: 15.0 KG 	SEAL REPLACEMENT INSERT HCS 16" 12" (2025) MATERIAL NO: 1022584 BASE QTY: 4 WEIGHT IN AIR: 20 KG SUBMERGED WEIGHT: 15.0 KG 	CLEANING DISC HCS 16" 14" (B) (2025) MATERIAL NO: 1022950 BASE QTY: 4 WEIGHT IN AIR: 28 KG SUBMERGED WEIGHT: 42 KG 
CLEANING DISC HCS 16" 14" (B) (2025) MATERIAL NO: 1022950 BASE QTY: 4 WEIGHT IN AIR: 28 KG SUBMERGED WEIGHT: 42 KG 	SEAL REPLACEMENT INSERT HCS 16" 12" (2025) MATERIAL NO: 1022584 BASE QTY: 4 WEIGHT IN AIR: 20 KG SUBMERGED WEIGHT: 15.0 KG 	SEAL REPLACEMENT INSERT HCS 16" 12" (2025) MATERIAL NO: 1022584 BASE QTY: 4 WEIGHT IN AIR: 20 KG SUBMERGED WEIGHT: 15.0 KG 	SEAL REPLACEMENT INSERT HCS 16" 12" (2025) MATERIAL NO: 1022584 BASE QTY: 4 WEIGHT IN AIR: 20 KG SUBMERGED WEIGHT: 15.0 KG 	SEAL REPLACEMENT INSERT HCS 16" 12" (2025) MATERIAL NO: 1022584 BASE QTY: 4 WEIGHT IN AIR: 20 KG SUBMERGED WEIGHT: 15.0 KG 	CLEANING DISC HCS 16" 14" (B) (2025) MATERIAL NO: 1022950 BASE QTY: 4 WEIGHT IN AIR: 28 KG SUBMERGED WEIGHT: 42 KG 
CLEANING DISC HCS 16" 14" (B) (2025) MATERIAL NO: 1022950 BASE QTY: 4 WEIGHT IN AIR: 28 KG SUBMERGED WEIGHT: 42 KG 	SEAL REPLACEMENT INSERT HCS 16" 12" (2025) MATERIAL NO: 1022584 BASE QTY: 4 WEIGHT IN AIR: 20 KG SUBMERGED WEIGHT: 15.0 KG 	SEAL REPLACEMENT INSERT HCS 16" 12" (2025) MATERIAL NO: 1022584 BASE QTY: 4 WEIGHT IN AIR: 20 KG SUBMERGED WEIGHT: 15.0 KG 	SEAL REPLACEMENT INSERT HCS 16" 12" (2025) MATERIAL NO: 1022584 BASE QTY: 4 WEIGHT IN AIR: 20 KG SUBMERGED WEIGHT: 15.0 KG 	SEAL REPLACEMENT INSERT HCS 16" 12" (2025) MATERIAL NO: 1022584 BASE QTY: 4 WEIGHT IN AIR: 20 KG SUBMERGED WEIGHT: 15.0 KG 	CLEANING DISC HCS 16" 14" (B) (2025) MATERIAL NO: 1022950 BASE QTY: 4 WEIGHT IN AIR: 28 KG SUBMERGED WEIGHT: 42 KG 
CLEANING DISC HCS 16" 14" (B) (2025) MATERIAL NO: 1022950 BASE QTY: 4 WEIGHT IN AIR: 28 KG SUBMERGED WEIGHT: 42 KG 	SEAL REPLACEMENT INSERT HCS 16" 12" (2025) MATERIAL NO: 1022584 BASE QTY: 4 WEIGHT IN AIR: 20 KG SUBMERGED WEIGHT: 15.0 KG 	SEAL REPLACEMENT INSERT HCS 16" 12" (2025) MATERIAL NO: 1022584 BASE QTY: 4 WEIGHT IN AIR: 20 KG SUBMERGED WEIGHT: 15.0 KG 	SEAL REPLACEMENT INSERT HCS 16" 12" (2025) MATERIAL NO: 1022584 BASE QTY: 4 WEIGHT IN AIR: 20 KG SUBMERGED WEIGHT: 15.0 KG 	SEAL REPLACEMENT INSERT HCS 16" 12" (2025) MATERIAL NO: 1022584 BASE QTY: 4 WEIGHT IN AIR: 20 KG SUBMERGED WEIGHT: 15.0 KG 	CLEANING DISC HCS 16" 14" (B) (2025) MATERIAL NO: 1022950 BASE QTY: 4 WEIGHT IN AIR: 28 KG SUBMERGED WEIGHT: 42 KG 

TYPE 3 Use as is (if possible)

Tie In Tools SOS	10002419156	AO-100-46-S001-000003	N/A
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SPS HANDBOOK TABLE OF CONTENT	Document:	10002504361-PDC-000
	Version:	05 - Re-issued Constr
	Issue date:	2017.11.17
BLOCK 32 - KAOMBO SPS	Page:	282 of 315

10.4 Tie in general assembly connections

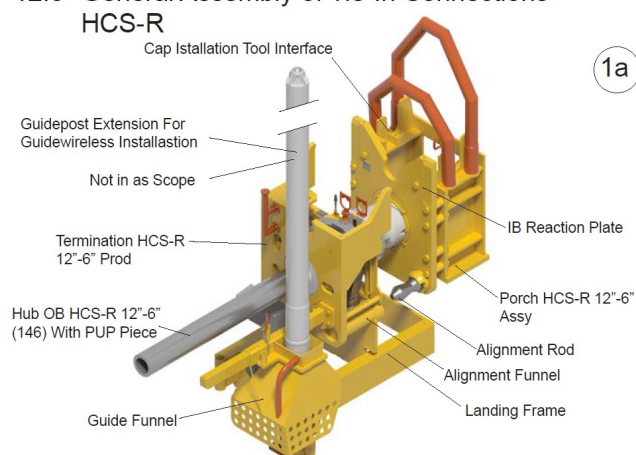
See SOS 10002242727 for full list

10.4.1 Horizontal Connection System (HCS)-R 16"

Use model from animation

Include description where HCS-R 16" is used on SPS

12.3 General Assembly of Tie-In Connections HCS-R



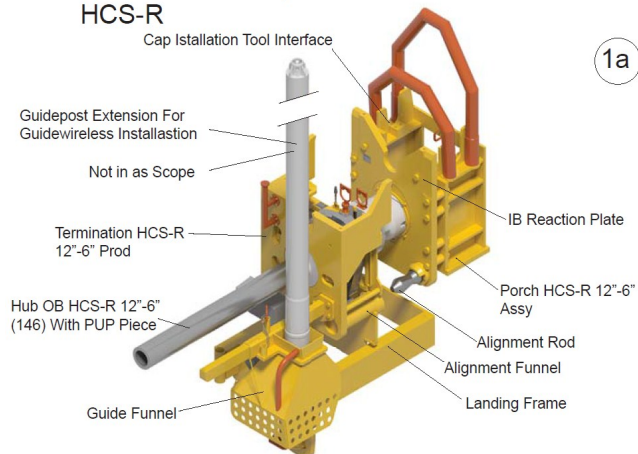
CAPS for HCS-R 16" tie-in connection to be shown here

10.4.2 HCS-R 12" (Insulated)

Use model from animation

Include description where HCS-R 12" is used on SPS

12.3 General Assembly of Tie-In Connections HCS-R



CAPS for HCS-R 12" tie-in connection to be shown here

10.4.3 HCS-R 6"

Use model from animation

Include description where HCS-R 6" is used on SPS

12.3 General Assembly of Tie-In Connections HCS-R

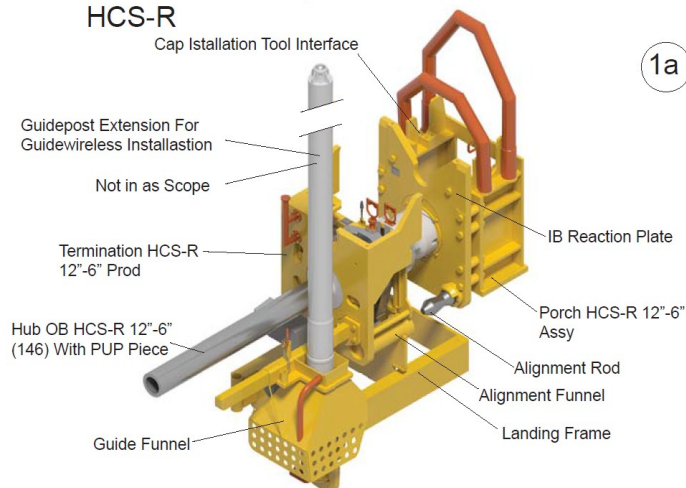


Illustration from Brynhild HB

CAPS for HCS-R 6" tie-in connection to be shown here

SPS HANDBOOK TABLE OF CONTENT	Document:	10002504361-PDC-000
	Version:	05 - Re-issued Constr
	Issue date:	2017.11.17
BLOCK 32 - KAOMBO SPS	Page:	285 of 315

10.4.4 HCS-U 12”

Use model from animation

Include description where HCS-U 12” is used on SPS

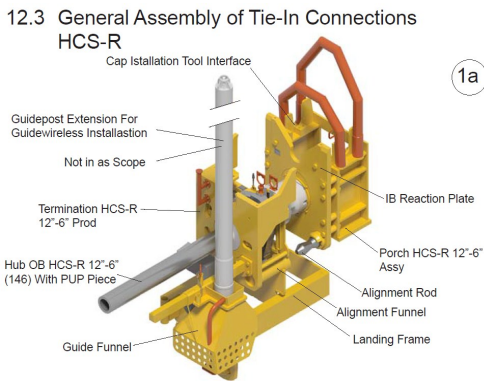


Illustration from Brynhild HB

For full SOS overview see dir below

Tie In SOS	10002242727	AO-100-47-S001-000017	N/A
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CAPS for HCS-U 12” tie-in connection to be shown here

	Document:	10002504361-PDC-000
SPS HANDBOOK TABLE OF CONTENT	Version:	05 - Re-issued Constr
	Issue date:	2017.11.17
BLOCK 32 - KAOMBO SPS	Page:	286 of 315

10.4.5 Flow Control Module (FCM) connection

Use model from animation
CAPS for FCM tie-in connection to be shown here

	Document:	10002504361-PDC-000
SPS HANDBOOK TABLE OF CONTENT	Version:	05 - Re-issued Constr
	Issue date:	2017.11.17
BLOCK 32 - KAOMBO SPS	Page:	287 of 315

10.4.6 SSIV Vertical Connection Module (VMC)

Use model from animation
CAPS for SSIV VMC tie-in connection to be shown here

SPS HANDBOOK TABLE OF CONTENT	Document:	10002504361-PDC-000
	Version:	05 - Re-issued Constr
	Issue date:	2017.11.17
BLOCK 32 - KAOMBO SPS	Page:	288 of 315

11 ROV INTERVENTION TOOLING

11.1 Reference list

Tie In Tools SOS	10002484290	AO-100-46-S001-000006	N/A
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11.3 Deployment Basket

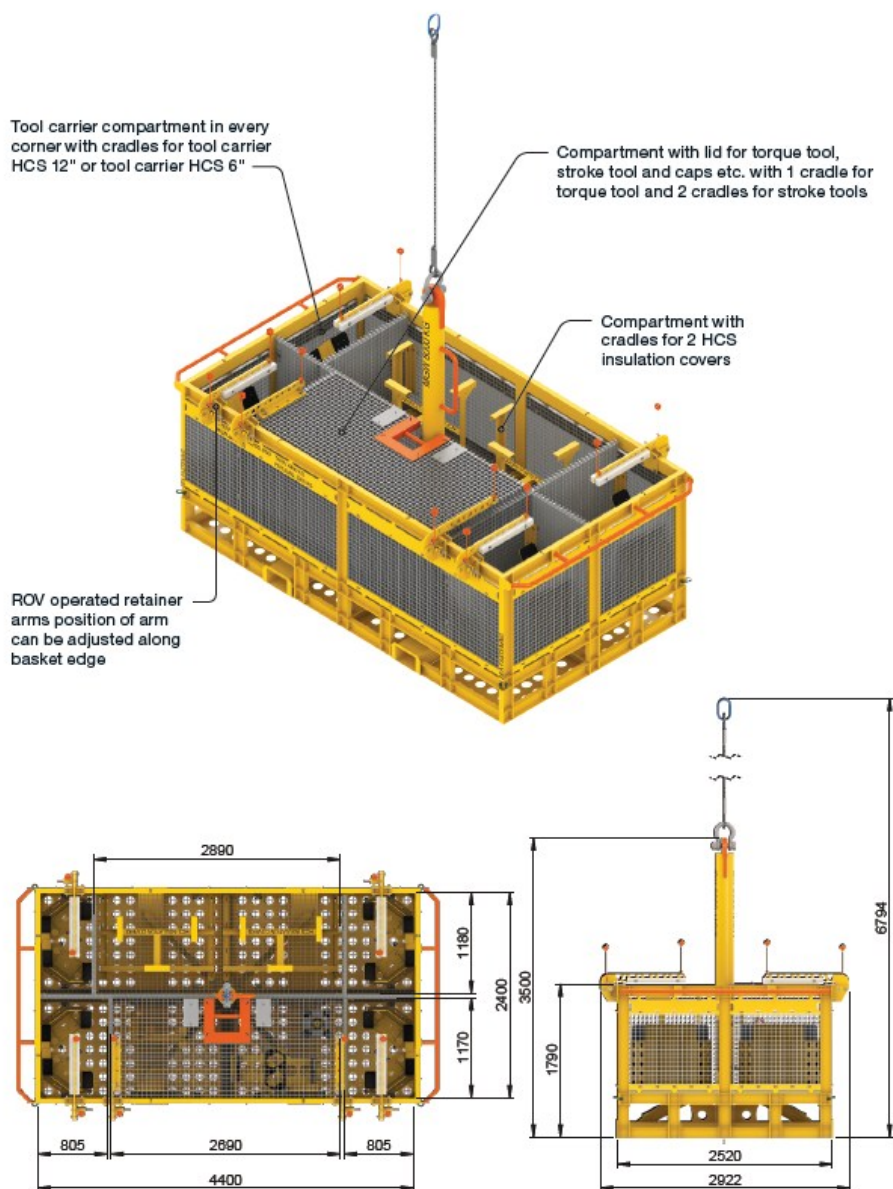


Illustration only – MOHO

GA, Deployment Basket	10002517580	AO-100-46-S001-000345	10241259
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11.4 SCM/SRM/MCM Running Tool

Client Doc No: CG-MHN-20-3100-020094Ver:

12.5 SCM/MCM/SRM Running Tool

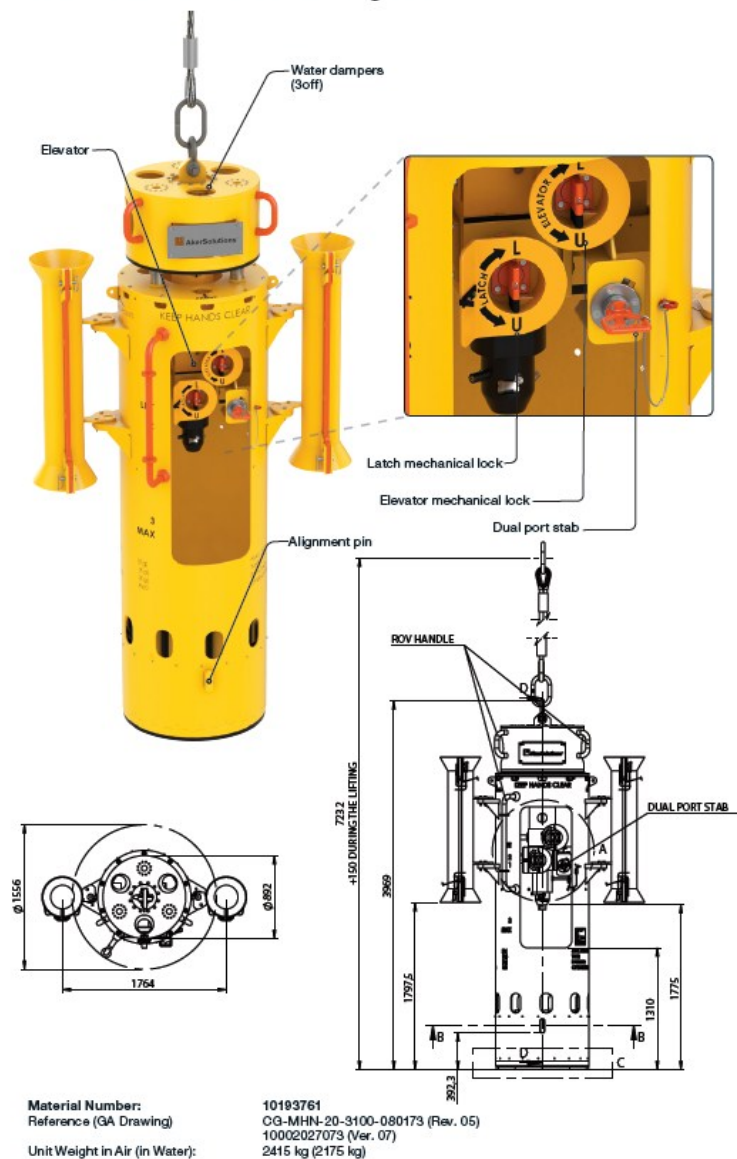


Illustration only - MOHO

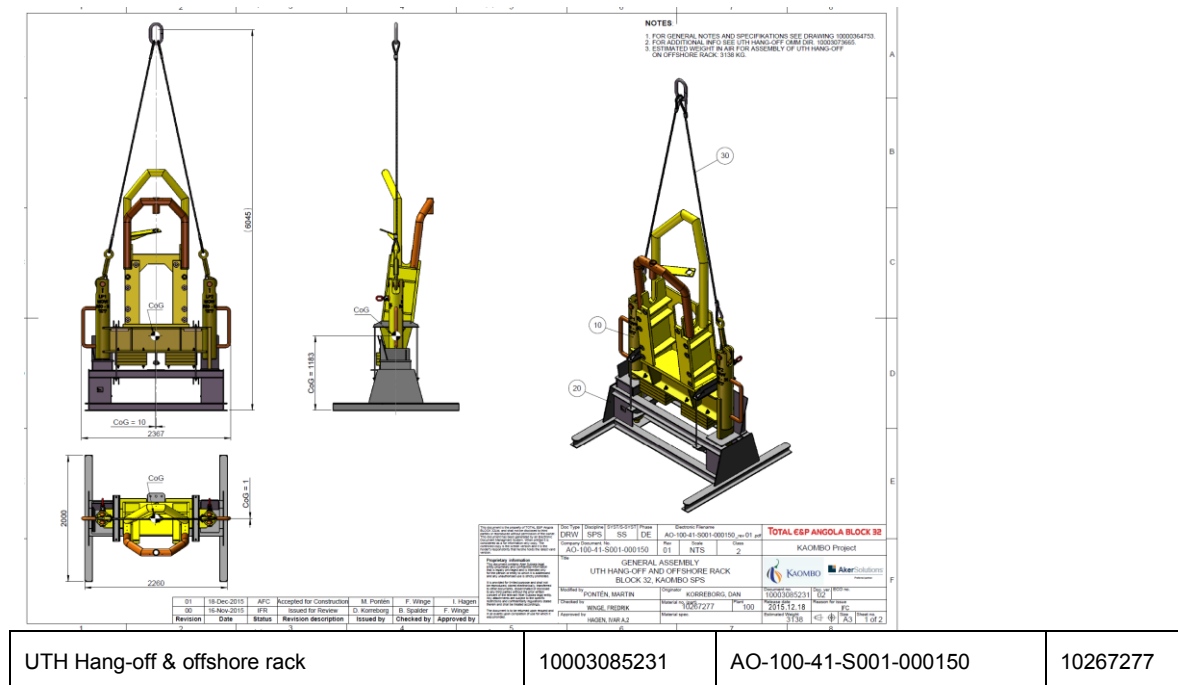
GA, SCM RT, Ø860, TYPE A	10002517676	AO-100-46-S001-000430	10259351
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SPS HANDBOOK TABLE OF CONTENT

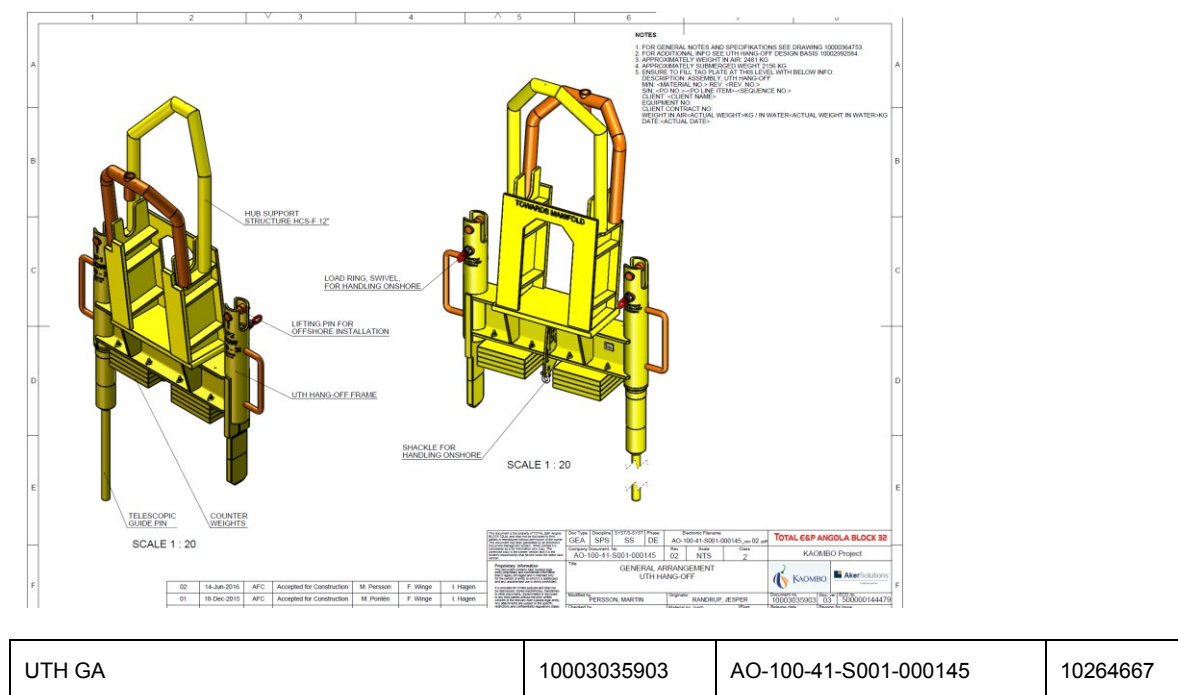
BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 293 of 315

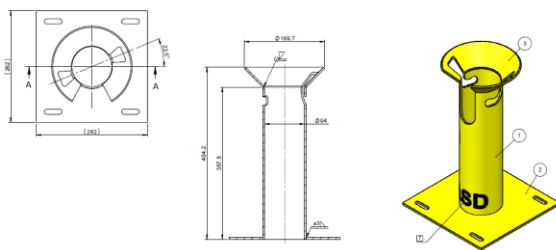
11.6 Umbilical Termination Head (UTH) Hang-off & offshore rack



11.7 UTH temporary installation frame

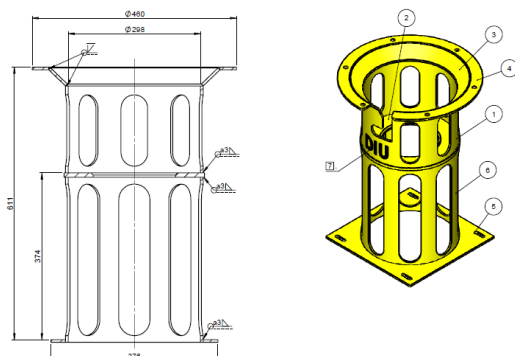


11.8 Acoustic Sand Detector (ASD) CRADLE



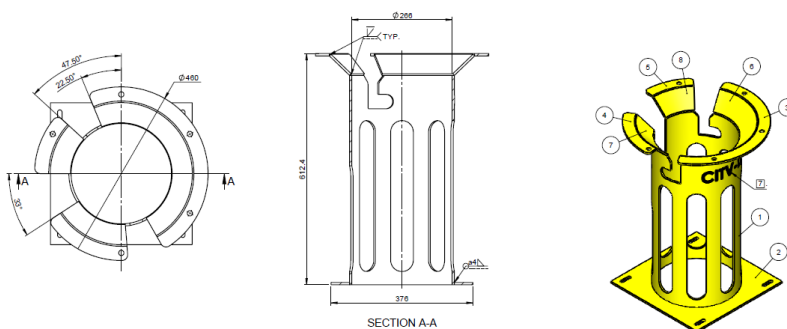
ASD Cradle	10003428793	N/A	10286442
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11.9 Downhole Interface Unit (DIU) CRADLE



DIU Cradle	10003428511	N/A	10286440
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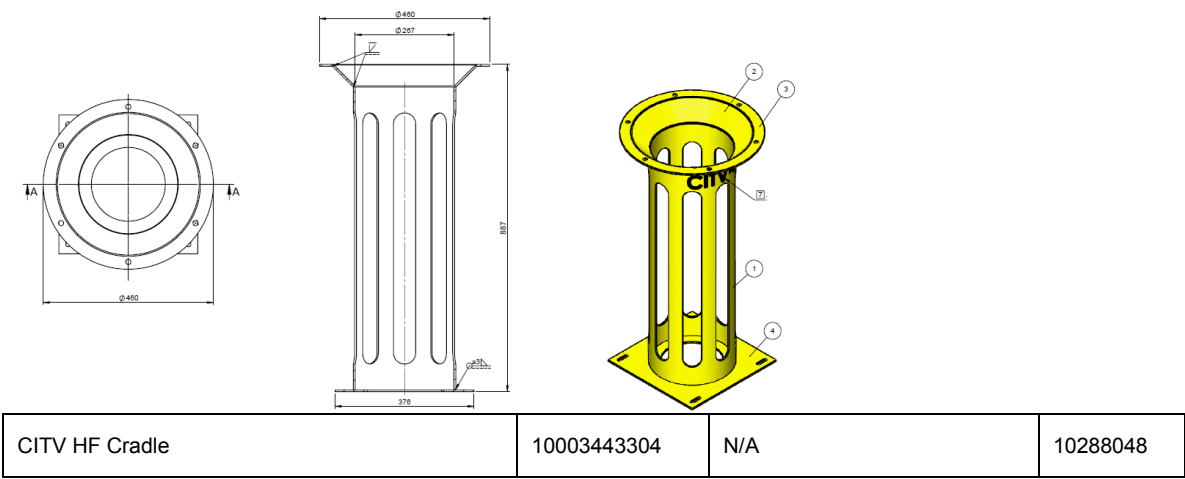
11.10 Chemical Injection Throttlet Valve (CITV) Low Flow CRADLE



CITV LF Cradle	10003428516	N/A	10286441
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SPS HANDBOOK TABLE OF CONTENT	Document:	10002504361-PDC-000
	Version:	05 - Re-issued Constr
	Issue date:	2017.11.17
	Page:	295 of 315

11.11 CITV High Flow CRADLE



SPS HANDBOOK TABLE OF CONTENT	Document:	10002504361-PDC-000
	Version:	05 - Re-issued Constr
	Issue date:	2017.11.17
BLOCK 32 - KAOMBO SPS	Page:	296 of 315

12 SUBSEA DISTRIBUTION SYSTEM

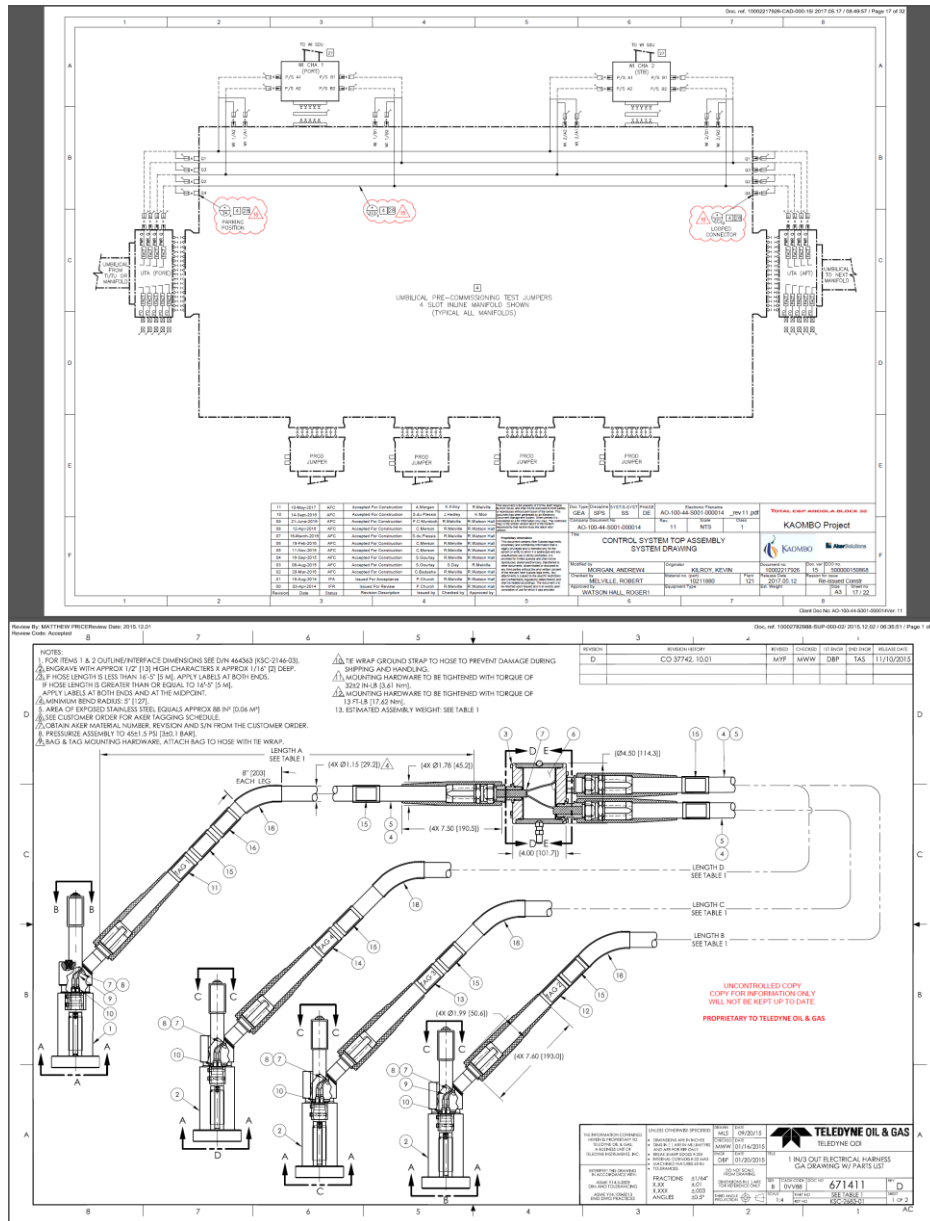
12.1 Reference list

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 298 of 315

12.3 Flying lead for Umbilical commissioning



10002782988

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 299 of 315

12.4 Electrical & Optical Flying Lead (incl. WI XT, SSIv)

Only subsea deployable flying leads

Production Control System

94

Ref Goliat handbook

Doc. ref. 10000891455-PDC-000-11/ 2014.06.05 / 06:21:02 / Page 103 of 193
Client Doc No: 229A-UAS-U-RA-2019Ver: C02

6.2 Equipment list

Material	Equipment	Qty	GA		OMM		Weight [kg] dry	Length [mm]	Width [mm]	Height [mm]
			AKSO number	ENI number	AKSO number	ENI number				
	Test equipment									
10114719	Electronic Test Unit	2	10001202298	229A-UAS-U-XD-6095	10000901861	229A-UAS-U-MA-6018	25	560	860	465
1010008	RIMG Outboard Test & Flush 14 Way 14 Populated	4	10001000047	229A-UAS-U-XD-6044	10001078632	229A-UAS-U-MB-6023	30	357	361	297
10129548	PESU Load Bank Test Equipment	1	10000901949	229A-UAS-U-XD-6034	10000901947	229A-UAS-U-MB-6015	372.5	177	463	496
10101970	Umbilical Simulator	2	100009045200	229A-UAS-U-XD-6099	NA	NA	500	1025	780	553
10106922	SCM / SRM / SAM Shipping Frame	6	10000901930	229A-UAS-U-XD-6035	NA	NA	1015	2540	1360	1360
	Jumpers						Weight [kg] dry	Length [mm]	Width [mm]	Height [mm]
10098890	EFL (OF) 12W ROV_P(FM)2x4W DIV_R	11	10001018450	229A-UAS-U-XD-6070	10000901848	229A-UAS-U-MB-6020	16.7	6.5	029.2	NA
10109327	EFL (OF) 12W ROV_P(FM)2x4W+7W DIV_R	3	10001056625	229A-UAS-U-XD-6061	10000901848	229A-UAS-U-MB-6020	21.8	6.5	029.2	NA
10106547	EFL (OF) 12W ROV_P/ROV_R L=10m	6	10000901830	229A-UAS-U-XD-6024	10000901848	229A-UAS-U-MB-6020	13.1	10	029.2	NA
10098916	EFL (OF) 12W ROV_P/ROV_R L=27m (ETH3PWR)	48	10000901842	229A-UAS-U-XD-6030	10000901848	229A-UAS-U-MB-6020	28.5	27	029.2	NA
10098878	EFL (OF) 12W ROV_P/ROV_R L=6.5m	48	10000901830	229A-UAS-U-XD-6024	10000901848	229A-UAS-U-MB-6020	9.9	6.5	029.2	NA
10111854	EFL (OF) 2 x 12W ROV_P / 3 x 12W ROV_R	8	10001050953	229A-UAS-U-XD-6081	10000901848	229A-UAS-U-MB-6020	87.4	30	029.2	NA
10098871	EFL (OF) 4W ROV_P(FM)3x3DIV_R	13	10000901854	229A-UAS-U-XD-6021	10000901848	229A-UAS-U-MB-6020	21.0	6	029.2	NA
10098870	EFL (OF) 4W ROV_P(FM)DIV_R L=3m	13	10000901853	229A-UAS-U-XD-6020	10000901848	229A-UAS-U-MB-6020	5.0	3	029.2	NA
10106922	EFL (OF) 4W ROV_P(FM)DIV_R L=3m	24	10001056627	229A-UAS-U-XD-6051	10000901848	229A-UAS-U-MB-6020	4.5	3	029.2	NA
10127207	EFL (OF) 4W ROV_P/ROV_P L= 6.0m	9	10001227895	229A-UAS-U-XD-6098	10000901848	229A-UAS-U-MB-6020	6	13.4	029.2	NA
10098818	EFL (OF) 4W ROV_P/ROV_P L=40m	56	10000901827	229A-UAS-U-XD-6010	10000901848	229A-UAS-U-MB-6020	36.9	40	029.2	NA
10116418	EFL (OF) 4W ROV_P/ROV_R L=2.5m	24	10001142043	229A-UAS-U-XD-6084	10000901848	229A-UAS-U-MB-6020	6.0	2.5	029.2	NA
10098921	EFL (OF) 4W ROV_P/ROV_R L=30m	16	10000901856	229A-UAS-U-XD-6023	10000901848	229A-UAS-U-MB-6020	31.2	30	029.2	NA
10098879	EFL (OF) 4W ROV_P/ROV_R L=6.5m	12	10000901857	229A-UAS-U-XD-6025	10000901848	229A-UAS-U-MB-6020	10.2	6.5	029.2	NA
10103285	EFL (OF) 7W ROV_P/ROV_R L=25m	18	10001050850	229A-UAS-U-XD-6080	10000901848	229A-UAS-U-MB-6020	26.7	25	029.2	NA
10098911	EFL (OF) 12W STAB_R(FL)STAB_R(FL) L=5.5m	24	10000901858	229A-UAS-U-XD-6026	10000901848	229A-UAS-U-MB-6020	9.0	5.5	029.2	NA
10098875	EFL (OF) 4W STAB_R(FL)STAB_R (FL) L=5.5m	30	10000901855	229A-UAS-U-XD-6022	10000901848	229A-UAS-U-MB-6020	7.7	5.5	029.2	NA
10114475	EFL TEST 12W ROV_R/3 X PESU CONNECTORS	12	10001177122	229A-UAS-U-XD-6091	10000901848	229A-UAS-U-MB-6020	22	22	NA	NA
10100237	OFL (OF) 3x8W ROV_R	16	10000901829	229A-UAS-U-XD-6012	10000901848	229A-UAS-U-MB-6020	41	44	017.8	NA
10098919	OFL (OF) 8W ROV_R/ROV_R L=40m	16	10000901828	229A-UAS-U-XD-6011	10000901848	229A-UAS-U-MB-6020	20.9	40	017.8	NA
10108790	OPT FACT 1xCAB/4x8W ROV_P (RA) SPLIT FLG	8	10001015572	229A-UAS-U-XD-6060	10000901848	229A-UAS-U-MB-6020	15.1	2.3	017.8	NA
10098913	OPT FACT 1xCAB/8W ROV_P (RA) SPLIT FLG	48	10000901837	229A-UAS-U-XD-6028	10000901848	229A-UAS-U-MB-6020	9.4	2.3	017.8	NA
10110317	OPT FACT 1xCAB/8W ROV_P (RA) SPLIT FLG	8	10000901837	229A-UAS-U-XD-6028	10000901848	229A-UAS-U-MB-6020	9.4	2.3	017.8	NA
	Caps						Weight [kg] dry	Length [mm]	Width [mm]	Height [mm]
10106549	CONN ROV PROTECTIVE CAP UNIVERSAL	152	10000901834	229A-UAS-U-XD-6058	10000901848	229A-UAS-U-MB-6020	0.6	305	119.4	89
10109575	ROV PROTECT CVR FOR 4W PLUGS LONG TERM	12	10001027037	229A-UAS-U-XD-6078	10000901848	229A-UAS-U-MB-6020	1.1	301	119.4	89
10109572	ROV PROTECT CVR FOR 12W PLUGS LONG TERM	48	10001027037	229A-UAS-U-XD-6078	10000901848	229A-UAS-U-MB-6020	1.1	301	119.4	89
10118321	ELEC CONN 4W ROV SHORTENING CAP - PLUG	56	10001167810	229A-UAS-U-XD-6067	10000901848	229A-UAS-U-MB-6020	2.3	305	119.4	89
10098912	ELEC FITA 1xCAB /4W ROV_R (RA) SPLIT FLG	64	10000901836	229A-UAS-U-XD-6027	10000901848	229A-UAS-U-MB-6020	3.4	320.5	0139.7	NA
10110316	ELEC FITA 1xCAB / 4W ROV_R (RA) SPLIT FL	64	10000901836	229A-UAS-U-XD-6027	10000901848	229A-UAS-U-MB-6020	3.4	320.5	0139.7	NA

SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 300 of 315

12.5 Hydraulic Flying Lead (incl. WI XT, SSIV)

Only subsea deployable flying leads

Doc. ref. 10000891455-PDC-000-11/ 2014,06,05 / 06:21:02 / Page 103 of 193
Client Doc No: 229A-UAS-U-RA-2019Ver: C02

Production Control System

6.2 Equipment list

Material	Equipment		Qty	AKSO number	GA	AKSO number	ENI number	AKSO number	OMM	ENI number	Weight [kg] dry	Length [mm]	Width [mm]	Height [mm]
Test equipment														
10114719	Electronic Test Unit	2	10001202298	229A-UAS-U-XD-6095	10000901861	229A-UAS-U-MA-6018	25	560	860	485				
10110068	RIMS Outboard Test & Flush 14 Way 14 Populated	4	10001000047	229A-UAS-U-XD-6094	10001078632	229A-UAS-U-MB-6023	30	357	361	297				
10128548	PESU Load Bank Test Equipment	1	10000901949	229A-UAS-U-XD-6094	10000901947	229A-UAS-U-MB-6015	372.5	177	483	486				
10101970	Umbilical Simulator	2	10000945200	229A-UAS-U-XD-6099	NA	NA	500	1025	780	553				
10106922	SCM / SRM / SAM Shipping Frame	6	10000901930	229A-UAS-U-XD-6035	NA	NA	1015	2540	1360	1360				
Jumpers														
10098890	EFL (OF) 12W ROV_P(FM)/2x4W DIV_R	11	10001018450	229A-UAS-U-XD-6070	10000901848	229A-UAS-U-MB-6020	18,7	6,5	029,2	NA				
10109327	EFL (OF) 12W ROV_P(FM)/2x4W+7W DIV_R	3	10001056625	229A-UAS-U-XD-6061	10000901848	229A-UAS-U-MB-6020	21,8	6,5	029,2	NA				
10106547	EFL (OF) 12W ROV_P/ROV_R L=10m	6	10000901830	229A-UAS-U-XD-6024	10000901848	229A-UAS-U-MB-6020	13,1	10	029,2	NA				
10098916	EFL (OF) 12W ROV_P/ROV_R L=27m (ETH3PWR)	48	10000901842	229A-UAS-U-XD-6030	10000901848	229A-UAS-U-MB-6020	28,5	27	029,2	NA				
10098878	EFL (OF) 12W ROV_P/ROV_R L=6.5m	48	10000901830	229A-UAS-U-XD-6024	10000901848	229A-UAS-U-MB-6020	9,9	6,5	029,2	NA				
10111854	EFL (OF) 2 x 12W ROV_P / 3 x 12W ROV_R	8	10001050953	229A-UAS-U-XD-6081	10000901848	229A-UAS-U-MB-6020	87,4	30	029,2	NA				
10098871	EFL (OF) 4W ROV_P(FM)/3x3W DIV_R	13	10000901854	229A-UAS-U-XD-6021	10000901848	229A-UAS-U-MB-6020	21,0	8	029,2	NA				
10098870	EFL (OF) 4W ROV_P(FM)/DIV_R L=3m	13	10000901853	229A-UAS-U-XD-6020	10000901848	229A-UAS-U-MB-6020	5,0	3	029,2	NA				
10108022	EFL (OF) 4W ROV_P(FM)/DIV_R L=3m	24	10001056627	229A-UAS-U-XD-6051	10000901848	229A-UAS-U-MB-6020	4,5	3	029,2	NA				
10127207	EFL (OF) 4W ROV_P/ROV_P L= 6.0m	9	10001227695	229A-UAS-U-XD-6098	10000901848	229A-UAS-U-MB-6020	6	13,4	029,2	NA				
10098818	EFL (OF) 4W ROV_P/ROV_P L=40m	56	10000901827	229A-UAS-U-XD-6010	10000901848	229A-UAS-U-MB-6020	36,9	40	029,2	NA				
10116418	EFL (OF) 4W ROV_P/ROV_R L=2.5m	24	10001142043	229A-UAS-U-XD-6084	10000901848	229A-UAS-U-MB-6020	6,0	2,5	029,2	NA				
10098921	EFL (OF) 4W ROV_P/ROV_R L=30m	16	10000901856	229A-UAS-U-XD-6023	10000901848	229A-UAS-U-MB-6020	31,2	30	029,2	NA				
10098879	EFL (OF) 4W ROV_P/ROV_R L=6.5m	12	10000901857	229A-UAS-U-XD-6025	10000901848	229A-UAS-U-MB-6020	10,2	6,5	029,2	NA				
10103285	EFL (OF) 7W ROV_P/ROV_R L=25m	18	10001050850	229A-UAS-U-XD-6080	10000901848	229A-UAS-U-MB-6020	26,7	25	029,2	NA				
10098911	EFL (OF) 12W STAB_R(F/L)/STAB_R(F/L) L=5.5m	24	10000901858	229A-UAS-U-XD-6026	10000901848	229A-UAS-U-MB-6020	9,0	5,5	029,2	NA				
10098875	EFL (OF) 4W STAB_R(F/L)/STAB_R(F/L) L=5.5m	30	10000901855	229A-UAS-U-XD-6022	10000901848	229A-UAS-U-MB-6020	7,7	5,5	029,2	NA				
10114475	EFL TEST 12W ROV_R/3 X PESU CONNECTORS	12	10001177122	229A-UAS-U-XD-6091	10000901848	229A-UAS-U-MB-6020	22	22	NA	NA				
10100237	OFL (OF) 3x8W ROV_R	16	10000901829	229A-UAS-U-XD-6012	10000901848	229A-UAS-U-MB-6020	41	44	017,8	NA				
10098819	OFL (OF) 8W ROV_P/ROV_R L=40m	16	10000901828	229A-UAS-U-XD-6011	10000901848	229A-UAS-U-MB-6020	20,9	40	017,8	NA				
10108790	OPT FACT 1xCAB/4x8W ROV_P (RA) SPLIT FLG	8	10001015572	229A-UAS-U-XD-6080	10000901848	229A-UAS-U-MB-6020	15,1	2,3	017,8	NA				
10098913	OPT FACT 1xCAB/8W ROV_P (RA) SPLIT FLG	48	10000901837	229A-UAS-U-XD-6028	10000901848	229A-UAS-U-MB-6020	9,4	2,3	017,8	NA				
10110317	OPT FACT 1xCAB/8W ROV_P (RA) SPLIT FLG	8	10000901837	229A-UAS-U-XD-6028	10000901848	229A-UAS-U-MB-6020	9,4	2,3	017,8	NA				
Caps														
10108549	CONN ROV PROTECTIVE CAP UNIVERSAL	152	10000901834	229A-UAS-U-XD-6058	10000901848	229A-UAS-U-MB-6020	0,6	305	119,4	89				
10109575	ROV PROTECT CVR FOR 4W PLUG LONG TERM	12	10001027037	229A-UAS-U-XD-6078	10000901848	229A-UAS-U-MB-6020	1,1	301	119,4	89				
10109572	ROV PROTECT CVR FOR 12W PLUGS LONG TERM	48	10001027037	229A-UAS-U-XD-6078	10000901848	229A-UAS-U-MB-6020	1,1	301	119,4	89				
10118321	ELEC CONN 4W ROV SHORTENING CAP - PLUG	56	10001167810	229A-UAS-U-XD-6067	10000901848	229A-UAS-U-MB-6020	2,3	305	119,4	89				
10098912	ELEC FITA 1xCAB /4W ROV_R (RA) SPLIT FLG	64	10000901836	229A-UAS-U-XD-6027	10000901848	229A-UAS-U-MB-6020	3,4	320,5	0139,7	NA				
10110316	ELEC FITA 1xCAB / 4W ROV_R (RA) SPLIT FL	64	10000901836	229A-UAS-U-XD-6027	10000901848	229A-UAS-U-MB-6020	3,4	320,5	0139,7	NA				

12.6 FLDF Flying Lead Deployment Frame

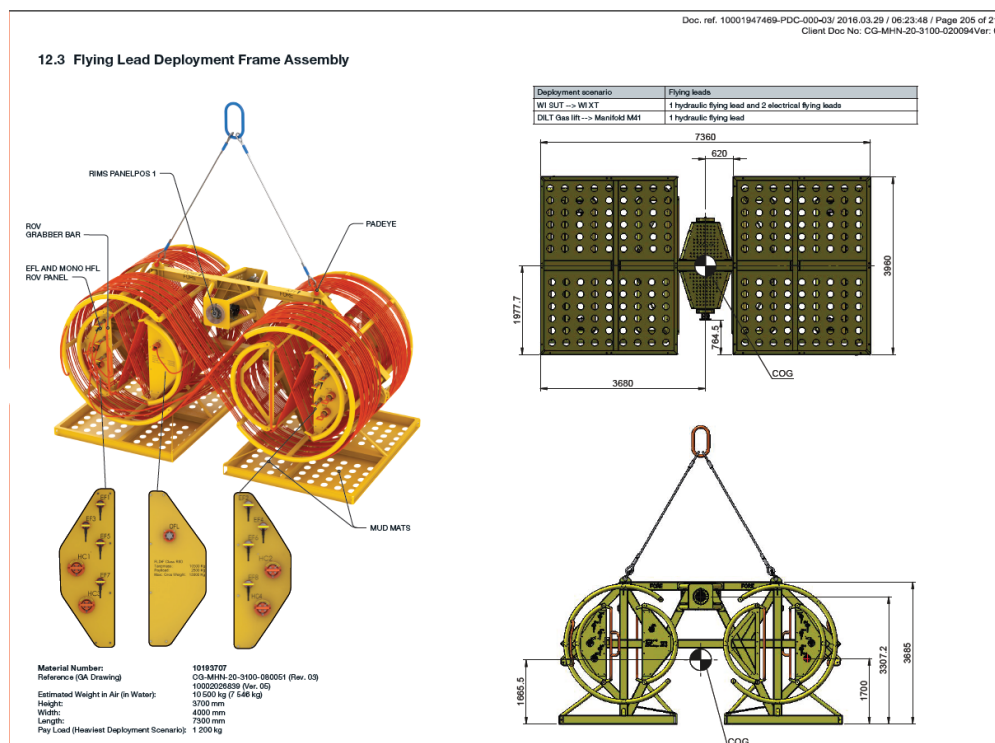
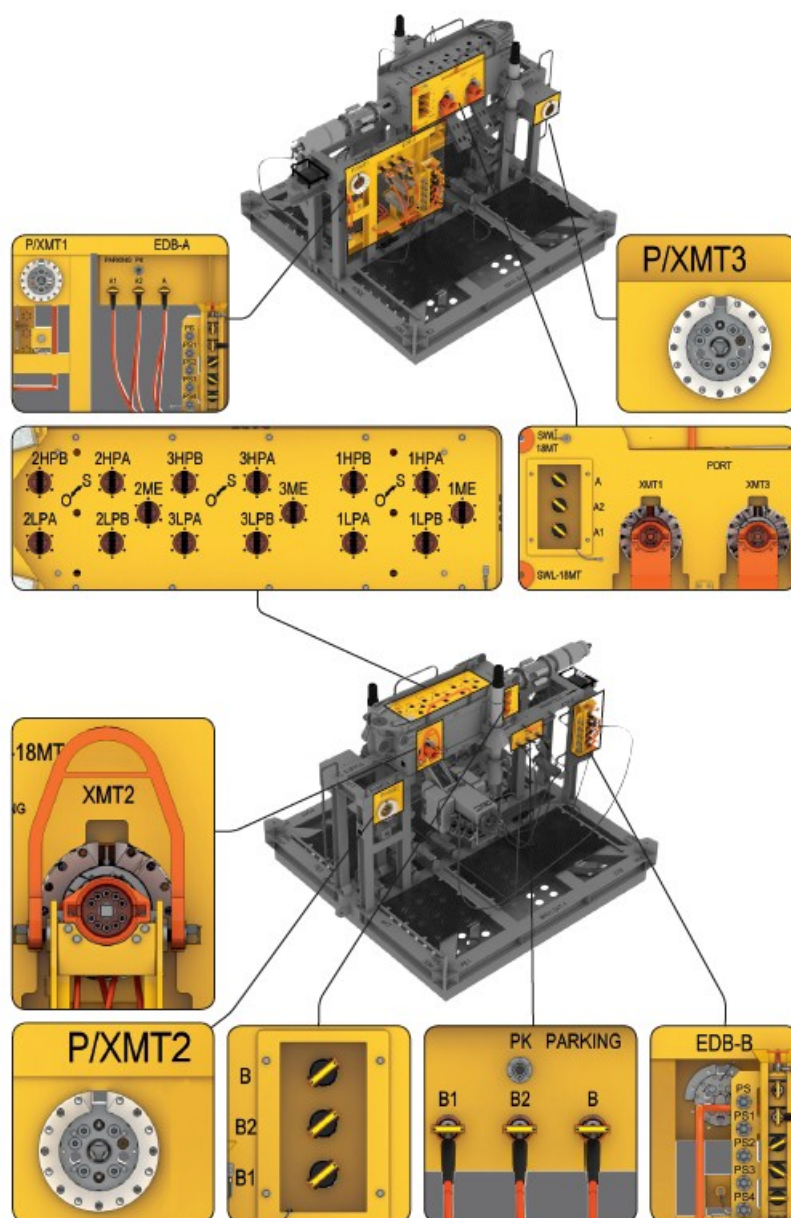


Illustration only – MOHO

DEPL. FRAME, FLYING LEADS, TYPE B	10002517598	AO-100-46-S001-000361	10241421
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12.8.3 ROV Panel marking SDU

3.4.3 WI SUT – ROV Markings



Picture is illustration from moho

SDU GA	10002506118	AO-100-40-S001-000118	10233690
SDU Markings	10002506119	AO-100-40-S001-000119	10247077 10247076

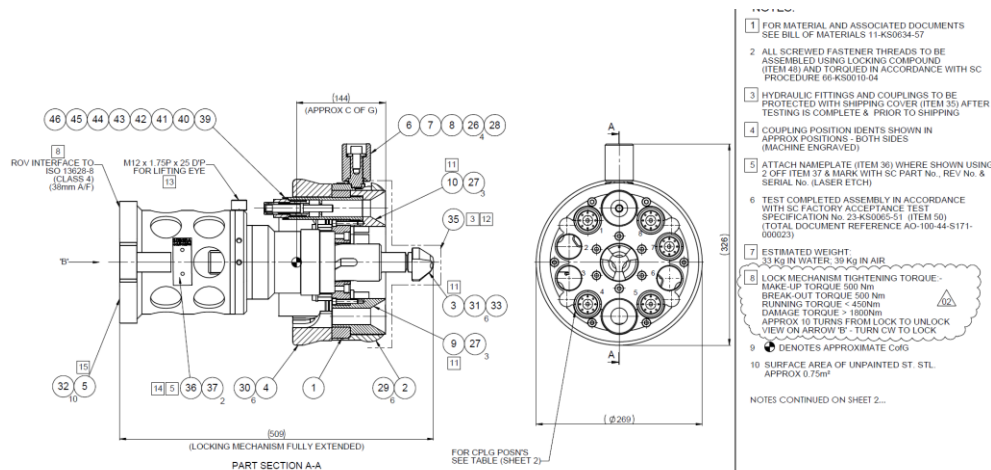
SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 306 of 315

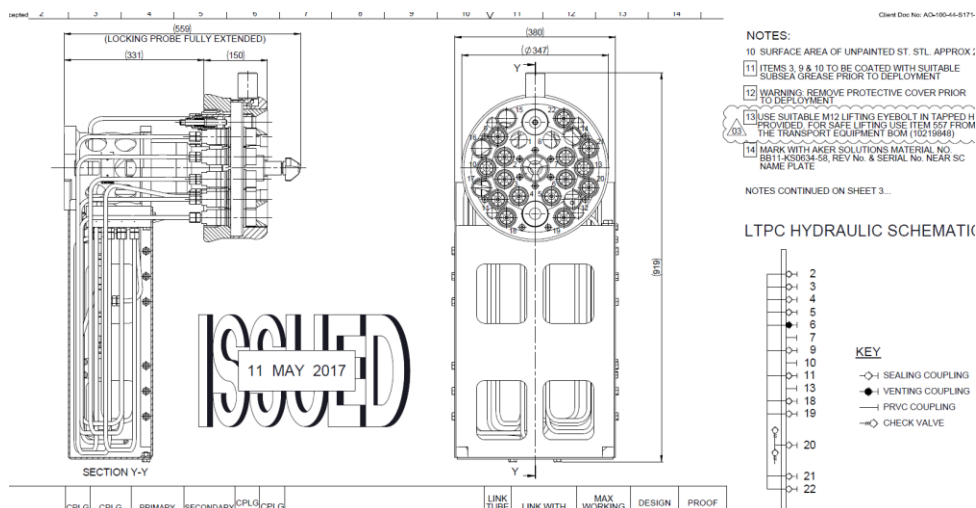
12.9 LTPC

12.9.1 8WAY (5POP) Retrievable Integrated Modular Stabplate (RIMS) Outboard (OB) Long Term Protective Cover (LTPC)



8WAY (5POP) Rims OB LTPC stabplate	10002523522	AO-100-44-S171-000008	BB11-KS0634-57
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12.9.2 22WAY (15POP) WI XMT RIMS LTPC



22WAY (15POP) WI XMT RIMS LTPC stabplate	10002523528	AO-100-44-S171-000006	BB11-KS0634-58
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SPS HANDBOOK TABLE OF CONTENT	Document:	10002504361-PDC-000
	Version:	05 - Re-issued Constr
	Issue date:	2017.11.17
BLOCK 32 - KAOMBO SPS	Page:	308 of 315

13 SUBSEA EMERGENCY RESPONSE SYSTEM (SERS)

13.1 Reference List

SPS HANDBOOK TABLE OF CONTENT	Document:	10002504361-PDC-000
	Version:	05 - Re-issued Constr
	Issue date:	2017.11.17
BLOCK 32 - KAOMBO SPS	Page:	309 of 315

13.2 Scope of Supply

WP05

10229303	SERS REH ADAPTER - EQUIPMENT PACKAGE	2
10169318	VXT TOOLS , 5-1/8" X 2-1/16" VXT HTT	2
10232489	SLING SET, 1L, Wl, 8, WLL80, SØ-	2
10161204	10229306 SERS REH ADAPER, DSA/LRP GUIDE FUNNEL	2
10257988	GASKET, RING, BX-151, API6A, ALLOY 825	2
10115799	SEAL, BX159, 426,72x25,70x25,70, NI825	2
BB17-MX0364-00	STUD TE, 3/4-10UNRC x 100mm, L7M	16
10247446	NUT HVY HEX, 3/4-10UNC, 7M	16
BB17-MX0014-00	AKER SOLUTIONS COMPANY SIGN KAOMBO	4
	DRIVE SCREW, NO.6 SMS 1549	16

WP07.2

10237661	ASSY, SERS CONNECTOR ,10M	2
10251710	TEST STUMP 13"5/8 ASSY SERS	1
10248870	REMOVAL TOOL BX164 ASSY SERS	2
10262916	SLINGSET WITH SPREADING BEAM, SERS, ASSY	2
10251331	TRANSPORTATION SKID ASSEMBLY, SERS	2

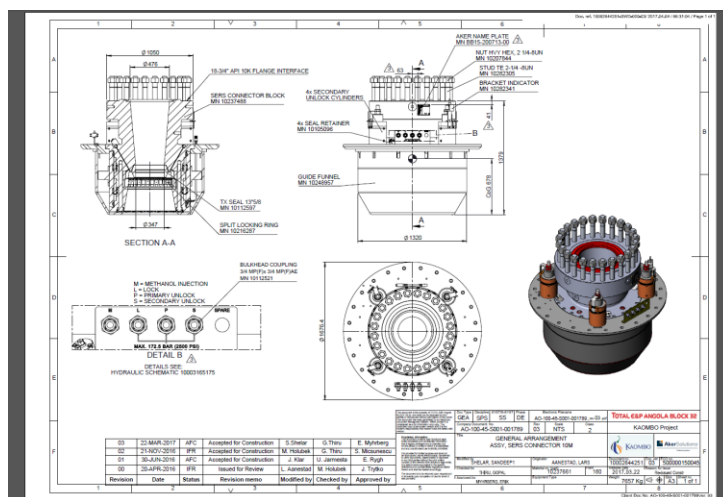
SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
 Version: 05 - Re-issued Constr
 Issue date: 2017.11.17
 Page: 310 of 315

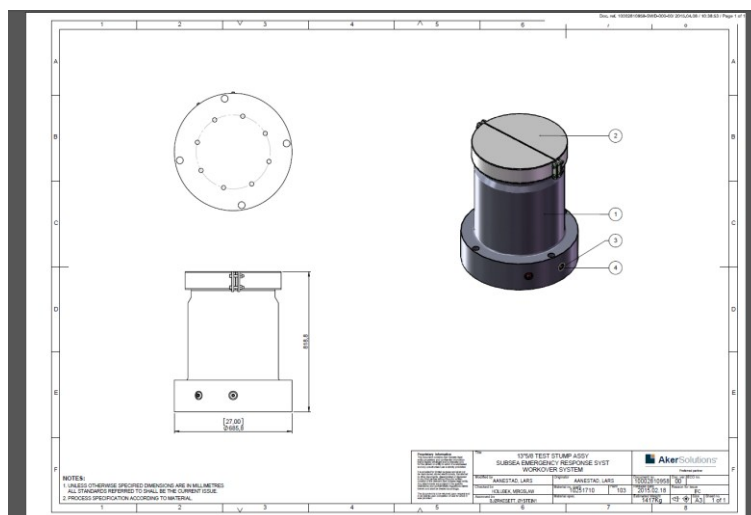
13.3 SERS

13.3.1 SERS CONNECTOR ,10M



Sers connector 10M	10002644251	AO-100-45-S001-001789	10237661
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13.3.2 SERS TEST STUMP 13"5/8 ASSY



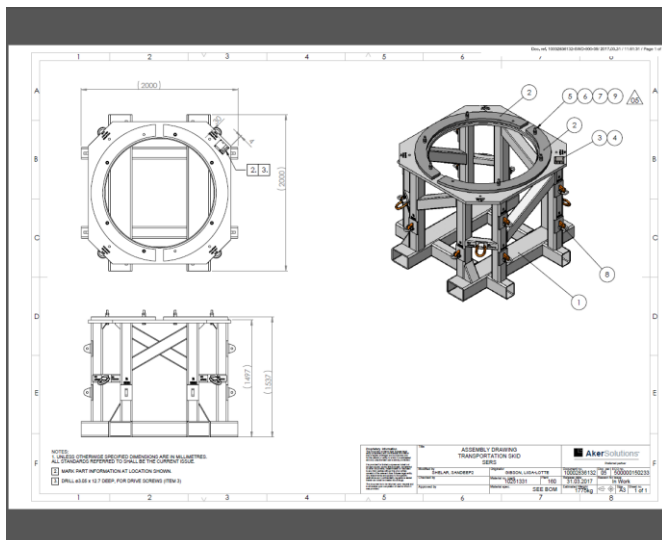
Sers connector 10M	10002810958	N/A	10251710
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SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
 Version: 05 - Re-issued Constr
 Issue date: 2017.11.17
 Page: 312 of 315

13.3.5 SERS TRANSPORTATION SKID ASSEMBLY



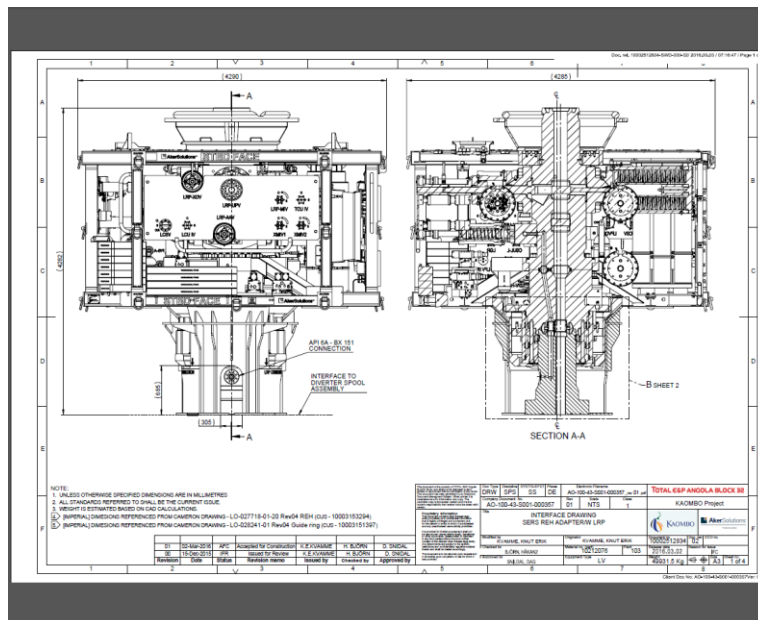
Transportation skid	10002836132	N/A	10251331
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SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

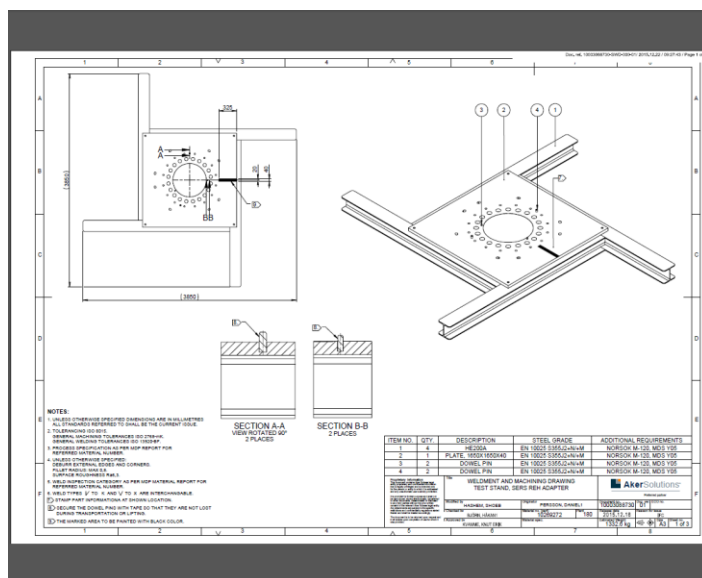
Document: 10002504361-PDC-000
Version: 05 - Re-issued Constr
Issue date: 2017.11.17
Page: 313 of 315

13.3.6 SERS Re-entry Hub (REH) ADAPTER - EQUIPMENT PACKAGE



REH adapter W/LRP	10002512834	AO-100-43-S001-000357	10229303
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13.3.7 SERS FRAME, TEST STAND, ADAPTER



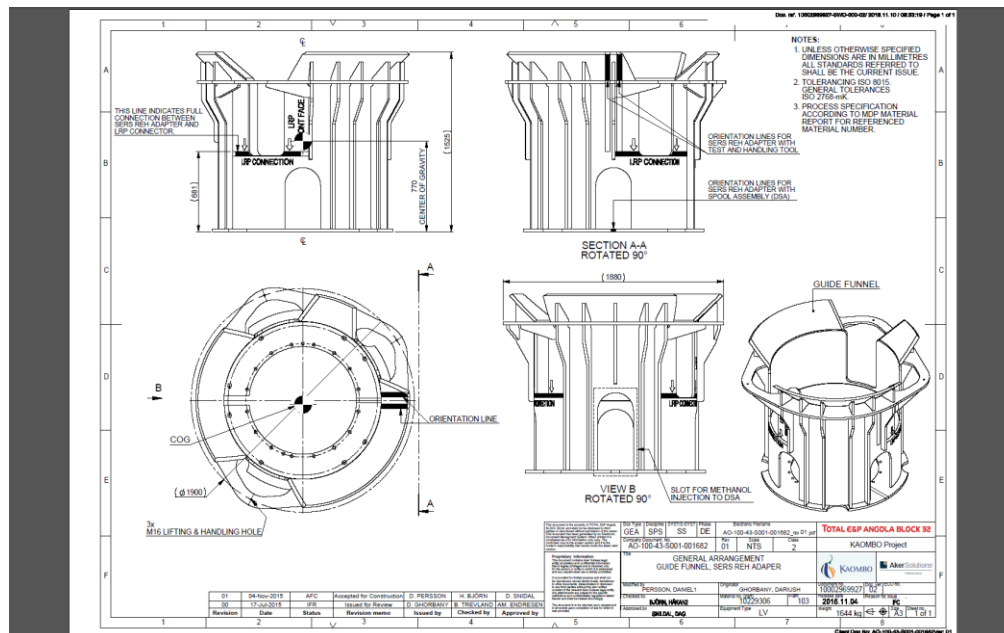
REH adapter W/LRP	10003088730	N/A	10269272
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SPS HANDBOOK TABLE OF CONTENT

BLOCK 32 - KAOMBO SPS

Document: 10002504361-PDC-000
 Version: 05 - Re-issued Constr
 Issue date: 2017.11.17
 Page: 314 of 315

13.3.8 SERS GUIDE FUNNEL REH ADAPTER



Guide funnel, SERS REH ADAPTER	10002969927	AO-100-43-S001-001682	10229306
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